

Freeland Community Schools

PROJECT MANUAL



Freeland Community Schools

BP 2 - 2025 Elementary Cafeteria

February 10, 2025

ARCHITECTS/ENGINEERS

The Collaborative
One Sea Gate, Park Level 118
Toledo, Ohio 43604
Telephone: 419-242-7405
Fax: 419-242-7400

THE
COLLAB Architecture
Planning &
Design
ORATIVE

CONSTRUCTION MANAGER

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

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

Freeland Community Schools will receive sealed bid proposals for construction trade work from qualified contractors for the **Freeland Community Schools, BP 2 - 2025 Elementary Cafeteria**. A pre-bid meeting and project walk-through will be conducted by the Construction Manager, Wolgast Corporation, and the Architect, **The Collaborative**, on **Wednesday, February 12, 2025**, at **3:30 PM** (local time) at **Elementary School Main Entrance**.

Proposals may be mailed or delivered in person to **Marcus Hillborg, Superintendent**, c/o **Freeland Community Schools, 710 Powley Drive, Freeland, MI 48623**. Proposals must be received prior to **3:30 PM** (local time) on **Thursday, February 27, 2025**, at the **Freeland Community Schools Administration Building** or upload to Building Connected <https://app.buildingconnected.com/login?retUrl=%2F>. Proposals will be publicly opened and read aloud at **3:31 PM** in the **Administration Office**. All bids will be evaluated after the bid opening. All bids received after **3:30 PM** of the bid date will be returned to the Bidder unopened. If you would like to listen in while bid are being opened, please use this <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 through Wolgast Corporation. 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: **Freeland Community Schools.**
- B. The Architect is: **The Collaborative.**
- 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: **Freeland Community Schools, BP 2 - 2025 Elementary Cafeteria**
- 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 are 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. **Elementary School Main Entrance**
710 Powley Drive
Freeland, MI 48623
Wednesday, February 12, 2025 at 3:30 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

- 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:

Freeland Community Schools
Marcus Hillborg, Superintendent
710 Powley Drive
Freeland, MI 48623

Or upload to Building Connected <https://app.buildingconnected.com/login?retUrl=%2F>

If you would like to listen in while the bids are being opened, please use this link

<https://8x8.vc/wolgast/lisa.donahue>

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

- B. Proposals shall be submitted by **3:30 PM on Thursday, February 27, 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 1 complete copy of your proposal, 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:	Freeland Community Schools Attn: Marcus Hillborg 710 Powley Drive Freeland, MI 48623
	<u>SEALED BID FOR:</u>
	Freeland Community Schools BP 2 - 2025 Elementary Cafeteria
	Bid Division No: _____

END OF SECTION 00300

Project: Freeland Community Schools
BP 2 - 2025 Elementary Cafeteria

Submitted By: _____
(Bidder's Company Name)

Address: _____

City / State / Zip: _____

Phone: _____

Contact Name: _____

Email: _____

Bid Proposal Deadline: Prior to Thursday, February 27, 2025 at 3:30 PM (local time) to:

Freeland Community Schools
Marcus Hillborg, Superintendent,
710 Powley Drive
Freeland, MI 48623.

Or upload to Building Connected <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 Freeland Community Schools BP 2 Elem Cafeteria (not including Labor Bond, Material Bond, and/or Performance Bond Costs):

_____ Dollars and 00/100ths

\$ _____

BOND COST for Freeland Community Schools BP 2 Elem Cafeteria (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

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 042000 – Unit Masonry
Section 070150.19 Preparation for Re-Roofing
Section 076200 – Sheet Metal Flashing and Trim
Section 077200 – Roof Accessories
Section 081113 – Hollow Metal Doors and Frames
Section 083326 – Overhead Coiling Grilles
Section 090561 – Common Work Results for Flooring Preparation
Section 095113 – Acoustical Panel Ceilings

Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):

Section 024119 – Selective Demolition
Section 079200 – Joint Sealants (As it relates to work in this Bid Division)

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:

All required nailers, fasteners, blocking, etc for a complete operational system.

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 compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor 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.

Bid Division: 060000 – General Trades

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. Contractors shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or 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 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. All temporary shoring as required for work in this Bid Division.
2. Provide for proper legal off-site disposal of all construction debris generated by the described work.
3. 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.
4. The contractor shall broom sweep building daily your work area.
5. Provide all temporary enclosures as required, review demo drawings throughout the duration of construction.

Project Inclusions:

1. Per Section 012100 – Allowances this Contractor shall include a \$10,000 allowance to be used at the direction of the Construction Manager for additional patching requirements.
2. Remove existing food service equipment from space to be relocated within the building. Dispose of what is not being salvaged. Equipment will be disconnected by M.E.P Contractors. Once the project is complete you be required to relocate equipment back for M.E.P. Contractors to hook back up.
3. Salvage door hardware and marker / chalk / bulletin boards noted per the drawing and turn-over to the district.
4. Remove and reinstall tectum panels noted per the drawing.
5. Removal to include but not limited to; drywall ceiling systems, acoustical ceiling systems, direct mounted ceiling tiles with suspension system, casework and shelving, doors, overhead door systems, coiling door, aluminum door systems, lockers, flooring, CMU walls, stud walls with drywall. Decorative wall finish such as paneling, tile, or wall covering.
6. Provide and install new masonry work. Tooth in as required. Include lintels for masonry openings
7. Saw cut concrete slab for new underground utilities.
8. Fill floor trenches, removed walls, and curbs with concrete.
9. Review M.E.P drawings for concrete slab removal and replacement.
10. Remove raised concrete slab and infill it with concrete.
11. Provide and install new concrete equipment pad.
12. Provide and install new doors, frames, and hardware.
13. Provide and install coil door complete. Include break metal, galvanized frame, grout, and anchor per details.
14. Provide and install ceiling grid and tile.
15. This Contractor to install owner furnished wall monitors.
16. Furnish and install all bathroom accessories. Owner to provide paper towel and soap dispensers for installation by this contractor.

Bid Division: 060000 – General Trades

17. Furnish and install all blocking and sheathing as required, including fire-rated and treated as documented.
18. Install M.E.P. access panels as needed.
19. Label any smoke and fire barriers partitions per code.
20. Include all roofing, flashing, and deck repair for this project. It is Durolast PVC mechanically attached roof installed by Beyer Roofing. It is out of warranty.

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.
2. Any abatement work.
3. Keynote FD1 and FD2 on Drawing D1.00. Floor drain plug and leveling compound will be by plumbing and flooring contractor.

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-mentioned 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

Contents

060000-01-001 060000-01 General Trades	3
060000-02-001 060000-02 General Trades Startup	5
060000-03-001 060000-03 General Trades Closeout	7

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
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Package: **060000-01-001** - 060000-01 General Trades

Draft	042000 Unit Masonry	1	0	Product Data	Unit Masonry - Product Data				Lisa Donahue (WOLGAST CORPORATIO N)
Draft	042000 Unit Masonry	2	0	Mix Design	Unit Masonry - Mix Design				Lisa Donahue (WOLGAST CORPORATIO N)
Draft	070150.19 Preparatio n for Re- Roofing	3	0	Product Data	Prep for Roof - Product Data				Lisa Donahue (WOLGAST CORPORATIO N)
Draft	077200 Roof Accessorie s	5	0	Product Data	Roof Accessories - Product Data				Lisa Donahue (WOLGAST CORPORATIO N)
Draft	079200-2 Joint Sealant2	10	0	Product Data	Joint Sealant - Product Data				Lisa Donahue (WOLGAST CORPORATIO N)
Draft	079200-2 Joint Sealant2	11	0	Samples	Joint Sealant - Colors				Lisa Donahue (WOLGAST

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	079200-2 Joint Sealant2	12	0	Product Data	Joint Sealant - Schedule		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	081113 Hollow Metal Doors and Frames	22	0	Product Data	HM Doors Frames - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	081113 Hollow Metal Doors and Frames	23	0	Product Data	HM Doors Frames - Door Schedule		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	081113 Hollow Metal Doors and Frames	24	0	Shop Drawings	HM Doors Frames - Shop Drawings		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	083326 Overhead Coiling Grilles	26	0	Product Data	OH Coiling Grilles - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	083326	27	0	Shop Drawings	OH Coiling Grilles - Shop Drawings		Lisa Donahue (WOLGAST		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Overhead Coiling Grilles						CORPORATION)		
Draft	095113 Acoustical Panel Ceiling	31	0	Product Data	Acoustical Panel Ceilings - Product Data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	095113 Acoustical Panel Ceiling	32	0	Samples	Acoustical Panel Ceilings - Samples		Lisa Donahue (WOLGAST CORPORATION)		

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

Draft	060000-02 Start Up	96	0	Startup	Post Bid Interview/ Proposal Forms		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-02 Start Up	97	0	Startup	Schedule of Values		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-02 Start Up	98	0	Startup	Contracts Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	060000-02 Start Up	99	0	Startup	Payment/ Performance Bonds		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-02 Start Up	100	0	Startup	Insurance		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-02 Start Up	101	0	Startup	On Site Employee List		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-02 Start Up	102	0	Startup	Safety Policy		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-02 Start Up	103	0	Startup	Safety Data Sheets (SDS)		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-02 Start Up	104	0	Startup	Sub/Supplier Form		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	060000-02 Start Up	105	0	Startup	Hazardous/AHERA Notifications		Lisa Donahue (WOLGAST CORPORATION)		

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

Draft	060000-03 Close Out	106	0	Closeout	Contractor (2) Yr Guarantee		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-03 Close Out	107	0	Closeout	Consent of Surety		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-03 Close Out	108	0	Closeout	Substantial Completion		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-03 Close Out	109	0	Closeout	Completed Punch List		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000-03 Close Out	110	0	Closeout	As Built Drawings		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	060000-03 Close Out	111	0	Closeout	All CO Signed/ Returned		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000-03 Close Out	112	0	Closeout	Insurance Up-To- Date		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000-03 Close Out	113	0	Closeout	Signed Hazardous Materials		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000-03 Close Out	114	0	Closeout	Asbestos Materials Affidavits		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	076200 Sheet Metal Flashing and Trim	4	0	Closeout	Sheet Metal Flashing Trim - Warranty		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	077200	6	0	Closeout	Roof Accessories - Warranty		Lisa Donahue (WOLGAST		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Roof Accessorie s						CORPORATIO N)		
Draft	081113 Hollow Metal Doors and Frames	25	0	Closeout	HM Doors Frames - Install Instruction		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	083326 Overhead Coiling Grilles	28	0	Closeout	OH Coiling Grilles - install instruction		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	083326 Overhead Coiling Grilles	29	0	Closeout	OH Coiling Grilles - Maintenance Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	095113 Acoustical Panel Ceiling	33	0	Closeout	Acoustical Panel Ceilings - Install Inst		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	095113 Acoustical Panel Ceiling	34	0	Closeout	Acoustical Panel Ceilings - Extra Materials		Lisa Donahue (WOLGAST CORPORATIO N)		

Bid Division: 096700 – Fluid-Applied Flooring

Bid to Include:

Total Responsibility for Specification Sections:

Section 090561 – Common Work Results for Flooring Preparation
Section 096513 – Resilient Base and Accessories
Section 096700 – Fluid-Applied Flooring

Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):

Section 079200 – Joint Sealants (As it relates to work in this Bid Division)

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:

All adhesives, base, sealants, etc.

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 compounds 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.

Wolgast Corporation – Construction Management

Bid Division: 096500 – Flooring

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. Contractors shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or 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 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. Preparation of existing areas to receive new flooring, installation as shown and specified. (Prep is this Bid Division's responsibility.)
2. Expansion and control joints as required by design and/or product manufacturers.
3. Follow finish schedule.
4. Clean and prepare floor including leveling and filling of voids prior to starting work.
5. Provide and install all required base.
6. Transition, thresholds and divider stripes.
7. Furnish and install all the caulking required for the work of this Bid Division.
8. To repair any adjacent material damaged in the execution of the above-listed work.
9. The contractor shall broom sweep building daily your work area.

Project Inclusions:

1. Per Section 012100 – Allowances this Contractor shall include a \$10,000 allowance to be used at the direction of the Construction Manager for additional epoxy flooring.
2. Clean and prepare floors to receive new flooring, including leveling and filling of voids prior to starting work, and in accordance with specifications and manufacturer's requirements. This contractor is responsible for furnishing and installing leveling materials to create a smooth finish flooring transition at dissimilar flooring materials or new to existing slabs.
3. Please see Keynote FD1 and FD2 on Drawing D1.00. Floor drain plug and fill with concrete will be by others and leveling compound will be by floor contractor.
4. Furnish and install all fluid applied flooring rubber wall base.

Excludes:

1. Floor Demo

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-mentioned 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 096500

Contents

096700-01-001 096700-01 Fluid Applied Flooring	3
096700-02-001 096700-02 Fluid Applied Flooring Startup	4
096700-03-001 096700-03 Fluid Applied Flooring Closeout	6

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
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Package: 096700-01-001 - 096700-01 Fluid Applied Flooring

Draft	079200-1 Joint Sealant1	8	0	Samples	Joint Sealant - Colors				Lisa Donahue (WOLGAST CORPORATION)
Draft	079200-1 Joint Sealant1	9	0	Product Data	Joint Sealant - Schedule				Lisa Donahue (WOLGAST CORPORATION)
Draft	079200-3 Joint Sealant3	13	0	Product Data	Joint Sealant - Product Data				Lisa Donahue (WOLGAST CORPORATION)
Draft	090561 Flooring Preparation	30	0	Product Data	Floor Prep - Product data				Lisa Donahue (WOLGAST CORPORATION)
Draft	096513 Resilient Wall Base and Accessories	35	0	Product Data	Resilient Wall Base/ Acc - Product Data				Lisa Donahue (WOLGAST CORPORATION)
Draft	096513	36	0	Samples	Resilient Wall Base/ Acc - Color Samples				Lisa Donahue

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Resilient Wall Base and Accessories						(WOLGAST CORPORATION)		
Draft	096700 Fluid Applied Flooring	37	0	Product Data	Fluid Applied Flooring - Product Data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	096700 Fluid Applied Flooring	38	0	Samples	Fluid Applied Flooring - Samples		Lisa Donahue (WOLGAST CORPORATION)		

Package: 096700-02-001 - 096700-02 Fluid Applied Flooring Startup

Draft	096700-02 Start Up	115	0	Startup	Post Bid Interview/ Proposal Forms		Lisa Donahue (WOLGAST CORPORATION)		
Draft	096700-02 Start Up	116	0	Startup	Schedule of Values		Lisa Donahue (WOLGAST CORPORATION)		
Draft	096700-02 Start Up	117	0	Startup	Contracts Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	096700-0 2 Start Up	118	0	Startup	Payment/ Performance Bonds		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	096700-0 2 Start Up	119	0	Startup	Insurance		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	096700-0 2 Start Up	120	0	Startup	On Site Employee List		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	096700-0 2 Start Up	121	0	Startup	Safety Policy		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	096700-0 2 Start Up	122	0	Startup	Safety Data Sheets (SDS)		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	096700-0 2 Start Up	123	0	Startup	Sub/Supplier Form		Lisa Donahue (WOLGAST		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	096700-0 2 Start Up	124	0	Startup	Hazardous/AHERA Notifications		Lisa Donahue (WOLGAST CORPORATIO N)		

Package: 096700-03-001 - 096700-03 Fluid Applied Flooring Closeout

Draft	096700 Fluid Applied Flooring	39	0	Closeout	Fluid Applied Flooring - Install Inst		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	096700 Fluid Applied Flooring	40	0	Closeout	Fluid Applied Flooring - Maintenance		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	096700 Fluid Applied Flooring	41	0	Closeout	Fluid Applied Flooring - Warranty		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	096700-0 3 Close Out	125	0	Closeout	Contractor (2) Yr Guarantee		Lisa Donahue (WOLGAST CORPORATIO N)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	096700-03 Close Out	126	0	Closeout	Consent of Surety		Lisa Donahue (WOLGAST CORPORATION)		
Draft	096700-03 Close Out	127	0	Closeout	Substantial Completion		Lisa Donahue (WOLGAST CORPORATION)		
Draft	096700-03 Close Out	128	0	Closeout	Completed Punch List		Lisa Donahue (WOLGAST CORPORATION)		
Draft	096700-03 Close Out	129	0	Closeout	As Built Drawings		Lisa Donahue (WOLGAST CORPORATION)		
Draft	096700-03 Close Out	130	0	Closeout	All CO Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		
Draft	096700-03 Close Out	131	0	Closeout	Insurance Up-To-Date		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	096700-03 Close Out	132	0	Closeout	Signed Hazardous Materials		Lisa Donahue (WOLGAST CORPORATION)		
Draft	096700-03 Close Out	133	0	Closeout	Asbestos Materials Affidavits		Lisa Donahue (WOLGAST CORPORATION)		

Bid Division: 099000 – Painting

Bid to Include:

Total Responsibility for Specification Sections:

Section 099123 – Interior Painting

Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):

Section 079200 – Joint Sealants (Interior Control Joints and all dissimilar products)

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:

All painting of doors, frames, CMU walls, drywall, access panels, caulking and sealing of interior control joints, expansion joints and imperfections on finish surfaces.

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. 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 compounds 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.

Bid Division: 099000 – Painting

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 last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
19. **Wolgast uses 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. Follow room finish and door schedules.
2. Painting of all electrical and mechanical lines and equipment (as specified).
3. Paint all bulkheads.
4. Paint exposed structural components as specified.
5. Remove all foreign items and substances on existing surfaces (including, but not limited to, nails, hangers, tape, screws, etc.) and patch prior to painting.
6. All surfaces to be painted, including but not limited to drywall and masonry, are to be inspected and accepted by this contractor prior to application of paint. Surface imperfections not repaired prior to painting or submitted to the construction manager in writing as existing defects prior to painting, will be repaired by the painting contractor at no additional cost.
7. Painting Contractor is responsible for removing or protecting all cover plates, trimming and other pre-finished surfaces necessary for the completion of this work scope. This Contractor is responsible for replacing anything removed upon completion of work.
8. Furnish and install all the caulking required for the work of this Bid Division.
9. To repair any adjacent material damaged in the execution of the above-listed work.
10. The contractor shall broom sweep building daily your work area.

Project Inclusions:

1. All surfaces to be painted, including but not limited to drywall, steel, masonry, doors, frames, and trim are to be inspected and accepted by this contractor prior to application of paint. Surface imperfections not repaired prior to painting or submitted to the Construction Manager in writing as existing defects prior to painting, will be repaired by the painting contractor at no additional cost.
2. Paint all gas lines as documented.
3. Provide all caulking of interior control joints in masonry, drywall, and drywall to dissimilar materials and inside masonry corners.

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-mentioned 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 099000

Wolgast Corporation – Construction Management

Contents

099000-01-001 099000-01 Painting	3
099000-02-001 099000-02 Painting Start Up	3
099000-03-001 099000-03 Painting Close Out	5

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
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Package: 099000-01-001 - 099000-01 Painting

Draft	079200-3 Joint Sealant3	14	0	Samples	Joint Sealant - Colors				Lisa Donahue (WOLGAST CORPORATION)
Draft	079200-4 Joint Sealant4	18	0	Product Data	Joint Sealant - Schedule				Lisa Donahue (WOLGAST CORPORATION)
Draft	079200-5 Joint Sealant5	19	0	Product Data	Joint Sealant - Product Data				Lisa Donahue (WOLGAST CORPORATION)
Draft	099123 Interior Painting	42	0	Product Data	Interior Painting - Product Data				Lisa Donahue (WOLGAST CORPORATION)
Draft	099123 Interior Painting	43	0	Samples	Interior Painting - Samples				Lisa Donahue (WOLGAST CORPORATION)

Package: 099000-02-001 - 099000-02 Painting Start Up

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	099000-02 Start Up	134	0	Startup	Post Bid Interview/ Proposal Forms		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099000-02 Start Up	135	0	Startup	Schedule of Values		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099000-02 Start Up	136	0	Startup	Contracts Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099000-02 Start Up	137	0	Startup	Payment/ Performance Bonds		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099000-02 Start Up	138	0	Startup	Insurance		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099000-02 Start Up	139	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	099000-02 Start Up	140	0	Startup	Safety Policy		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099000-02 Start Up	141	0	Startup	Safety Data Sheets (SDS)		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099000-02 Start Up	142	0	Startup	Sub/Supplier Form		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099000-02 Start Up	143	0	Startup	Hazardous/AHERA Notifications		Lisa Donahue (WOLGAST CORPORATION)		

Package: 099000-03-001 - 099000-03 Painting Close Out

Draft	099000-03 Close Out	145	0	Closeout	Contractor (2) Yr Guarantee		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099000-03 Close Out	146	0	Closeout	Consent of Surety		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	099000-0 3 Close Out	147	0	Closeout	Substantial Completion		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	099000-0 3 Close Out	148	0	Closeout	Completed Punch List		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	099000-0 3 Close Out	149	0	Closeout	As Built Drawings		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	099000-0 3 Close Out	150	0	Closeout	All CO Signed/ Returned		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	099000-0 3 Close Out	151	0	Closeout	Insurance Up-To- Date		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	099000-0 3 Close Out	152	0	Closeout	Signed Hazardous Materials		Lisa Donahue (WOLGAST		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	099000-03 Close Out	153	0	Closeout	Asbestos Materials Affidavits		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099123 Interior Painting	44	0	Closeout	Interior Painting - Maintenance		Lisa Donahue (WOLGAST CORPORATION)		
Draft	099123 Interior Painting	45	0	Closeout	Interior Painting - Extra Material		Lisa Donahue (WOLGAST CORPORATION)		

Bid Division: 114000 – Food Service Equipment

Bid to Include:

Total Responsibility for Specification Sections:

Section 114011 – Food Service Equipment

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. 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 compounds 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.
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 last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.

Wolgast Corporation – Construction Management

Bid Division: 114000 – Food Service Equipment

19. **Wolgast uses 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. Only final connections are provided by other trade contractors.
2. Clean, prep, and adjust all equipment immediately prior to Owner occupancy.
3. Protection of floor during installation.
4. Verify all power requirements and coordinate with other Bid Divisions.
5. Provide and completely install all kitchen equipment and components to allow for final plumbing, mechanical, and electrical connection by others.
6. Field verify measurements before fabrication of equipment.
7. Supply and install fillers as required.
8. Provide Owner with training of all equipment.
9. The contractor shall broom sweep building daily your work area.

Project Inclusions:

1. Provide and install all Kitchen equipment. This includes exhaust hoods.
2. Supply emergency gas shut off valve.
3. Supply and install flexible gas piping connections for the required equipment.
4. Existing hood to be removed by Food Service Contractor per drawing M1.01, note 10.

Excludes:

1. Mechanical, Electrical, and Plumbing final connections.
2. Exhaust hood ductwork

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-mentioned 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 114000

Wolgast Corporation – Construction Management

Contents

114000-01-001 114000-01 Food Service Equip	3
114000-02-001 114000-02 Food Service Equip Start Up	3
114000-03-001 114000-03 Food Service Eqp Close Out	5

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
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Package: 114000-01-001 - 114000-01 Food Service Equip

Draft	114000 Food Service Equipment	46	0	Shop Drawings	Food Serv Eq - Shop Drawings	Lisa Donahue (WOLGAST CORPORATION)			
Draft	114000 Food Service Equipment	47	0	Product Data	Food Serv Eq - Product Data	Lisa Donahue (WOLGAST CORPORATION)			
Draft	114000 Food Service Equipment	48	0	Product Data	Food Serv Eq - Equipment Schedule	Lisa Donahue (WOLGAST CORPORATION)			

Package: 114000-02-001 - 114000-02 Food Service Equip Start Up

Draft	114000-02 Start Up	154	0	Startup	Post Bid Interview/ Proposal Forms	Lisa Donahue (WOLGAST CORPORATION)			
Draft	114000-02 Start Up	155	0	Startup	Schedule of Values	Lisa Donahue (WOLGAST CORPORATION)			

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	114000-02 Start Up	156	0	Startup	Contracts Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		
Draft	114000-02 Start Up	157	0	Startup	Payment/ Performance Bonds		Lisa Donahue (WOLGAST CORPORATION)		
Draft	114000-02 Start Up	158	0	Startup	Insurance		Lisa Donahue (WOLGAST CORPORATION)		
Draft	114000-02 Start Up	159	0	Startup	On Site Employee List		Lisa Donahue (WOLGAST CORPORATION)		
Draft	114000-02 Start Up	160	0	Startup	Safety Policy		Lisa Donahue (WOLGAST CORPORATION)		
Draft	114000-02 Start Up	161	0	Startup	Safety Data Sheets (SDS)		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	114000-02 Start Up	162	0	Startup	Sub/Supplier Form		Lisa Donahue (WOLGAST CORPORATION)		
Draft	114000-02 Start Up	163	0	Startup	Hazardous/AHERA Notifications		Lisa Donahue (WOLGAST CORPORATION)		
Draft	114000-02 Start Up	164	0	Startup	Copy of all Permits		Lisa Donahue (WOLGAST CORPORATION)		

Package: 114000-03-001 - 114000-03 Food Service Eqp Close Out

Draft	114000 Food Service Equipment	49	0	Closeout	Food Serv Eq - Maintenance Manuals		Lisa Donahue (WOLGAST CORPORATION)		
Draft	114000-03 Close Out	165	0	Closeout	Contractor (2) Yr Guarantee		Lisa Donahue (WOLGAST CORPORATION)		
Draft	114000-03 Close Out	166	0	Closeout	Consent of Surety		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	114000-0 3 Close Out	167	0	Closeout	Substantial Completion		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	114000-0 3 Close Out	168	0	Closeout	Completed Punch List		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	114000-0 3 Close Out	169	0	Closeout	As Built Drawings		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	114000-0 3 Close Out	170	0	Closeout	All CO Signed/ Returned		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	114000-0 3 Close Out	171	0	Closeout	Insurance Up-To- Date		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	114000-0 3 Close Out	172	0	Closeout	Signed Hazardous Materials		Lisa Donahue (WOLGAST		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	114000-0 3 Close Out	173	0	Closeout	Asbestos Materials Affidavits		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	114000-0 3 Close Out	174	0	Closeout	Final Inspections on permits		Lisa Donahue (WOLGAST CORPORATIO N)		

Bid Division: 222300 – Plumbing & HVAC Systems

Bid to Include:

Total Responsibility for Specification Sections:

Section 220500 – Plumbing Requirements
Section 220510 – Plumbing Systems Testing, Cleaning, Water Treatment and Startup
Section 220553 – Plumbing System Identification
Section 220600 – Plumbing Specialties
Section 220700 – Plumbing Pipe Insulation
Section 221000 – Plumbing Piping
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 230900 – Temperature Controls
Section 232500 – HVAC Systems Testing, Cleaning, Water Treatment and Startup
Section 233000 – Air Distribution
Section 237400 – Rooftop HVAC Unit

Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):

Section 024119 – Selective Demolition (As it relates to this bid division)
Section 079200 – Joint Sealants (As it relates to this bid division)

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:

Plumbing, heating, ventilating, air conditioning, balancing, temperature control, etc., for a complete operational system.

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. 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.

Bid Division: 222300 – Plumbing & HVAC Systems

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 compounds 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.
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 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 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 all blocking required for plumbing fixture mounting.
2. Provide all final connections and hook-ups for kitchen equipment.
3. Furnish all louvers and access panels to masonry and drywall contractors for installation.
4. Perform all excavating, backfill, and compaction required for the work of this bid division.
5. Furnish and install duct detectors, back draft dampers, etc. as shown and specified.
6. Maintain fire rating in all walls penetrated.
7. Remove spoils from site.
8. Provide all required layout and verify that no conflict occurs with other trades.
9. Provide all necessary connection between temperature control and instrumentation devices and equipment to be controlled.
10. Provide roof curbs for rooftop equipment.
11. Refer to all equipment schedules for additional equipment to be furnished and installed (including kitchen equipment and kitchen equipment schedules).
12. Furnish test and balance reports.
13. Contractor shall maintain existing HVAC systems in fully functional order in occupied areas of the building throughout the duration of the project.
14. 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 temporary heating, and building security.
15. Remove, clean and reinstall all existing grids, vents, registers and diffusers including those mounted in metal ceiling grid systems.

Bid Division: 222300 – Plumbing & HVAC Systems

16. All HVAC equipment is to be completed with all motor starters, disconnects or other items to allow for the proper operation of the system.
17. The contractor shall broom sweep building daily your work area.

Project Inclusions:

1. Per Section 012100 – Allowances this Contractor shall include a \$4,000 allowance to be used at the direction of the Construction Manager for additional utility clean-up.
2. Provide all required plumbing and HVAC demolition as documented.
3. Include disconnecting of existing Kitchen equipment and reconnection of salvaged or owner supplied equipment.
4. Remove all existing concrete, masonry, etc. as required for the installation of new plumbing and HVAC work unless the demolition scope of work is specifically indicated in the documents to be completed by another bid division.
5. Provide all required concrete, masonry and drywall patching work associated with the installation of plumbing and HVAC work unless the patching scope of work is specifically indicated in the documents to be completed by another bid division.
6. Furnish and install all pre-fabricated curbs and/or wood material as required for mechanical equipment curbing.
7. Furnish all access panels as required for the installation of the bid division's work.
8. Furnish and install all required gas piping.
9. Provide all required plumbing and HVAC insulation.
10. Provide all required test and balance work.
11. Provide and complete all controls connections and programming. This contractor must use Honeywell as the Controls Contractor.
12. Supply and install roof top exhaust fans.
13. Supply and install hood ductwork, light testing, air balancing, and insulation.
14. Supply and install hood fire suppression equipment and testing.
15. Install emergency gas shut off valve supplied by kitchen equipment supplier.

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-mentioned 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 222300

Contents

222300-01-001 222300-01 Plumbing & HVAC Systems	3
222300-02-001 222300-02 Plumbing & HVAC Systems Start Up	5
222300-03-001 222300-03 Plumbing & HVAC Systems Close Out	7

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
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Package: 222300-01-001 - 222300-01 Plumbing & HVAC Systems

Draft	079200-4 Joint Sealant4	16	0	Product Data	Joint Sealant - Product Data				Lisa Donahue (WOLGAST CORPORATION)
Draft	079200-5 Joint Sealant5	20	0	Samples	Joint Sealant - Colors				Lisa Donahue (WOLGAST CORPORATION)
Draft	079200-5 Joint Sealant5	21	0	Product Data	Joint Sealant - Schedule				Lisa Donahue (WOLGAST CORPORATION)
Draft	220500 Plumbing Requirments	50	0	Shop Drawings	Plumbing - Shop Drawings				Lisa Donahue (WOLGAST CORPORATION)
Draft	220500 Plumbing Requirments	51	0	Product Data	Plumbing - Product Data				Lisa Donahue (WOLGAST CORPORATION)
Draft	220553 Plumbing ID	55	0	Product Data	Plumbing ID - list of working symbols				Lisa Donahue (WOLGAST CORPORATION)

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	220553 Plumbing ID	56	0	Product Data	Plumbing ID - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	220600 Plumbing Specialties	58	0	Product Data	Plumbing Specialties - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	220700 Plumbing Pipe Insulation	59	0	Product Data	Plumbing Pipe Insulation - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	221000 Plumbing Piping	60	0	Product Data	Plumbing Piping - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	230553 HVAC Identificat ion	61	0	Product Data	HVAC ID - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	230713	63	0	Product Data	External Duct Insulation - Product Data		Lisa Donahue (WOLGAST		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	External Duct Insulation						CORPORATION)		
Draft	230900 Temperature Control Systems	64	0	Shop Drawings	Temp Controls - Shop Drawings		Lisa Donahue (WOLGAST CORPORATION)		
Draft	230900 Temperature Control Systems	65	0	Product Data	Temp Controls - Product Data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	233000 Air Distribution	70	0	Product Data	Air Distribution - Product Data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	237400 Rooftop HVAC Unit	71	0	Product Data	Rooftop HVAC Unit - Product Data		Lisa Donahue (WOLGAST CORPORATION)		

Package: 222300-02-001 - 222300-02 Plumbing & HVAC Systems Start Up

Draft	222300-02 Start Up	175	0	Startup	Post Bid Interview/ Proposal Forms		Lisa Donahue (WOLGAST CORPORATION)		
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Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	222300-02 Start Up	176	0	Startup	Schedule of Values		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-02 Start Up	177	0	Startup	Contracts Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-02 Start Up	178	0	Startup	Payment/ Performance Bonds		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-02 Start Up	179	0	Startup	Insurance		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-02 Start Up	180	0	Startup	On Site Employee List		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-02 Start Up	181	0	Startup	Safety Policy		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	222300-02 Start Up	182	0	Startup	Safety Data Sheets (SDS)		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-02 Start Up	183	0	Startup	Sub/Supplier Form		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-02 Start Up	184	0	Startup	Hazardous/AHERA Notifications		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-02 Start Up	185	0	Startup	Copy of all Permits		Lisa Donahue (WOLGAST CORPORATION)		

Package: [222300-03-001](#) - 222300-03 Plumbing & HVAC Systems Close Out

Draft	220500 Plumbing Requirments	52	0	Closeout	Plumbing - Maintenance Data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	220500	53	0	Closeout	Plumbing - Warranty		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Plumbing Requirments						CORPORATION)		
Draft	220510 Plumbing Testing, Cleaning and Start Up	54	0	Closeout	Plumbing Testing - reports		Lisa Donahue (WOLGAST CORPORATION)		
Draft	220553 Plumbing ID	57	0	Closeout	Plumbing ID - Install Inst		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-03 Close Out	186	0	Closeout	Contractor (2) Yr Guarantee		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-03 Close Out	187	0	Closeout	Consent of Surety		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-03 Close Out	188	0	Closeout	Substantial Completion		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	222300-03 Close Out	189	0	Closeout	Completed Punch List		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-03 Close Out	190	0	Closeout	As Built Drawings		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-03 Close Out	191	0	Closeout	All CO Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-03 Close Out	192	0	Closeout	Insurance Up-To-Date		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-03 Close Out	193	0	Closeout	Signed Hazardous Materials		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300-03 Close Out	194	0	Closeout	Asbestos Materials Affidavits		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	222300-03 Close Out	195	0	Closeout	Final Inspections on permits		Lisa Donahue (WOLGAST CORPORATION)		
Draft	230593 Testing and Balancing	62	0	Closeout	Testing and Balancing - Reports		Lisa Donahue (WOLGAST CORPORATION)		
Draft	230900 Temperature Control Systems	66	0	Closeout	Temp Controls - O&M Manuals		Lisa Donahue (WOLGAST CORPORATION)		
Draft	230900 Temperature Control Systems	67	0	Closeout	Temp Controls - Owner Training		Lisa Donahue (WOLGAST CORPORATION)		
Draft	230900 Temperature Control Systems	68	0	Closeout	Temp Controls - O&M Manuals		Lisa Donahue (WOLGAST CORPORATION)		
Draft	232500 HVAC Testing Cleaning Startup	69	0	Closeout	HVAC Testing - Reports		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	237400 Rooftop HVAC Unit	72	0	Closeout	Rooftop HVAC Unit - Extra Materials		Lisa Donahue (WOLGAST CORPORATIO N)		

Bid Division: 260000 – Electrical

Bid to Include:

Total Responsibility for Specification Sections:

Section 260000 – Basic Electrical Requirements
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 – Hangers 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 216923 – Lighting Control Devices
Section 262200 – Low Voltage Transformers
Section 262416 – Panelboards
Section 262716 – Electrical Cabinets and Enclosures
Section 262726 – Wiring Devices
Section 262813 – Fuses
Section 262816 – Enclosed Switches and Circuit Breakers
Section 262913 – Enclosed Controllers
Section 265100 – Interior Lighting
Section 270528 – Pathways for Communication System
Section 271500 – Communications Horizontal Cabling
Section 284613 – Fire Alarm System

Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):

Section 024119 – Selective Demolition (As it relates to this bid division)
Section 079200 – Joint Sealants (As it relates to this bid division)

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:

All conduits, boxes, switches, etc., for a complete operational system.

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.

Bid Division: 260000 – Electrical

6. 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 compounds 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.
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 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 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. 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 hook-up, final connection and interlocks for kitchen exhaust fan and kitchen make-up air units to hood controls.
4. Remove spoils from site.
5. Maintain fire rating at all walls penetrated.
6. All excavation, backfill, compaction, and disposal of spoil for any electrical work placed below finish grade.
7. Coordinate with other trades for rough-in locations.
8. Provide temporary lighting and power distribution. A minimum of 100 watts of temporary lighting per 250 SF of floor area.
9. Provide all plywood or nailers required for mounting of electrical, audio, fire alarm or phone equipment.
10. Furnish any access hatches to mason and drywall contractors for installation required for electrical work.
11. Final hook-up of all equipment for other disciplines of work.
12. The contractor shall broom sweep building daily your work area.

Bid Division: 260000 – Electrical

13. Provide all final connection for kitchen equipment.
14. Supply and install a complete & operational fire protection alarm system.
15. Contractor is responsible for complete code compliance of Fire Alarm System.
16. Provide Owner with training of new equipment.

Project Inclusions:

1. Per Section 012100 – Allowances this Contractor shall include a \$6,000 allowance to be used at the direction of the Construction Manager for additional utility clean-up.
2. Include disconnecting of existing Kitchen equipment and reconnection of salvaged or owner supplied equipment.
3. Provide all required electrical demolition work as documented and for the completion of the new work.
4. Provide all required temporary power and lighting.
5. Remove all existing concrete, drywall, masonry, etc. as required for the installation of new electrical work unless the demolition scope of work is specifically indicated in the documents to be performed by another bid division.
6. Provide all required patching work associated with the installation of electrical work unless the patching scope of work is specifically indicated in the documents to be performed by another bid division.
7. Furnish and install all required backer boards for electrical equipment, fire rated as documented.
8. Provide all required coordination with other Bid Division contractors for installation of all electrical materials and equipment prior to the work commencing.
9. Provide all required power disconnection at existing mechanical equipment and new power connections for new mechanical equipment.
10. Provide final electrical connection for all equipment.
11. Provide all required fire alarm / detection items. Provide all required paperwork, payments, certification coordination with Office of Fire Safety and the State Fire Marshal.
12. Furnish and install all lighting control systems and provide Owner training of systems.
13. Furnish and install all conduits for cabling and data outlets as documented.
14. Furnish and install all smoke detectors.
15. Furnish access doors as required for installation by other contractors.
16. Provide and install all low voltage wiring and connections. Owners access control contractor to make final connections for access control.
17. This contractor will be required to provide information pertaining to the energy incentive program of the utility company.
18. This bid division is responsible for all cabling work for this project and all final connections to devices and equipment.
19. Include electrical fire alarm and kill switch for exhaust hoods.

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

Contents

260000-01-001 260000-01 Electrical	3
260000-02-001 260000-02 Electrical Start Up	5
260000-03-001 260000-03 Electrical Close Out	7

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
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Package: 260000-01-001 - 260000-01 Electrical

Draft	079200-1 Joint Sealant1	7	0	Product Data	Joint Sealant - Product Data				Lisa Donahue (WOLGAST CORPORATION)
Draft	079200-3 Joint Sealant3	15	0	Product Data	Joint Sealant - Schedule				Lisa Donahue (WOLGAST CORPORATION)
Draft	079200-4 Joint Sealant4	17	0	Samples	Joint Sealant - Colors				Lisa Donahue (WOLGAST CORPORATION)
Draft	260000 Electrical Requirements	73	0	Product Data	Electrical - Product Data				Lisa Donahue (WOLGAST CORPORATION)
Draft	260000 Electrical Requirements	74	0	Shop Drawings	Electrical - Shop Drawings				Lisa Donahue (WOLGAST CORPORATION)
Draft	260923	76	0	Shop Drawings	Lighting Control Devices - Shop Drawings				Lisa Donahue (WOLGAST CORPORATION)

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Lighting Control Devices						CORPORATION)		
Draft	262200 Low Voltage Transformers	77	0	Product Data	Low Voltage Transformers - Product data and testing		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262416 Panelboards	79	0	Shop Drawings	Panelboards - Shop Drawings		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262716 Electrical Cabinets and Enclosures	82	0	Product Data	Electrical Cabinets Enclosures - Product Data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262816 Enclosed Switches and Circuit Breakers	85	0	Product Data	Switches/Circuit Breakers - Product data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262913 Enclosed Controllers	87	0	Product Data	Enclosed Controllers - Product Data		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	265100 Interior Lighting	90	0	Shop Drawings	Interior Lighting - Shop Drawing		Lisa Donahue (WOLGAST CORPORATION)		
Draft	265100 Interior Lighting	91	0	Product Data	Interior Lighting - Product Data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	271500 Comm Horizontal Cabling	92	0	Product Data	Comm. Hor Cabling - Product Data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	284613 Fire Alarm System	93	0	Product Data	Fire Alarm System - Product Data		Lisa Donahue (WOLGAST CORPORATION)		
Draft	284613 Fire Alarm System	94	0	Shop Drawings	Fire Alarm System - Shop Drawings		Lisa Donahue (WOLGAST CORPORATION)		

Package: 260000-02-001 - 260000-02 Electrical Start Up

Draft	260000-02 Start Up	196	0	Startup	Post Bid Interview/ Proposal Forms		Lisa Donahue (WOLGAST		
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Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	260000-0 2 Start Up	197	0	Startup	Schedule of Values		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	260000-0 2 Start Up	198	0	Startup	Contracts Signed/ Returned		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	260000-0 2 Start Up	199	0	Startup	Payment/ Performance Bonds		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	260000-0 2 Start Up	200	0	Startup	Insurance		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	260000-0 2 Start Up	201	0	Startup	On Site Employee List		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	260000-0 2 Start Up	202	0	Startup	Safety Policy		Lisa Donahue (WOLGAST		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	260000-0 2 Start Up	203	0	Startup	Safety Data Sheets (SDS)		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	260000-0 2 Start Up	204	0	Startup	Sub/Supplier Form		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	260000-0 2 Start Up	205	0	Startup	Hazardous/AHERA Notifications		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	260000-0 2 Start Up	206	0	Startup	Copy of all Permits		Lisa Donahue (WOLGAST CORPORATIO N)		

Package: [260000-03-001](#) - 260000-03 Electrical Close Out

Draft	260000-0 3 Close Out	207	0	Closeout	Contractor (2) Yr Guarantee		Lisa Donahue (WOLGAST CORPORATIO N)		
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Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	260000-03 Close Out	208	0	Closeout	Consent of Surety		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000-03 Close Out	209	0	Closeout	Substantial Completion		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000-03 Close Out	210	0	Closeout	Completed Punch List		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000-03 Close Out	211	0	Closeout	As Built Drawings		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000-03 Close Out	212	0	Closeout	All CO Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000-03 Close Out	213	0	Closeout	Insurance Up-To-Date		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	260000-03 Close Out	214	0	Closeout	Signed Hazardous Materials		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000-03 Close Out	215	0	Closeout	Asbestos Materials Affidavits		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000-03 Close Out	216	0	Closeout	Final Inspections on permits		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262200 Low Voltage Transformers	78	0	Closeout	Low Voltage Transformers - Install Inst		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262416 Panelboards	80	0	Closeout	Panelboards - Install Inst		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262416 Panelboards	81	0	Closeout	Panelboards - O&M Manuals		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	262716 Electrical Cabinets and Enclosures	83	0	Closeout	Electrical Cabinets Enclosures - Install Inst		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262716 Electrical Cabinets and Enclosures	84	0	Closeout	Electrical Cabinets Enclosures - Extra Materials		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262816 Enclosed Switches and Circuit Breakers	86	0	Closeout	Switches/Circuit Breakers - Manufacturers Instructions		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262913 Enclosed Controllers	88	0	Product Data	Enclosed Controllers - Test Reports		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262913 Enclosed Controllers	89	0	Closeout	Enclosed Controllers - Install Inst		Lisa Donahue (WOLGAST CORPORATION)		
Draft	284613 Fire Alarm System	95	0	Closeout	Fire Alarm System - O&M Manuals		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							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 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: Freeland Community Schools

Site Location: BP 2 - 2025 Elementary Cafeteria

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
<<Alternate Description>>	

§ 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

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§ 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
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- .7 The Addenda, if any:

Number	Date	Pages
<u>«Addendum 1»</u>	<u>«Adm Date»</u>	

«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
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- .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: **Freeland Community Schools**
710 Powley Drive
Freeland, MI 48623
- D. Certificates must show as ‘additional insured’ the Owner, **Freeland Community Schools**, the Architect, **The Collaborative**, 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:

Freeland Community 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:

Freeland Community 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: _____

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.

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY

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.

END OF SECTION 00650

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 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 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 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)**

END OF SECTION 00700



AIA® Document A232® – 2019

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:

(Name, and location or address)

Freeland Community School District, 2024 School Construction Project – including

- General Funds – Middle School six (6) classroom addition,
- Safety Grant – Middle School secure vestibule addition,
- Food Service Funds – Elementary School kitchen renovations;

All in accordance with approved project scopes, applicable laws, the approved plans and specifications, the Owner’s fixed budget, and as otherwise approved by the Owner.

THE CONSTRUCTION MANAGER:

(Name, legal status, and address)

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

THE OWNER:

(Name, legal status, and address)

Freeland Community School District
710 Powley Drive
Freeland, Michigan 48623
Telephone: (989) 695-5527
Facsimile: (989) 695-5789

THE ARCHITECT:

(Name, legal status, and address)

The Collaborative, Inc.
One SeaGate, Park Level 118
Toledo, Ohio 43604
Telephone: (614) 362-8351
Facsimile: Not Applicable

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 A132™–2019, Standard Form of Agreement Between Owner and Contractor, 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.

TABLE OF ARTICLES

1	GENERAL PROVISIONS
2	OWNER
3	CONTRACTOR
4	ARCHITECT AND CONSTRUCTION MANAGER
5	SUBCONTRACTORS
6	CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7	CHANGES IN THE WORK
8	TIME
9	PAYMENTS AND COMPLETION
10	PROTECTION OF PERSONS AND PROPERTY
11	INSURANCE AND BONDS
12	UNCOVERING AND CORRECTION OF WORK
13	MISCELLANEOUS PROVISIONS
14	TERMINATION OR SUSPENSION OF THE CONTRACT
15	CLAIMS AND DISPUTES

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User Notes:

(1752118123)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 **The Contract Documents.** The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the ~~Agreement, Agreement as to contractors,~~ the Contract Documents ~~do not also~~ include the advertisement or invitation to bid, Instructions to Bidders, ~~sample forms,~~ other information furnished by the Owner in anticipation of receiving bids or proposals, Owner-accepted portions of the Contractor's bid or proposal, or and portions of addenda relating to bidding or proposal requirements, requirements but do not include sample forms. The Architect's execution of the Owner/Architect Agreement and the Construction Manager's execution of the Owner/Construction Manager Agreement shall constitute their acceptance of all terms herein related to the respective parties.

§ 1.1.2 **The Contract.** The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 **The Work.** The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. The Contractor acknowledges and agrees that the Contract Documents are sufficient to provide for the completion of the Work and that the Contract Documents include work (whether or not shown or described) which reasonably may be inferred to be required or useful for the completion of the Work in accordance with applicable laws, codes, and customary standards of the construction industry.

§ 1.1.4 **The Project.** The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 **Contractors.** Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 **Separate Contractors.** Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 **The Drawings.** The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.8 **The Specifications.** The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.9 **Instruments of Service.** Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's

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consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.10 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not ~~show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith~~ faith and without negligence.

§ 1.1.11 Products. The term "Product(s)" as used in the Contract Documents refers to the materials, systems, and equipment provided by the Contractor for use in the Work of the Project.

§ 1.1.12 Warranty. The terms "Warranty" and "Guarantee" as used in the Contract Documents shall have the same meaning and shall be defined as "legally enforceable assurance of satisfactory performance or quality of a product or Work".

§ 1.1.13 Materials. Where materials, systems, and equipment items are referred to in the singular, such reference shall not serve to limit the quantity required. The Contractor shall furnish quantities as required by the Contract Documents to complete the Work. Unless specifically limited in the Contract Documents, the words "furnish", "install", and "provide", or any combination thereof mean to furnish and incorporate into the Work, including all necessary labor, materials, and equipment and other items required to perform the Work indicated.

§ 1.1.14 Project Manual. The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Where responsibility for particular Work is required of the Contractor, the Contractor shall not be released from that responsibility by reason of the specification or drawing which establishes the responsibility. Thus, the Contractor shall be responsible for all Work required of it, even though that responsibility may be shown only in that portion of the documents typically pertaining to another contractor or trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 If there should be a conflict between two or more of the Contract Documents then the following order of interpretation shall apply:

- .1 Where requirements specifically set forth in the applicable Agreement are in conflict with other Contract Documents, including but not limited to these General Conditions, the Agreement shall govern.
- .2 In all other instances, the conflict shall be resolved by complying with the provision that is most favorable to the Owner (as determined by the Owner in the Owner's sole discretion).
- .3 When a duplicate of material or equipment occurs in the Drawings, the Specifications or other Contract Documents, each Contractor shall be deemed to have bid on the basis of each furnishing such material or equipment. The Owner, with the assistance of the Architect and Construction Manager, will decide which Subcontractor(s) shall furnish the same.

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§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

~~§ 1.5.1 Unless otherwise indicated in the Contract Documents or the Owner/Architect Agreement, the Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and unless otherwise indicated in the Contract Documents or the Owner/Architect Agreement, the Architect and respective consultants will retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.~~

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by national overnight courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement. Further, any other written notice delivered with a written acknowledgement or receipt shall be deemed duly served, regardless of method.

Wherever the Contract Documents require the Contractor to give "Notice" or "Timely Notice" to the Architect, Public Authority, and/or others, it shall be the Contractor's responsibility to furnish all such notices sufficiently in advance to allow the party receiving the notice reasonable time to react to such notice, including travel time on the job site as necessary, when such notices require the on-site presence of the Architect, Public Authority, their authorized representatives, or others for field observation of inspections, testing or approvals. Reasonable time shall be defined as no less than 24 hours plus normal travel time from the home office of the party being notified to the job site and must also accommodate known, standard, or reasonable processing periods.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties ~~shall~~ may agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

~~§ 1.8 Building Information Models Use and Reliance~~

~~Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.~~

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or ~~authorization~~ authorization subject to parameters of authority established by Owner's board of education. Except as otherwise provided in Section 4.2.I, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

~~§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.~~

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work, and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

~~§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as Owner's information is~~ "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, ~~including including, but not limited to,~~ those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

~~§ 2.3.2 The Owner shall retain an architect~~ Architect is the person lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project ~~is located,~~ is located, if licensed architecture is required by law for the Project. That person or entity is identified as the Architect in the Agreement and

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is referred to throughout the Contract Documents as if singular in number. The term "Architect," "Architect/Engineer," "Engineer," or "Design Professional" as used herein means the Architect or the Architect's authorized representative.

§ 2.3.3 ~~The Owner shall retain a~~ construction manager adviser is lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect ~~to whom the Contractor has no reasonable objection and~~ whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Taking into account the Contractor's experience and expertise, and exercise of professional caution, the Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work. The Contractor shall not be entitled to additional compensation resulting from its failure to confirm the location of the site utilities or existing structures prior to bid opening.

§ 2.3.6 ~~The~~ Upon specific written request of the Contractor, the Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services. Contracts with other Contractors alone shall not constitute sufficient Owner control for purposes of this section.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the ~~Owner shall furnish to the Contractor~~ Contractor will receive at least one copy of the Contract Documents in pdf format (or another format reasonably approved by the Owner) for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3.8 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or ~~repeatedly~~ fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. This right shall be in addition to and not in limitation of the Owner's rights under any provision of the Contract Documents.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ~~ten day~~ three-day period after receipt of notice from the Owner or the Owner's designee (or immediately in the case of a threat to the safety of persons or property) to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, ~~correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the~~ including any claim against the Contractor's Performance Bond, correct such default or neglect. In such case, the Owner may deduct from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses, including any and all legal expenses incurred to effectuate and enforce this provision and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

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If the Architect, Construction Manager, Owner, or other contractors or consultants are required to provide additional services due to defects or deficiencies in the Contractor's work or by failure of the Contractor to perform under its agreement, the Contractor shall be responsible for all such costs and fees (including attorney fees), which shall promptly be paid to the Owner. The Owner, Contractor, Architect, and Construction Manager acknowledge that the Owner's receipt of such payment from the Contractor is a condition precedent to the Owner's obligation to make payment to those adversely affected.

This Section 2.5 allows the Owner to withhold payments from a non-performing Contractor irrespective of the termination procedure identified in Section 14.2, and the Owner may pursue either remedy, or both.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.1.1 Possession, sale, or consumption of alcoholic beverages on the construction site is strictly prohibited. The unlawful manufacture, distribution, dispensation, possession or use of drugs is prohibited on the construction site.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors,

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inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 Prior to submitting its bid, the Contractor shall have studied and compared the Contract Documents and shall have reported to the Architect any error, inconsistency, or omission in the Contract Documents related to its work. It will be presumed that the Contractor's bid and the Contract Sum include the cost of correcting any error, inconsistency, or omission, which could have been discovered by the exercise of reasonable diligence. Unless the Contractor establishes that such error, inconsistency, or omission could not have been discovered by the exercise of reasonable diligence, the Contractor will make such corrections without additional compensation so that the Work is fully functional.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or ~~procedures~~ procedures, specifically including any delays that could impact timely coordination and completion of the Work. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures. The Contractor shall immediately notify the Construction Manager of delays of other contractors that could impact timely coordination and completion of the Work.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Such provision of labor and materials shall occur in sufficient time to satisfy the existing Project schedule. The Contractor bears the risk of any failure to timely provide such labor and materials for any reason. The Contractor agrees to execute the appropriate UCC forms to effectuate the Owner's ownership of the material and equipment furnished pursuant to this Agreement.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.4 The Contractor, Construction Manager, and Architect each respectively agree that neither they nor their subcontractors will discriminate against any employee or applicant for employment, to be employed in the performance of this contract, with respect to hire, tenure, conditions or privilege of employment, or any matter directly

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or indirectly related to employment, because of race, age, sex, color, religion, national origin, ancestry or physical disability. Breach of this covenant may be regarded as a material breach of this contract.

§ 3.4.5 Asbestos-Free Product Installation

§ 3.4.5.1 It is hereby understood and agreed that no product and/or material containing asbestos including chrysolite, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos and any combination of these materials that have been chemically treated and/or altered shall be installed or introduced into the Work by the contractor or his employees, agents, subcontractors, or other individuals or entities over whom the Contractor has control. If applicable, the Contractor shall be required to provide a signed certification statement ensuring that all products or materials installed or introduced into the work all be asbestos-free.

§ 3.4.5.2 The Contractor shall also be required to furnish certified statements from the manufacturers of supplied materials used during construction verifying their products to be asbestos-free in accordance with the requirements of Section 3.4.5.1.

§ 3.4.5.3 The Contractor shall complete and submit to the Owner a certification evidencing asbestos-free product installation prior to issuance of the final Certificate for Payment, in a form acceptable to the Owner.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit.

In addition to any other warranties, guarantees or obligations set forth in the Contract Documents or applicable as a matter of a law and not in limitation of the terms of the Contract Documents, the Contractor warrants and guarantees that:

- .1 The Owner will have good title to the Work and all materials and equipment incorporated into the Work and, unless otherwise expressly provided in the Contract Documents, will be of good quality and new;
2. The Work and all materials and equipment incorporated into the Work will be free from all defects, including any defects in workmanship or materials;
3. The Work and all equipment incorporated into the Work will be fit for the purpose for which they are intended;
4. The Work and all materials and equipment incorporated into the Work will be merchantable; and
5. The Work and all materials and equipment incorporated into the Work will conform in all respects to the Contract Documents.

If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

Upon notice of the breach of any of the foregoing warranties or guarantees or any other warranties or guarantees under the Contract Documents, the Contractor, in addition to any other requirements in the Contract Documents, will commence to correct such breach within seventy-two (72) hours after written notice thereof and thereafter will use its best efforts to correct such breach to the satisfaction of the Owner; provided that if such notice is given after final payment hereunder, such seventy-two (72) hour period shall be extended to seven (7) days. The foregoing warranties and obligations of the Contractor shall survive the final payment and/or termination of the Contract.

The Contractor shall, at the time of final completion of the Work and as a condition precedent to final payment to the Contractor, assign to the Owner all manufacturers' warranties related to the materials and labor used in the Work. The Contractor further agrees to perform the Work in such manner as to preserve any and all such manufacturers' warranties and deliver to the Owner the warranties, project manuals, operating procedures, and other materials related to each of the building systems and materials included in the Contractor's Work and as required by the Specifications.

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§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. The Contractor shall also pay all state and federal taxes levied on its business, income or property and shall make all contributions for social security and other wage or payroll taxes. The Contractor shall be solely responsible for such payments and shall hold the Owner harmless from same.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work ~~knowing it to be~~ contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide written and dated notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Owner and the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, they will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Owner and the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor, stating the reasons. If the ~~Owner or~~ Contractor disputes the Architect's determination or recommendation, ~~either party may the Contractor shall~~ submit a Claim as provided in Article 15. The requirements of Section 2 of 1998 PA 57 (MCL 125.1592), as amended, are hereby incorporated into this document. The Contractor shall be alert to any indication or evidence of existing underground or concealed utilities or structures not shown on the Contract Documents and shall immediately notify the Owner of discovery of such evidence. If the Contractor encounters such utilities or structures, it shall cease operations immediately to minimize damage and shall notify the Owner and Architect. The Contractor shall bear the cost of damage resulting from its failure to exercise reasonable care in its construction activity or from continuing operations without notifying the Owner.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall ~~notify~~ provide written and dated notification to the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features ~~may be made~~ shall be made, as needed as provided in Article 15.

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§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are ~~more than or~~ less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. The superintendent and any other personnel shall be satisfactory to the Owner in all respects, and the Owner shall have the right to require the Contractor to remove any superintendent or any other personnel from the Project whose performance is not satisfactory to the Owner and to replace such superintendent or other personnel with another who is satisfactory to the Owner.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. ~~Within The Owner and/or the Construction Manager may reply within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14 day period shall constitute notice of no reasonable objection.~~

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's ~~consent, which shall not unreasonably be withheld or delayed.~~ consent.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. In no event shall the Contractor's Construction Schedule be extended due to action or inaction of the Contractor, except with prior written approval of the Owner within the Owner's sole discretion. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Owner's, Construction Manager's and Architect's approval. ~~The Architect and Construction Manager's approval which~~ approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, ~~and~~ (2) allow the Construction Manager and Architect reasonable time to review ~~submittals-submittals,~~ and (3) provide for expeditious and practical execution of the Work. If the Contractor fails to submit a submittal schedule, or fails to

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provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in ~~general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.~~ accordance with the most recent approved project schedule and the most recent work schedule.

§ 3.10.5 The Contractor shall cooperate with the Construction Manager in scheduling and performing its Work to avoid conflict or interference with the Work of others, and the Contractor shall be responsible for any conflict or interferences that it causes. The Construction Manager and the Contractor acknowledge and understand that the work schedule will be modified from time-to-time with the Owner's approval to coordinate with the work of others and that such schedule changes do not give rise to a claim for damages or additional compensation by the Contractor for delay or otherwise. The Contractor shall be required to conform to the most recent Owner-approved schedule and acknowledges that fact was taken into account when it agreed to the Contract Sum and entered into this Contract.

§ 3.10.6 The Contractor shall cooperate with the Construction Manager in working out and following the proper sequence of operations between the Work of the Contractor and that of other trades on the site.

§ 3.10.7 The Contractor shall prosecute the Work undertaken in a prompt and diligent manner whenever the Work (or a part thereof) becomes available, or at such other time as the Owner and/or Construction Manager may direct so as to promote the general progress of the entire construction. The Contractor shall not, by delay or otherwise, interfere with or hinder the Work of the Construction Manager or any other Contractor. Any materials that are to be furnished by the Contractor shall be furnished in sufficient time to enable the Contractor to perform and complete its Work within the time or times provided in the schedule. If the Contractor shall, through its action or inactions, including the actions or inactions of its' subcontractors or suppliers, fall behind in furnishing necessary labor and/or materials to meet the construction needs in accordance with the established schedule, then it shall increase its forces or work such overtime as may be required, at its own expense, to bring its part of the work up to the proper schedule. In the event that the Contractor does not take such action necessary to bring its part of the work up to schedule, as determined by the Construction Manager, then the Owner may supplement the Contractor's forces or take other action permitted under Section 2.4 or Section 2.5. The Contractor shall be responsible for any and all costs of performing or completing the Work and shall pay any such sums within ten (10) days of an invoice. If not paid within ten (10) days, the amount will be withheld from the Contractor's next payment and paid to the relevant parties. If the amounts withheld from payments then or thereafter due Contractor are insufficient to cover such costs, the Owner may bill these costs to the Contractor, and the Contractor shall pay any such sums within ten (10) days of an invoice. Exercise of such rights shall in no way limit or jeopardize the Owner's right to any other remedy, including but not limited to a claim against the Performance Bond of the Contractor.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data, and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor for submittal to and review by the Architect to illustrate materials or

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equipment for some portion of the Work. All Work shall be furnished and installed in accordance with the Drawings, Specifications and as additionally required by the manufacturer's printed instructions. The Contractor shall review the manufacturer's instructions, and where conflict occurs between the Drawings or Specifications and the manufacturer's instructions, the Contractor shall request clarification from the Architect prior to commencing the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's review and approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect in a detail writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to reasonably rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract

~~Documents.~~ Documents subject to its experience and expertise. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. ~~The Owner, the Architect, and the Owner shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals. The Architect and Construction Manager shall be entitled to reasonably rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy, subject to their professional judgment, experience, and expertise.~~ Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, permits, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. Only materials and equipment which are to be used for the Project or to carry out the Work shall be stored at the Project site(s). Protection of such materials and equipment shall be the sole responsibility of the Contractor.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor and its Subcontractors shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.15.3 Any areas and/or concurrently occupied space both occupied by the Owner and used in the progress of the Work, whether within the limits of the construction site or the adjacent areas leading to it, shall be maintained in a clean and safe condition and open to travel. Failure by the Contractor to maintain said areas will result in the Owner's cleaning of same, at the expense of the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall indemnify and hold harmless the Owner, Construction Manager, and Architect harmless from from any and all cost, damage, and loss on account thereof, including, but not limited to actual attorneys' fees, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner, Architect, or Construction Manager. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect through the Construction Manager. The review by the Owner of any method of construction, invention, appliance, process, article, device or materials of any kind shall be for its adequacy as integrated into the Work and shall not be an approval for the use thereof by the Contractor in violation of any patent or other rights of any third person.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent in any way related to performance of the Work, or the duties or obligations of this Agreement or the failure of the Contractor or the Work to conform with the Contract Documents, caused in whole or in part by any acts or omissions of the Contractor, a Subcontractor, or anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. them or anyone for whose acts of any of them may be liable. The Contractor shall not be obligated to indemnify a party for that party's sole negligence but shall remain liable to the fullest extent of its fault or the fault of a person for whom the Contractor is responsible (e.g., a Subcontractor). The Contractor shall be responsible to the Owner, Construction Manager, Architect, Architect's consultants and agents and employees of any of them from and against all amounts such parties may be required to pay in attorney fees in order to pursue enforcement of this provision against the Contractor or otherwise obtain indemnification from the Contractor provided under the terms of this Section 3.18 or any other applicable Contract Document. Such obligation shall not be construed to negate, abridge, abridge or reduce any other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18, which would otherwise exist as to any party or person set forth in this section. To the fullest extent permitted by law, the Contractor shall indemnify the Owner and save the Owner harmless against all loss by fines, penalties or corrective measures resulting from negligent or wrongful acts or omissions by the Contractor, its Subcontractors, agents, employees or assigns, with respect to the violation of safety requirements of this Contract, including reasonable attorney fees.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts. addition to and not in limitation of the Contractor's other indemnity obligations, the Contractor hereby accepts and assumes exclusive liability for and shall indemnify and save harmless the Owner, Construction Manager and Architect from and against the payment of the following:

All contributions, taxes, or premiums (including interest and penalties thereon) which may be payable under the unemployment insurance law of any state, the federal Social Security Act, federal, state, county and/or municipal tax withholding laws, or any other law, measured upon the payroll of or required to be withheld from employees by whomsoever employed, engaged in the Work to be performed and furnished under the Contract Documents.

All sales, use, personal property and other taxes (including interest and penalties thereon) required by any federal, state, county, municipal or other law to be paid or collected by the Contractor or any of its Subcontractors or vendors or any other person or persons acting for, through or under it or any of them, by reason of the performance of the Work

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or the acquisition, ownership, furnishing, or use of any materials, equipment, supplies, labor, services or other items for or in connection with the Work;

All pension, welfare, vacation, annuity and other benefit contributions payable under or in connection with respect to all persons by whomsoever employed, engaged in the Work to be performed and furnished under the Contract Documents.

The Contractor shall indemnify and hold the Owner harmless from any claim, damage, loss or expense, including but not limited to actual attorney fees, incurred by the Owner related to any hazardous material or waste, toxic substance, pollution or contamination brought into the Project site or caused by the Contractor or used, handles, transported, stored, removed, remediated, disturbed or dispersed of by Contractor.

§ 3.18.3 In the event that any claim is made or asserted, or lawsuit filed for damages or injury arising out of or resulting from the performance of the Work, whether or not the Owner is named as a party, the Contractor shall immediately advise the Owner, in writing, of such claim or lawsuit and shall provide a full and complete copy of any documents or pleadings thereto, as well as a full and accurate report of the facts involved.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement. The term "Architect," "Architect/Engineer," "Engineer," or "Design Professional" as used herein means the Architect or the Architect's authorized representative.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

§ 4.1.3 Duties, responsibilities, and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the ~~Owner, Construction Manager, Architect, and Contractor.~~ Owner and the Construction Manager or Architect, respectively. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for ~~Payment.~~ Payment and with the Owner's written concurrence during the correction period. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or more frequently, as otherwise agreed with the Owner, Owner or as required by law, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. ~~However, Subject to the Owner/Architect Agreement,~~ the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, will guard the Owner against defects and deficiencies in the work, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents- Documents, the Project schedule and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project ~~schedule~~-schedule and shall supervise construction as required by 1937 PA 306 (MCL 388.851 et seq.).

§ 4.2.5 The Construction ~~Manager, Manager and Architect~~, except to the extent required by Section 4.2.4, and ~~Architect 4.2.4 or by 1937 PA 306 and/or 1980 PA 299, as applicable~~, will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the Contractor's safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, and Documents. Except as required by their respective agreements with the Owner, neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect Documents and neither will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work. The Construction Manager will schedule and coordinate the work of all Contractors on the Project, including the Contractors' use of the site. The Construction Manager will keep the Contractors informed of the Project Construction Schedule to enable the Contractors to plan and perform the Work in a timely manner.

§ 4.2.6 **Communications.** The Owner shall endeavor to communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager shall endeavor to include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall endeavor to promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers ~~shall~~may be through the Contractor. Communications by and with other Contractors shall be through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

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§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. However, should the Construction Manager or Architect discover during the course of such review any inaccuracies, incompleteness, or other irregularities, they shall immediately notify the Owner of the same to determine an appropriate corrective course of action or notify the Contractor of the same to correct the irregularities.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

~~§ 4.2.15 Utilizing the documents provided by the Contractor, the~~ The Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner in good condition and reasonably organized upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

~~§ 4.2.17 If the Owner and Architect agree, the~~ The Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.18 The Architect will interpret ~~and decide~~ matters concerning performance under, and requirements of, the Contract Documents on written request of the Construction Manager, Owner, or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

~~§ 4.2.19 Interpretations and decisions~~ of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such ~~interpretations and decisions,~~ interpretations, the Architect will endeavor to secure faithful performance by ~~both Owner and Contractor, will not show partiality to either,~~ and will not be liable for results of interpretations or decisions so rendered in good ~~faith,~~ faith and without negligence.

§ 4.2.20 The Architect's ~~decisions~~ interpretations on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract ~~Documents~~ Documents and acceptable to the Owner.

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable ~~promptness~~ promptness given the particular circumstances. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors. The term "Subcontractor" shall also include material and equipment suppliers.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish supplies, materials or equipment ~~equipment~~, including those fabricated to a special design. Within 14 days of receipt of the information, the Construction Manager ~~may~~ will notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. ~~Failure of the Construction Manager to provide notice within the 14 day period shall constitute notice of no reasonable objection.~~ The Contractor shall remain, in all instances, jointly and severally liable to the Owner for all acts or omissions of its Subcontractor. All contractual agreements with additional persons or entities serving as a subcontractor shall incorporate the Contract Documents, expressly identify the Owner as a third-party beneficiary, give the Owner all rights against the Subcontractor that it would have against the Contractor and state that the Owner shall enjoy all third-party beneficiary rights not prohibited by law.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution. The Contractor shall notify the Owner, the Architect, and the Construction Manager of any proposed subcontractor substitution a minimum of 10 days prior to such proposed change.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume

toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

- § 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that
- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
 - .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation ~~shall be equitably adjusted for increases in cost resulting from the suspension~~ may be equitably adjusted as negotiated by the parties.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. ~~If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.~~

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to ~~insurance and waiver of subrogation- insurance~~. The Construction Manager and Contractor shall be responsible for coordinating the Work with the work of other Contractors, including the Owner's own forces or Separate Contractors so as to complete the Work in accordance with the Project schedule.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

~~§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.~~

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Separate Contractors, Construction Manager and other Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of

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their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractors or other Contractors that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities or defective construction. ~~The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.~~

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction, or to property of the Owner, ~~Construction Manager~~, Separate Contractors, or other Contractors as provided in Section 10.2.5. Should a claim be made that the Contractor wrongfully delayed or caused damage to the Work or property of another contractor (including the Owner's own forces, other Contractors, or Separate Contractors), the Contractor shall promptly settle the dispute with such other contractor. If such other contractor sues the Owner on account of any delay or damage alleged to have been caused by the Contractor, the Construction Manager will notify the Contractor who shall defend such proceedings at the Contractor's sole expense. If any judgment or award against the Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for all costs, including attorneys' fees and court costs, which the Owner may have incurred.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and ~~the Construction Manager, with notice to the Architect,~~ will allocate the cost among those responsible. The Owner's right to clean up shall in no event be deemed a duty, and should the Owner choose not to pursue this remedy, the Contractor necessitating such action shall remain fully responsible for the same.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, only by Change Order, Construction Change Directive-Directive, written contract amendment, or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.3 The Contractor's agreement on any Change Order shall constitute its final settlement of all matters relating to the direct and indirect costs associated with such change and any and all related adjustments to the Contract Sum and the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one or more of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall ~~determine~~ determine, with the Owner's approval, the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to a reasonable amount of the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time. Contractor agreements to a Construction Change Directive shall require a follow-up writing or signature as contemplated in Section 7.3.7.

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§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for undisputed Work completed under the Construction Change Directive in Applications for Payment. ~~The~~ For those undisputed portions, the Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of ~~cost~~ cost, if agreed to by the Owner in writing, shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree in writing with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the ~~adjustments,~~ adjustments in writing, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Owner and Construction Manager and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Owner and Construction Manager that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for obtaining all supplies, materials, tools and equipment necessary to perform the Work and for properly performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. All work shall be completed in sufficient time to allow for clean-up and preparation for Owner move-in prior to the date of Substantial Completion.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 ~~If~~ Provided the Contractor submits a written request for an extension not more than fourteen days after the occurrence that gives rise to the delay, if the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, fire, government-declared emergencies, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; litigation, mediation, or arbitration, as applicable; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine may be extended by Change Order. Failure of the Contractor to submit a timely request for an extension shall irrevocably waive the Contractor's right to such an extension of time. If the contract time is subject to extension pursuant to this subparagraph, such extension shall be the exclusive remedy of the Contractor and the Contractor shall not be entitled to recover damages from the Owner. Further, minor modifications in Contract time resulting from adjustments in the Project construction schedule shall not be deemed a sufficient cause for an extension of time under this Section.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

~~§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.~~

§ 8.4 Delay Damage Claims

§ 8.4.1 If the Contractor fails to complete its Work on time resulting in loss or damage to the Owner, the Owner shall be entitled to recover any damages caused by the Contractor's breach, including overhead, profit, extended general conditions, actual attorney fees, etc.

§ 8.4.2 In the event the Contractor is delayed or hindered in the commencement or progress of the Work, including but not limited to those delays caused by the Work or lack of Work of another contractor or subcontractor on the Project, and the Contractor claims monetary damages as a direct and proximate consequences thereof (including, but not limited to, extended general conditions, overhead, profit, overtime, interest, supervisions or other costs or profits whatsoever), then the Contractor shall not assert such claims against the Architect, Construction Manager or Owner and, as to the Architect, Construction Manager and Owner, the Contractor's claims of such delay damages are hereby waived. The Contractor's sole and exclusive remedy regarding claims for monetary delay damages shall be to pursue such claims directly against any contractor(s) and/or subcontractors on the job which may have caused the delay, and with regard to such claims asserted against the Contractor by any other contractor(s) and/or subcontractors, the Contractor hereby waives the defense of absence of contractual privity and hereby assumes liability to other contractor(s) and/or subcontractors arising out of the Contractor's actions or inactions resulting in such delay and claim.

§ 8.4.3 For any delay claims raised against the Owner, the Contractor's sole and exclusive remedy is an extension of time to perform the Work not to exceed the time frame of any proven delay. Under no circumstances is the Contractor entitled to monetary delay damages from the Owner.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted-adjusted, unless the Contractor provided such unit prices as a part of a competitive bid.

§ 9.2 Schedule of Values

~~Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, Before the first Application for Payment, the Contractor shall submit a schedule of values to the Construction Manager, before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Owner, Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Owner and Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.~~

§ 9.3 Applications for Payment

~~§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, values for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.~~

~~§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders. A Contractor's request for payment of sums related to work regarding Construction Change Directive shall, unless qualified in writing at the time of request, constitute full and complete consent to the Construction Change Directive(s) and to the issuance of a Change Order.~~

~~§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.~~

~~§ 9.3.1.3 The Contractor shall submit with each monthly Application for Payment (1) an Affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the previous application was submitted and the Owner might in any way be responsible have been paid or otherwise satisfied, and (2) a release or waiver of liens rising out of the Contract from each Contractor and/or Subcontractor, materialman, supplier and laborer or the Contractor addressing all previous Applications for Payment submitted for the Project.~~

~~§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site. Payment to Contractor for materials stored off site is discouraged. When circumstances indicate that the Owner's best interest is served by off-site storage, the Contractor shall make written request to the Owner and Construction Manager for approval to include such material costs in its next progress payment. The Contractor's request shall include the following information:~~

- ~~.1 A list of the fabricated materials consigned to the Project (which shall be clearly identified, giving the place of storage, together with copies of invoices and reasons why materials cannot be delivered to the site.~~
- ~~.2 Certification that items have been tagged for delivery to the Project and that they will not be used for another purpose.~~
- ~~.3 A letter from the Contractor's Surety indicating agreement to the arrangements and that payment to the Contractor shall not relieve either party of their responsibility to complete the Work.~~
- ~~.4 Evidence of adequate insurance covering the material in storage, which shall name the Owner as additionally insured.~~
- ~~.5 Costs incurred by the Owner, Construction Manager and Architect to inspect material in off-site storage shall be paid by the Contractor.~~

.6 Subsequent pay requests shall itemize the materials and their cost which were approved on previous pay requests and remain in off-site storage.

.7 When a partial payment is allowed on account of material delivered on the site of the Work or in the vicinity thereof or under possession and control of the Contractor, but not yet incorporated therein, such material shall become the property of the Owner, but if such material is stolen, destroyed or damaged by casualty before being used, the Contractor will be required to replace it at its own expense.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors. As between the Owner and the Contractor, the failure of the Architect or Construction Manager to notify the Contractor or the Owner of a withheld certification does not render such withholding ineffective, and the Owner shall have no obligation to pay a Contractor for uncertified amounts or amounts for which no Certificate for Payment has been issued. If the Contractor does not receive notice of a withheld certification, it shall proceed as provided in Section 9.7.

§ 9.4.3 The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or ~~Architect~~ Architect, in writing, together with the Certification which the qualification pertains.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect ~~has~~ has, unless otherwise required by contract or law, (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- .1 defective Work not ~~remedied~~ remedied or the Contractor is in breach of the Agreement;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor or other Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; ~~or~~
- .7 ~~repeated~~ failure to carry out the Work in accordance with the Contract Documents.
- .8 the Work not having progressed to the extent set forth in the Application for payment; or
- .9 representations of the Contractor are untrue.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the

Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.5.5 If the Contractor disputes any determination by the Owner, Architect, or Construction Manager with regard to any Certificate for Payment, the Contractor shall nevertheless continue to expeditiously perform the Work and such dispute shall provide no basis for any manner of suspension of the Contractor's performance of the Work.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.1.1 The Owner may, in its sole discretion, choose to make payments to Contractors through the Construction Manager. More particularly, the Owner may distribute funds to the Construction Manager for the Construction Manager to then provide payment to each respective and applicable Contractor. The Owner may discontinue this practice at any time in its sole discretion.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4. Owner may, in its sole discretion, after providing Contractor with ten (10) days prior written notice, make direct payments to the Contractor's Subcontractors, material men, laborers or claimants relating to labor or material provided to the Contractor in the event the Subcontractors, material men, laborers or claimants threaten to or actually cease providing labor and/or materials for the Project due to nonpayment such that, in the Owner's determination, progress of the Project and the Project's schedule are jeopardized. All payments made pursuant to this section shall be considered the same as if paid directly to the Contractor and shall constitute partial payment of the Contract Sum. In the event the Contractor disagrees with the amount proposed to be paid to one or more Subcontractors, material men, laborers or claimants, the Contractor shall provide a bond in the amount the Contractor believes the Owner will overpay, within ten (10) days of receipt of notice, or be barred from making any claim that the amount of the direct payment was incorrect. Payment under this provision shall not jeopardize any other remedy available to the Owner.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.6.9 Subject to applicable law, if a petition in bankruptcy or any other arrangement or proceeding regarding insolvency, assignment for the benefit of creditors, trust, chattel mortgage, or similar state or federal proceeding, whether voluntary or involuntary, shall be filed with respect to the Contractor, the Owner may withhold the final balance, or any other payments, whether or not an application for progress payment has been properly filed, until expiration of the period of any guarantees or warranties required for the Contractor, and the Owner may pay out such funds the amount necessary to satisfy any claims or costs that otherwise would have been covered by such guarantees or warranties.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, ~~Contractor and without justifiable basis under the Contract Documents,~~ within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, ~~then the Contractor may, upon seven~~ unless the Owner, in good faith, disputes the amount certified, ~~then the Contractor may, upon twenty-one~~ additional days' notice to the Owner, Construction Manager and Architect, stop the Work until ~~payment of the amount owing has been received. (1) the Contractor receives payment of the amount owing, or (2) the Contractor receives notice from the Architect, Construction Manager, or Owner or a full or partial withheld certification as provided herein.~~ The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents. The Owner shall have no obligation to pay the Contractor unless it receives a Certificate for Payment for the amount certified. The Owner may withhold payment from a non-performing Contractor irrespective of the issuance of a Certificate for Payment.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents and when all required occupancy permits, if any, have been issued, so the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item ~~upon notification by the Architect, immediately.~~ In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of

Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 Notwithstanding Sections 9.8.1 and 9.8.2, as a condition precedent to establishing the date of Substantial Completion, the Contractor shall prepare and submit to the Architect and Construction Manager a comprehensive list of items to be completed or corrected (a "punch list"). The Contractor shall respond immediately to correct Work deficiencies and/or punch list items. Should the Contractor fail to make corrections in a timely fashion, but not later than thirty (30) calendar days from the date of Substantial Completion or notification of the required corrections, whichever is earlier, such Work may be corrected by the Owner at the Contractor's sole expense, and the Contract Sum may be adjusted accordingly.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, ~~provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager complete. The Contractor shall proceed with the work in such a manner as reasonably directed and shall cooperate with the Owner to limit interruptions.~~

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or

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encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final ~~payment~~ ~~(5) payment~~, (5) an affidavit that states the Work is fully completed and performed in accordance with the Contract Documents and is satisfactory to the Architect and the Owner, (6) in the event of Contractor bankruptcy, at the Owner's option, an order entered by the court having jurisdiction of the Contractor's insolvency proceeding authorizing such payment, (7) a general release executed by the Contractor on a form provided by the Construction Manager, (8) all close-out documents and warranties have been provided in a reasonable and acceptable manner, (9) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and ~~(6), (10)~~, if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and ~~reasonable~~ actual attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 ~~The making of final payment shall constitute a waiver of Claims by the Owner except those arising from~~
~~.1 — liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;~~
~~.2 — failure of the Work to comply with the requirements of the Contract Documents;~~
~~.3 — terms of special warranties required by the Contract Documents; or~~
~~.4 — audits performed by the Owner, if permitted by the Contract Documents, after final payment.~~ not constitute a waiver of any Claims by the Owner.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of all claims by that payee except those previously made in writing and identified by that payee as being unsettled and being an exception to the waiver of this section at the time of final Application for Payment.

§ 9.10.6 All architectural costs incurred after the specified Final Completion date resulting from the Contractor's failure to complete the Work as agreed shall be paid by the Contractor to the Owner prior to the authorization of final payment. Charges to the Contractor shall be made at such times and in such amounts as the Architect invoices the Owner under the current rate schedule in effect at the time of service, for services provided in connection with the Work. The architectural costs incurred after the final completion date will be deducted from the Contractor's progress payment or final payment as applicable.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

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§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and
- .4 construction or operations by the Owner, Separate Contractors, or other Contractors.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss. The Contractor shall take all reasonable safety precautions with respect to its Work and the work of others, shall comply with all standard industry safety measures and shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority and all other requirements of the Contract Documents, including those applicable to the safety of persons or property. The Contractor shall be responsible for the safety of all of the Contractor's employees and the safety of all of the Contractor's Subcontractors, suppliers, and their employees. The Contractor shall report in writing to the Construction Manager any injury to any of Contractor's or its Subcontractors' employees at the site within one (1) day after the occurrence of such injury. The Contractor acknowledges receiving, or having access to an opportunity to review, health and safety information about the Project site(s), including any applicable asbestos management plan and any other environmental information it deems necessary to perform the work.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, ~~reasonable~~ reasonable, necessary, and appropriate safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. The Contractor shall be solely and fully responsible for any and all damage claims and for defense of all actions against the Owner relating to such explosives, hazardous materials and/or unusual methods.

§ 10.2.5 The Contractor shall promptly remedy damage and loss ~~(other than damage or loss insured under property insurance required by the Contract Documents)~~ to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

~~If either party the Contractor suffers injury or damage to person or property because of an act or omission of the other party, Owner, or of others for whose acts such party the Owner is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party Owner within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter. Owner to~~

investigate the matter. The Contractor's failure to do so shall be an irrevocable waiver of any claim against the Owner arising out of such injury or damage. Injury or damage to persons or property suffered by the Owner because of an act or omission of the Contractor or others for whose acts the Contractor is legally responsible shall be subject to the limitations provisions established by Michigan law.

§ 10.2.8.1 The Contractor causing damage to the Work of another Contractor shall be responsible for the repair and replacement of such damaged Work. Back charges may be made against the Contract sum of the damaging Contractor when corrections are not made promptly.

§ 10.2.8.2 The Owner reserves the right to pay the Contractor suffering damage from monies due the Contractor who is responsible for the Work required by same and shall deduct it from the Contract amount due the said responsible Contractor.

§ 10.2.9 If the Contractor or any Subcontractor chooses to use any systems, equipment, facilities, or services which have been incorporated in the Project as a permanent part thereof by any other, the Contractor shall assume full responsibility for damages caused to said systems, equipment, facilities or services, and have damages repaired as required, so that in no case will the performance of the used systems, equipment, facilities or services be diminished from the specified criteria as a result of such use.

§ 10.2.10 The Contractor acknowledges that the safety of the Owner's students, employees and guests is of the utmost importance. The Contractor will take no action which would jeopardize the safety of the Owner's students, employees and guests and, without the Owner's written approval, shall take no action which would interfere with the Owner's activities. Without limiting the foregoing provisions, the Contractor shall comply with all laws applicable to students and/or school safety.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner, Construction Manager and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner in its discretion shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner ~~shall~~ shall, as a courtesy, furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. ~~The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection.~~ When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up to address shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of

tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site ~~unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.~~ site. To the extent the Contract requires the removal, transport and disposal of hazardous materials, the Contractor agrees that it assumes responsibility or said tasks as a part of the Agreement.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

~~§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.~~

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's reasonable discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7. Nothing in this section will be construed as relieving Contractor from the cost and responsibilities for emergencies covered hereby.

§ 10.5 Notification of Utility Companies

§ 10.5.1 At least five (5) working days prior to the start of work in areas which may involve existing utility lines, the Contractor shall notify the MISS DIG notification system of the planned work.

§ 10.5.2 The utility company should, upon receipt of notice, stake, mark or otherwise designate the location (and depth) of their lines, or temporarily move the line(s).

§ 10.5.3 The Contractor shall immediately report to the respective utility company any break or leak in its lines, or any dent, gouge, groove or other damage to the utility line or to its coating or cathodic protection made or discovered in the course of the Work.

§ 10.5.4 The Contractor shall immediately alert the Owner, Construction Manager, Architect and occupants of nearby premises of any and all emergencies caused or discovered in the utility lines(s) in the course of the Work.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the ~~Agreement or elsewhere in the Contract Documents.~~ Agreement, as described elsewhere in the Contract Documents, as required by law, or as reasonably required by the Owner in light of the nature of services performed and insurance obligations of its other contractors and consultants. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents. On all insurance contracts under which the Contractor is obligated to have its insurance company name the Owner as additional insured, the Contractor shall require such insurance company to add to the policy the following clause: "The insurance afforded to the Additional Insured is primary insurance. If the Additional Insureds have other insurance which is applicable to the loss on an excess or contingent basis, the amount of the insurance company's liability under this policy shall not be reduced by the existence of such other insurance." Certificates of insurance acceptable to the Owner shall be submitted by Contractor to the Owner and Construction

Manager prior to commencement of Work and thereafter upon renewal or replacement of each required policy of insurance.

§ 11.1.2 The Contractor shall provide bonds covering faithful performance of 100% of the Contract and payment of 100% of the obligations arising thereunder as stipulated in bidding requirements or specifically required by the Contract Documents or as by law on the date of the Contract. The Contractor shall provide such additional surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, located and that are reasonably acceptable to the Owner. The Construction Manager shall obtain copies of the Performance Bond and Payment Bond required by the Agreement from the Contractor prior to Contractor beginning performance pursuant to the Agreement. The Contractor's obligation to provide such bonds shall not be waived in any fashion, including any failure to secure such bonds prior to Contractor beginning performance pursuant to the Agreement.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform both the Contractor and the Construction Manager, separately and in writing, prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. ~~In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner.~~ The cost of the insurance shall be charged to the Owner by a Change Order. ~~If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.~~

§ 11.2.2.1 The Contractor shall at the Contractor's own expense provide insurance coverage for materials stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the Work in transit until such materials are permanently attached to the Work.

§ 11.2.2.2 The insurance required by Section 11.2 is not intended to cover machinery, tools or equipment owned or rented by the Contractor that are utilized in the performance of the Work, but not incorporated into permanent improvements. The Contractor shall, at the Contractor's own expense, provide insurance for owned or rented machinery, tools or equipment.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property

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insurance required by the Contract Documents, the Owner shall provide notice directly to the Contractor, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; ~~and (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. may be adjusted negotiation between the parties.~~ If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

~~§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property is not waiving any rights its insurer(s) may have to subrogation. To the extent any terms in the General Conditions or any other Contract Documents are contrary to the aforementioned, such terms shall be deemed void and unenforceable.~~

~~§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.~~

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. ~~The Owner waives all rights of action against the Contractor, Architect, and Construction Manager for loss of use of the Owner's property, due to fire or other hazards however caused.~~

§ 11.5 Adjustment and Settlement of Insured Loss

~~§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner insureds. The Owner shall use its best efforts, with consultation of the Construction Manager, to reach a quick and fair settlement for all interested parties, with the insurance companies after a loss.~~

~~§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the~~

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Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract ~~Time~~ Time or Contract Sum.

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may ~~request~~ request, with the Owner's consent, to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the ~~Contractor shall be entitled to an equitable adjustment to~~ Owner shall reasonably adjust the Contract Sum and Contract Time as may be appropriate. At the time, Owner's consent is sought as described herein, the Architect and/or Construction Manager shall notify the Owner that additional costs may apply if the Work is in accordance with the Contract Documents. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion, and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense. If any portion of the Work is determined by the Owner, Construction Manager or Architect, either during performance of the Work or during any applicable warranty period, to be defective or not in compliance with the contract requirements, the Construction Manager or Owner shall notify the Contractor in writing that such Work is rejected. Thereupon, the Contractor shall immediately replace and/or correct such Work by making the same comply strictly with all the requirements therefor. The Contractor shall bear all costs of correcting such rejected Work, including work of other subcontractors and including compensation for the Architect's and Construction Manager's additional services and any delay or related damage to the Owner made necessary thereby. The Construction Manager shall have the right to charge the Contractor for any compensation payable for the Architect's or Construction Manager's additional services required by the Contractor's rejected Work and deduct the payment from the next payment due the Contractor.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner or Construction Manager to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner or Construction Manager shall give such notice promptly after discovery of the condition. ~~During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.~~ If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Separate Contractors, or other Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 The Contractor shall respond immediately to correct Work deficiencies and/or punch list items. Failure to correct Work deficiencies and/or punch list items in a timely fashion shall be a substantial breach, and the Owner may terminate the Contract immediately without following the procedure identified in Section 14.2. As used in this Section 12.2.6, "timely" means the Contractor shall begin correction within three days of receiving the punch list or notice of work deficiency, and correction will be completed in a commercially reasonable time in accordance with the direction of the Construction Manager. Whether or not the Contract is terminated, if the Contractor fails to make corrections in a timely fashion, such Work may be corrected by the Owner, in its sole discretion, at the Contractor's expense and the Contract Sum may be adjusted by backcharge accordingly. The Contractor shall promptly notify the Construction Manager, in writing, when the Work deficiencies and/or punch list items are completed. Upon the review of the Work by the Construction Manager after such notification by the Contractor, if Work deficiencies and/or punch list items shall continue to exist, the Contractor shall reimburse any cost incurred by the Owner, including the Construction Manager's and Architect's fees for reinspections of the Work. Failure to pay such costs within ten (10) days of receipt of a demand regarding the same shall permit the Owner to withhold such amounts from the unpaid portion of the Contractor's contract.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made. The acceptance of nonconforming Work by the Owner shall be by written Change Order, specifically referencing that it addresses nonconforming work, acceptable to the Owner's authorized representative, and signed by all parties. Acceptance of nonconforming Work may only occur pursuant to such written Change Order.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

~~The Contract shall be governed by the law of the place where the Project is located excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.State of Michigan in all respects, except that claims and causes of action brought by the Owner shall not be deemed untimely if filed within six (6) years of substantial completion of the entire (and all) Project(s).~~

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other.

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If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Construction Manager, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Construction Manager, Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid ~~unreasonable~~ delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.6 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 workers, so as not to delay the work of any other Contractor or completion of the Project.

§ 13.7 Notwithstanding any provisions within the Contract Documents, nothing shall be deemed a waiver of any immunity granted to Owner by law or statute, including but not necessarily limited to, governmental immunity under MCL 691.1407.

§ 13.8 The Owner, being a governmental unit, is protected by the Michigan Void Construction Contracts Act, MCL 691.991.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days for reasons within the Owner's control through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 ~~An act of government, such as a declaration of national emergency, that requires all Work to be stopped;~~
- .3 ~~Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents, subject to justifiable withholding of payment as described herein or in the Contract Documents; or~~
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and ~~profit~~ direct costs on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive ~~days~~ days, for reasons within the Owner's control and through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3. The Contractor may not terminate the Contract unless it has submitted claims for the delays and sought an extension of time for each delay.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 ~~repeatedly~~ refuses or fails to supply enough properly skilled workers or proper materials; materials to the point of negatively impacting the Project and/or the related schedule;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 ~~repeatedly~~ disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract ~~Documents~~ Documents; Or

- .5 fails to prosecute the Work or any part thereof with promptness and diligence or fails to perform any provisions of this Contract, or goes into bankruptcy, liquidation, makes an assignment for the benefit of creditors, enters into a composition with its creditors, or becomes insolvent.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety: three days' notice, terminate the Contractor's right to proceed with the Work, or such part of the Work as to which such defaults have occurred, and may take any one or more of the following actions;

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

The notice required by this Section 14.2.2 shall not give the Contractor a right to cure defective Work or to cure other grounds for termination under Section 14.2.1. Further, the Owner's failure to strictly comply with the formal requirements of termination (e.g., by providing less than three days' notice of termination) shall not be a substantial breach by the Owner. The Owner may terminate the Contractor immediately if the Contractor endangers persons or property or has breached Project safety requirements).

In the event, the Contractor's surety bond requires notice of intent to declare a default of the Contractor and if such bond notice is provided by the Owner, such notice shall be adequate to satisfy the three (3) day written notice described above in this section.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner in pursuing termination and completion of the Work, including actual attorney and legal fees and costs, and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

- 3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the ~~termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.~~termination.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 **Definition.** A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the ~~Contract.~~Contract, including but not limited to additional sums, additional time for performance, or damages for delay. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents. The Contractor shall not knowingly (as "knowingly" is defined in the Federal False Claims Act, 31 USC 3729, et seq.) present or cause to be presented a false or fraudulent Claim. As a condition precedent to making a Claim by the Contractor, the Claim shall be accompanied by an affidavit sworn to before a notary public or other person authorized to administer oaths in the State of Michigan and executed by an authorized representative of the Contractor, which states that: "The Claim which is submitted herewith complies with subparagraph 15.1.1 of the General Conditions, as amended, which provides that the Contractor shall not knowingly present or cause to be presented a false or fraudulent claim." Claims of the Owner shall be governed by the relevant Michigan statutory limitations period.

§ 15.1.2.1 Regardless of any provisions to the contrary, the statute of limitations with respect to any defective or nonconforming Work which is not discovered by the Owner shall not commence until the discovery of such defective or nonconforming Work by the Owner. See also Section 13.1.

§ 15.1.2 Time Limits on Claims

~~The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2, accordance with Section 13.1 and Section 15.1.21.1, regardless of any other time frames identified in this Agreement. The Contractor shall commence all claims and causes of action in accordance with Section 15.1 and, if shorter, any other provisions of this Agreement and Michigan law.~~

§ 15.1.3 Notice of Claims

§ 15.1.3.1 ~~Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by written notice to the other party Owner and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party The Contractor under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant Contractor first recognizes the condition giving rise to the Claim, whichever is later. Failure to timely and properly initiate a claim shall be an irrevocable waiver of such claim. Claims by the Owner shall be governed by the applicable statute of limitations period, except as such time frame may be longer in accordance with Section 13.1 and Section 15.1.2.1.~~

§ 15.1.3.2 ~~Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by written notice to the other party. In such event, no decision by the Initial Decision Maker is required. Claims by the Contractor under this Section 15.1.3.2 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later. Failure to timely and properly initiate a claim shall be an irrevocable waiver of such claim. Claims by the Owner shall be governed by the applicable statute of limitations period, except as such time frame may be longer in accordance with Section 13.1 and Section 15.1.2.1.~~

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§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, including by mediation and/or litigation, as applicable, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make undisputed payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time ~~shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15.~~ may be adjusted as mutually agreed by the Owner and Contractor. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Failure to provide such notice shall serve as an absolute bar against a claim for such an increase in the Contract Sum. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4. A Project delay shall not be a basis for a Claim for additional cost. Delay claims against the Owner may be remedied only through an extension of time per Section 8.4.2 and Section 8.4.3.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, additional notice as provided in Section 15.1.3 shall be ~~given~~ given in addition to the general requirements for filing a claim. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of ~~the Work, the Work due to the increase in Contract Time sought.~~ In the case of a continuing delay only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor ~~and Owner waive Claims against each other~~ waives Claims against the Owner for consequential damages arising out of or relating to this Contract. This ~~mutual~~ waiver includes

- ~~1~~ 1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- ~~2~~ 2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This ~~mutual~~ waiver is applicable, without limitation, to all consequential damages due to ~~either party's termination the Owner's termination of the Contractor~~ in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated ~~damages, damages in favor of the Owner,~~ when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial ~~decision-interpretation.~~ The Architect will serve as the Initial Decision Maker, ~~unless otherwise indicated in the Agreement.~~ Maker. Except for those Claims excluded by this Section 15.2.1, an initial ~~decision-interpretation~~ shall be required as a condition precedent to mediation of ~~any Claim.~~ If an initial decision or litigation of any Claim brought by the Contractor against the Owner. If an initial interpretation has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision-an interpretation having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not ~~decide-interpret~~ disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to ~~resolve the Claim,~~ interpret the Claim. Within ten (10) days of a written request, the Contractor shall make available to the Owner or its representative all of its books, records, or other documents in its possession or to which it has access relating to a Claim and shall require its subcontractors, regardless of tier, and materialmen to do the same.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker ~~will will, based on its interpretation,~~ either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial ~~decision-interpretation~~ approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial ~~decision-interpretation~~ shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution. ~~interpretation shall be subject to the parties' agreed upon binding dispute resolution process.~~

§ 15.2.6 ~~Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1. Regardless of any other time frames identified herein, claims and causes of action brought by the Owner shall be governed in accordance with the statute of limitations periods under Michigan law, except for such longer periods of time as may be permitted in Section 13.1 and Section 15.1.2.1.~~

~~§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days of receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.~~

§ 15.2.7 ~~In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.~~ **SURETY NOTICE AND PRIOR APPROVAL**

Except where otherwise expressly required by the terms of the Agreement, the Contract Documents or the General Conditions, exercise by the Owner of any contractual or legal right or remedy without prior notice to or approval by the Contractor's surety shall in no way bar or prohibit the Owner's ability to pursue such right or remedy. Further, pursuit of such a right or remedy without prior notice to or approval of surety shall in no way compromise, limit or bar any claim by the Owner against a surety bond of the Contractor. The Owner's claims against a Contractor's surety bond shall be governed by Section 13.1 with respect to any limitations periods.

~~§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.~~

§ 15.3 Mediation

~~§ 15.3.1~~ ~~Claims, Except as otherwise agreed in writing by the parties, claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.~~

~~§ 15.3.2~~ The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the ~~filing of commencement of the parties' agreed upon~~ binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. ~~If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.~~

~~§ 15.3.3~~ ~~Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.~~

~~§ 15.3.4~~ The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

~~§ 15.4 Arbitration~~

~~§ 15.4.1~~ ~~If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~

~~§ 15.4.1.1~~ A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

~~§ 15.4.2~~ The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

~~§ 15.4.3~~ The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

~~§ 15.4.4.1~~ Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration. ~~The Owner, at its sole discretion, may consolidate mediation conducted under this Agreement with any other arbitration mediation to which it is a party provided that (1) the arbitration mediation agreement governing the other arbitration mediation permits consolidation, (2) the arbitrations mediations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations mediations employ materially similar procedural rules and methods for selecting arbitrator(s) mediator(s).~~

Init.

~~§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party-~~ The Owner, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, in mediation, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration-mediation involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

~~§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement. Contractor further agrees to include similar dispute resolution provisions in all agreements with the independent contractors and consultants retained for the Project and to require all independent contractors and consultants also to include similar dispute resolution provisions in all agreements with subcontractors, all subconsultants, suppliers or fabricators so retained, thereby providing for a consistent method of dispute resolution between the parties to those agreements. Subject to the other limitations periods identified in these General Conditions which are understood to govern over this sentence, no demand for mediation shall be made after the date when the applicable statutes of limitations would bar legal or equitable proceedings. During the pendency of any mediation, all applicable limitations periods shall be tolled until the conclusion of that process.~~

The Owner reserves the right in its discretion to require consolidation or joinder of any mediation arising out of or relating to this Agreement with another mediation involving a person or entity not a party to this Agreement in any event the Owner believes such consolidation or joinder is necessary in order to resolve a dispute or avoid duplication of time, expense or effort. 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 provisions applicable to the parties shall be deemed to be void and nonexistent in the event Owner, in its discretion, determines the Contractor should become a party to that dispute by joinder or otherwise. Any mediation hearing shall be held in the general location where the Project is located unless another location is mutually agreed upon.

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

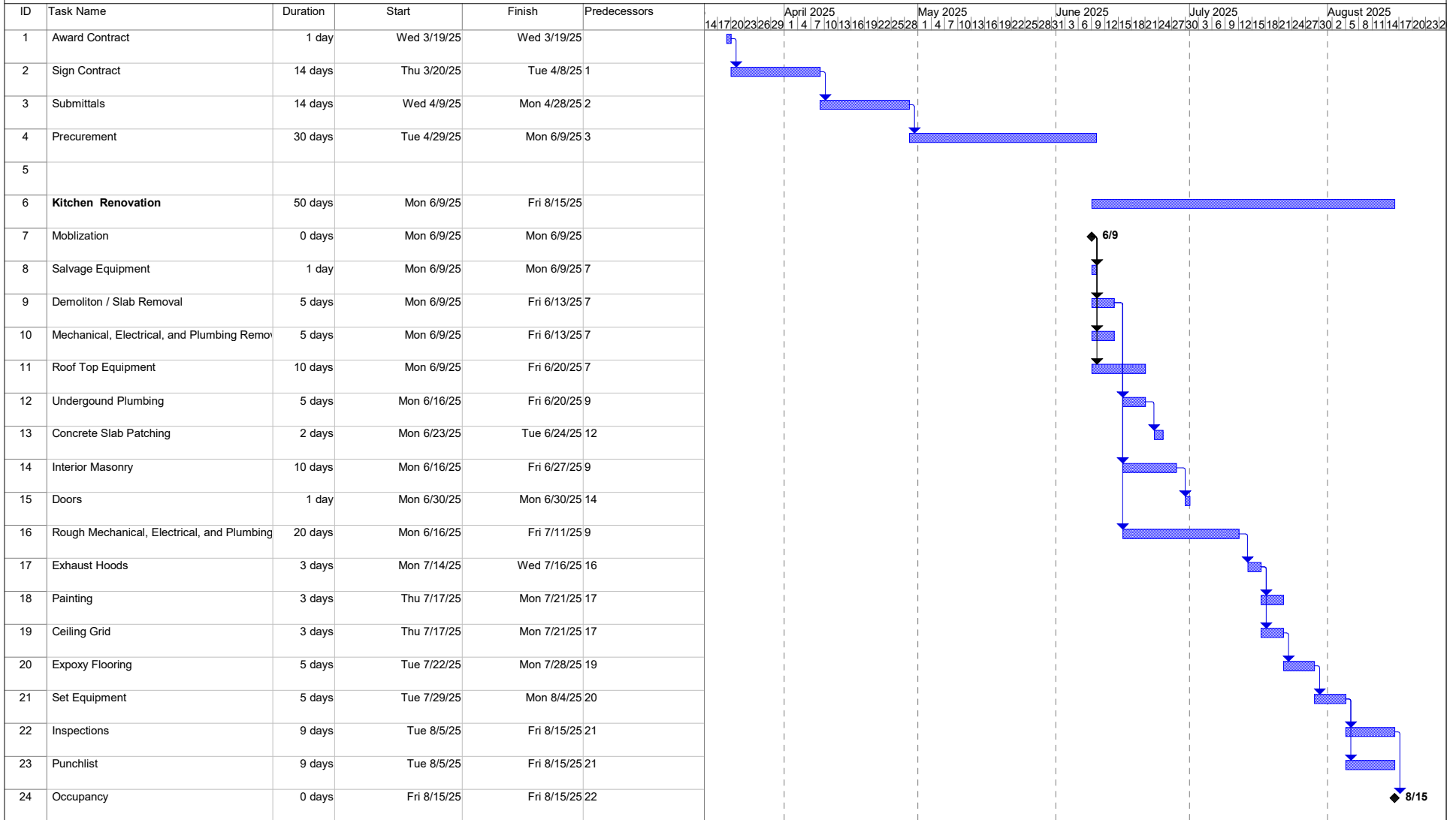
- A. Each Bidder shall be responsible for taking the provisions of all Addenda issued prior to the Bid Date into account during the presentation of his Proposal.
- B. Each Bidder shall be responsible for obtaining all Addenda, and for ascertaining that all Addenda issued prior to the Bid Date have been 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

Freeland Community School Elementary Cafeteria Milestone Schedule



Task		External Tasks		Inactive Summary		Start-only		Deadline	
Split		External Milestone		Manual Task		Finish-only			
Milestone		Inactive Task		Duration-only		External Tasks			
Summary		Inactive Milestone		Manual Summary Rollup		External Milestone			
Project Summary		Inactive Milestone		Manual Summary		Progress			

Wolgast Corporation reserves the right to make changes to this construction schedule as the project progress warrants.

PART 1 – GENERAL

1.01 PROJECT DESCRIPTION

A. Freeland Community Schools – BP 2 - 2025 Elementary Cafeteria

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. In order 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’s 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 **Freeland Community Schools – BP 2 - 2025 Elementary Cafeteria** to provide
_____ For the improvement of the property described as **Freeland
Community 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 **Freeland Community Schools – BP 2 - 2025 Elementary Cafeteria** to provide
_____ For the improvement of the property described as **Freeland
Community 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 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 <input type="checkbox"/> increased / <input type="checkbox"/> decreased by this Change Order.....	
The new Contract Sum including this Change Order is.....	\$

<u>Contractor</u>	<u>Architect</u>	<u>Owner</u>
-------------------	------------------	--------------

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

1.01 PREVAILING WAGE

- A. There is no prevailing wage on this project.

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

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

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 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 for providing 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 the 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 worn at all times. 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 of time 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 of time 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 district 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 **Freeland Community Schools** as they pertain to hazardous materials.

The SDS's are attached for all hazardous materials which will be brought to **Freeland Community 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 **Freeland Community 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: Freeland Community Schools – BP 2 - 2025 Elementary Cafeteria
Project #: A25906-01
Owner: Freeland Community Schools
Address: 710 Powley Drive, Freeland, MI 48623

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: Freeland Community 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 Freeland Community 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



N O R T H E R N
Analytical Services, LLC.
ENVIRONMENTAL CONSULTANTS

**Limited Hazardous Building
Material Survey
of
Freeland Elementary School
Kitchen Area**

Prepared for:

**Freeland Community School District
710 Powley Drive
Freeland, Michigan 48623**

Completed by:

**Northern Analytical Services, LLC.
PO Box 1604
Big Rapids, Michigan 49307**

**Project No.: 250002
Report Date: January 29, 2025**

Freeland Community School District
Freeland Elementary School Kitchen Area
Limited Hazardous Building Material Survey Report
Project No.: 250002
Report Date: January 29, 2025

**Limited Hazardous Building
Material Survey Report
of
Freeland Elementary School
Kitchen Area**

Table of Contents

1.0	EXECUTIVE SUMMARY	2
2.0	FINDINGS	3
2.1	Asbestos (Kitchen Area)	3
2.2	Lead/Cadmium/Chromium	3
2.3	Other Potentially Hazardous Materials	4
3.0	ASBESTOS BACKGROUND	4
4.0	SURVEY PROCEDURES.....	5
5.0	LIMITATIONS.....	7
6.0	CLIENT RESPONSIBILITIES	7
7.0	SIGNATURE PAGE	10
7.1	Building Inspector.....	10
7.2	Client.....	10
	Survey Data.....	11

1.0 EXECUTIVE SUMMARY

The Freeland Community School District retained Northern Analytical Services, LLC. (NAS) to conduct a limited hazardous building material survey of the kitchen area located on the campus of Freeland Elementary School. Building information is as follows:

<p>Freeland Elementary School Approximate Size: 102,000 square feet Number of Levels: 1 Year Constructed: Unknown Number of Additions: Unknown Date(s) of Inspection: 1/15/2025 Inspector's Name: Joshua Christie Inspector's Accreditation Number: A60272</p>

This survey was intended to identify potentially hazardous building materials found within the kitchen area of Freeland Elementary School. Materials such as asbestos containing materials (ACMs), paint/coatings that may contain lead, cadmium or chromium, devices that may contain mercury, devices that may contain polychlorinated biphenyls (PCBs), and refrigerants. Suspect asbestos containing materials (SACMs) were tested for asbestos content, the other material types were assumed to have hazardous properties. This survey did not include identification of any chemicals.

The portion of this survey aimed at SACMs was completed in accordance with asbestos building inspection procedures defined in 40 CFR, Chapter 1, Part 61-National Emission Standards for Hazardous Air Pollutants (NESHAP), 1926.1101-Asbestos Standards for Construction, and 1910.1001-Asbestos Standards for General Industry.

A summary of our findings is provided in the Findings section of this report. A more detailed description of the SACMs identified during this survey is provided in the section titled Material Report. Also attached are sections titled Inspection Report and Sample Location Report. The Inspection Report will show what SACMs were found in each room and the Sample Location Report will describe where bulk samples were collected.

Materials identified as asbestos containing or that are assumed to contain asbestos should be maintained in good condition through a detailed operations and maintenance program. Those ACMs that would otherwise be damaged or disturbed during a planned renovation or maintenance activity should be remediated by properly trained personnel.

2.0 FINDINGS

2.1 Asbestos (Kitchen Area)

The following table provides a summary of the SACMs that were identified during this survey:

Material Number	Homogeneous Material Description	Asbestos Detected	Percent Asbestos	Asbestos Type
10	Fire Rated Door -	Yes	---	Assumed
12	Floor Tile & Mastic - 9x9, Off-White w/ Black Streaks, Black Mastic	Yes	T-5% M-2%	Chrysotile
15	Miscellaneous - Terrazzo - Off-White With White and Grey Stones	No	---	None Detected
16	Concrete Block -	No	---	None Detected
17	Wood Door -	Yes	---	Assumed
18	Pipe Insulation-Assumed in Walls/Ceiling Cavities -	Yes	---	Assumed
19	Caulk - On Interior Steel Door Frame	Yes	5%	Chrysotile
20	Caulk - On Exterior Aluminum Door Frame	No	---	None Detected
21	Miscellaneous - Tar Assumed Inside Clock/Speaker Housing	Yes	---	Assumed
22	Drywall - 2ft x 4ft White Ceiling Tile	No	---	None Detected
23	Pipe Insulation - Fiberglass	No	---	None Detected
24	Pipe Insulation-Mudded Fitting - On Fiberglass Line	Yes	---	Assumed
25	Cove Base - 4in Grey	No	---	None Detected
26	Ceramic Tile & Grout - 1in Grey	No	---	None Detected
27	Ceramic Tile & Grout - 4in Grey	No	---	None Detected

Although NAS has provided estimated quantities and locations for each of the materials we found to contain asbestos, it should be noted that materials fitting the above descriptions should be treated as asbestos containing if found elsewhere in the building. Additionally, any material not described in the attached Material Report should be assumed to contain asbestos until testing proves otherwise.

2.2 Lead/Cadmium/Chromium

The following table provides a summary of the paint that was analyzed for Lead, Cadmium and Chromium:

Material Number	Homogeneous Material Description	Lead Results	Chromium Results	Cadmium Results
1P	White – Kitchen	59.0	<25.0	<10.0
2P	Light Yellow – Kitchen Storage	<25.0	<25.0	<10.0

*Results are in micrograms per gram (µg/g) which is also equal to parts per million (ppm).

Due to the age of the building, all paint and coatings, including ceramic tile glazing, are assumed to contain lead, cadmium and/or chromium.

2.3 Other Potentially Hazardous Materials

All refrigeration devices such as air conditioners, drinking fountains, coolers, and refrigerators likely contain refrigerant gas/liquid. Refrigerants should be removed from the unit by a licensed technician prior to opening any of the interior components that would otherwise release the refrigerant.

Fluorescent lights have bulbs that likely contain mercury and should not be broken during handling. These light bulbs should be disposed of as mercury containing or recycled after they burn out.

Fluorescent lights also have electrical ballasts that may contain PCBs. Ballasts that were manufactured after 1979 were legally required to be free of PCBs and were required to indicate this on the label. Ballasts that do not have a "PCB Free" label must be assumed to contain PCBs.

Other pre-1979 building materials that may contain PCBs include electrical transformers, elevator pumps, and automatic door closers. Any of these components, if present, should either be tested or assumed to contain PCBs. Those components that are either known or assumed to contain PCBs should be removed if leaking or removed prior to a building renovation or demolition project.

3.0 ASBESTOS BACKGROUND

The United States Environmental Protection Agency (USEPA) and the State of Michigan both define asbestos containing materials (ACM) as those materials that are found to contain more than 1% asbestos (Chrysotile, Amosite, Tremolite, Crocidolite, Anthophyllite, or Actinolite). ACMs are classified into one of three categories which include: Thermal System Insulation, Surfacing materials, and Miscellaneous Materials. ACMs are further divided as either friable or non-friable; friable materials are those that can be crushed, crumbled, or pulverized with hand pressure when dry.

According to the National Emissions Standards for Hazardous Air Pollutants (NESHAP, 40 CFR Part 61) friable ACM or non-friable ACMs that will likely become friable during renovation/demolition activities must be properly removed prior to the material being disturbed.

The Michigan Department of Licensing and Economic Opportunity (MDLEO) requires asbestos abatement activities be conducted by licensed asbestos abatement contractors and that the work be conducted by accredited Asbestos Workers (32-hour minimum) and

overseen by an accredited Asbestos Contractor Supervisor (40-hour) for all materials found to contain more than 1% asbestos. Should non-friable ACMs be left in place for demolition, MDLEO regulations would require the demolition work be conducted by a licensed asbestos abatement contractor with properly accredited workers.

Materials that contain 1% or less asbestos fiber as determined through point count analysis can be removed by properly trained individuals; MDLEO does not require asbestos worker accreditation for this type of work. Air monitoring, respiratory protection and training are required.

4.0 SURVEY PROCEDURES

NAS accredited Asbestos Building Inspector visited the site to perform the survey work. The areas included in the survey were visually and physically inspected for suspect asbestos containing materials. The attached drawing shows the areas that were included in this survey. During the survey the building was divided into functional spaces (FS) that represent a particular use area or room. Each FS was provided a unique room number or name and surveyed for the presence and quantity of SACMs. Functional spaces that appear on the attached drawing that are not labeled with a room number or name have not been included in this survey and must be inspected by NAS prior to performing any work that would otherwise disturb any of the materials present.

Once identified, each SACM was assigned a unique identifying number, called a material number, and provided a written description (material description). Each material was then categorized as thermal, surfacing, or miscellaneous; then quantified and classified as either friable or non-friable. Please keep in mind that materials classified as non-friable at the time of the survey may become friable overtime or during renovation/demolition activities; plaster and drywall are examples of non-friable materials that will likely become friable during renovation or demolition.

Identified SACMs were then either sampled for the presence of asbestos or assumed to contain asbestos.

Samples from each identified material were collected in random locations. A unique sample number was assigned to each sample collected to link it to the corresponding material. Sample numbers begin with the material number, and then two figures starting with 01 were added to the end. For example, sample number 101 was collected from material number 1. If additional samples were collected from the same material, sample numbers increased consecutively, therefore sample numbers 101, 102, 103 would all be from material number 1.

Freeland Community School District
Freeland Elementary School Kitchen Area
Limited Hazardous Building Material Survey Report
Project No.: 250002
Report Date: January 29, 2025

The number of samples collected from each material was determined by regulatory requirements and the Inspector's findings. Regulatory requirements for each of the three material classifications are as follows:

- Friable surfacing materials require either 3, 5, or 7 samples depending on the amount of material present. (3 for <1,000 sq.ft., 5 for 1,000 to 5,000 sq.ft., and 7 for >5,000 sq.ft.)
- Thermal system insulation requires a minimum of 3 samples.
- Miscellaneous and non-friable materials require a minimum of 2 samples.

Once collected, samples were properly packaged and shipped via United Parcel Service to an independent, properly accredited laboratory for analysis. Analytical results have been included at the end of the Survey Report section.

A description of each of the suspect materials identified during this survey is attached to this report in a section titled Material Report. Also attached are sections titled Inspection Report and Sample Location Report. The Inspection Report will show what suspect materials were found in each room/area and the Sample Location Report will describe where bulk samples were collected.

Prior to disturbing any of the materials found in these buildings, one should carefully match each building material that is going to be disturbed with the materials listed in this report, should a material be discovered that is not clearly identified in this report, that material should be assumed to contain asbestos until testing can be performed. Materials not described in this report have not been tested for asbestos and should be treated as asbestos containing until testing can prove otherwise.

The materials that are either known or assumed to contain asbestos should not be disturbed except by an accredited abatement contractor during the removal process.

The Material Report also identifies which materials are currently considered to be Regulated Asbestos Containing Materials (RACM) by the MDEGLE and the US EPA. According to these agencies, RACMs are asbestos containing materials that are either friable or will likely become friable with the forces expected to be acted upon them. Materials that are currently RACM or would likely become RACM if otherwise left in place must be properly removed by an accredited asbestos abatement contractor prior to the renovation or demolition work being performed. Please note NAS made the RACM determination for each ACM described in this report based on its current condition; future renovations were not considered in this determination. Materials not listed as RACM in this report could become RACM; an accredited Asbestos Contractor Supervisor must determine which materials will become RACM during the course of any renovation or demolition activity.

5.0 LIMITATIONS

- 5.1 NAS made a reasonable attempt to investigate all spaces within the building covered under this report. Destructive inspection measures however were not performed, and it is likely that hidden layers or cavities were not identified by our inspector. The Client Responsibilities section of this report must be reviewed, and each listed action performed to help prevent asbestos exposure.
- 5.2 Mudded pipe insulation/fittings were assumed to be located inside wall/ceiling cavities. We recommend these areas be more thoroughly inspected by an accredited asbestos building inspector prior to the start of any renovation/demolition work.
- 5.3 NAS only inspected areas and sampled SACM in the kitchen area.
- 5.4 Fire rated doors were not sampled to avoid damaging the material and losing its fire rating.
- 5.5 Materials that are assumed to contain asbestos were not sampled to avoid damaging the material.

6.0 CLIENT RESPONSIBILITIES

NAS believes the following actions are required to be carried out by our Client to prevent unnecessary exposure to asbestos:

- 6.1 Review this report in its entirety and provide a signature on the Client Section of the included Signature Page.
- 6.2 All materials that are assumed to contain asbestos or assumed to be present must be tested prior to the start of any renovation or demolition work.
- 6.3 If our Client is not the building owner or manager, our Client shall share this report with the building owner and manager.
- 6.4 Provide written notification to all building occupants, including tenants, employees, contractors, vendors, or visitors, of the presence, location, and quantity of ACM or PACM at this site.

- 6.5 Ensure all known or assumed friable ACM or RACM is properly labeled with the following information:

**DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST**

- 6.6 Ensure all building occupants, who are likely to impact these materials, have received at least 2 hours of awareness training that is specific to this site and in accordance with the Michigan Construction Safety and Health Standards, including, but not limited to: Parts 602-Asbestos in Construction, 603-Lead Exposure in Construction, 604-Chromium (VI) in Construction, 609-Cadmium in Construction, and 690-Silica in Construction.
- 6.7 A recommended Awareness Training Certification and Acknowledgement is attached to this report and should be signed by all building occupants who are likely to work in close proximity of materials that are either known or are assumed to contain asbestos.
- 6.8 If destructive testing measures were not used by NAS during the asbestos survey (see limitation), contract NAS to further inspect areas where renovation or demolition work is to take place using destructive testing measures to better inspect covered layers or inaccessible cavities for potentially hidden suspect materials before any materials are disturbed at this site.
- 6.9 Contract with NAS to prepare a written asbestos abatement work plan prior to disturbing any building materials at this site. The work plan must be prepared by a State of Michigan accredited Asbestos Project Designer in accordance with 40 CFR Part 763.
- 6.10 Contract a State of Michigan licensed Asbestos Abatement Contractor to properly abate all materials that are either known or assumed to contain asbestos before the disturbance of said material occurs.
- 6.11 Ensure the asbestos abatement contractor and/or demolition contractor file the required 10-day permits with MDLEO and MDEGLE prior to disturbing any friable ACM, any RACM, or demolition of a load bearing structure. Demolition contractors are required to file this permit with MDEGLE even if no asbestos is present.
- 6.12 Contract NAS to perform third party perimeter air monitoring and post abatement clearance testing for all abatement activities.

Freeland Community School District
Freeland Elementary School Kitchen Area
Limited Hazardous Building Material Survey Report
Project No.: 250002
Report Date: January 29, 2025


- 6.13 Contract a State of Michigan licensed Asbestos Abatement Contractor to oversee all building demolition activities with an accredited 40-hour Asbestos Abatement Contractor Supervisor.
- 6.14 Immediately stop all site work if a material is discovered that does not clearly match the materials identified in this report and contact NAS for testing; assume newly identified materials contain asbestos until laboratory testing can prove otherwise.

Freeland Community School District
 Freeland Elementary School Kitchen Area
 Limited Hazardous Building Material Survey Report
 Project No.: 250002
 Report Date: January 29, 2025

7.0 SIGNATURE PAGE

7.1 Building Inspector

The person listed below hereby attest that he/she/they did inspect, assess and perform sampling of suspect asbestos containing materials at Freeland Elementary School.

Name	Accreditation Number	Signature	Date
Joshua Christie	A60272		1/29/2025

7.2 Client

The person listed below hereby attests that he/she/they have read this report in its entirety and understands the information provided. Furthermore, they agree that all the items listed under Client Responsibilities must be carried out by the Client and releases Northern Analytical Services, LLC. and their employees of any liability associated with this should the Client not complete every item.

Client Name: Freeland Community School District
 Client Address: 710 Powley Drive, Freeland, Michigan 48623

Client Authorized Agent Name	Signature	Date
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This report is not valid unless all the above signatures are present.

Survey Data

Material Report

Northern Analytical Services

PO Box 1604, Big Rapids, Michigan 49307 - Phone (231) 268-0004 - Fax (866) 214-4739

Customer: Freeland Community School District
 Building: Freeland Elementary School
 Address: 710 Powley Drive
 Freeland, Michigan 48623

Material Report

<i>Material Number</i>	<i>Homogeneous Material Report</i>	<i>Category</i>	<i>Friability*</i>	<i>RACM**</i>	<i>Asbestos Detected</i>	<i>Percent Asbestos</i>	<i>Asbestos Type</i>	<i>Quantity</i>	<i>Units</i>
10	Fire Rated Door -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	3	Each
12	Floor Tile & Mastic - 9x9, Off-White w/ Black Streaks, Black Mastic	Misc.	Category I Non-Friable	No	Yes	T-5% M-2%	Chrysotile	2183	Sq.Ft.
15	Miscellaneous - Terrazzo - Off-White With White and Grey Stones	Misc.	No	No	No	---	None Detected	1700	Sq.Ft.
16	Concrete Block -	Misc.	No	No	No	---	None Detected	Not Quantified	Sq.Ft.
17	Wood Door -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	5	Sq.Ft.
18	Pipe Insulation-Assumed in Walls/Ceiling Cavities -	Thermal	Yes	Yes	Yes	---	Assumed	40	Ln.Ft.
19	Caulk - On Interior Steel Door Frame	Misc.	Category II Non-Friable	No	Yes	5%	Chrysotile	2	Sq.Ft.
20	Caulk - On Exterior Aluminum Door Frame	Misc.	No	No	No	---	None Detected	1	Sq.Ft.
21	Miscellaneous - Tar Assumed Inside Clock/Speaker Housing	Misc.	Category II Non-Friable	No	Yes	---	Assumed	1	Each
22	Drywall - 2ft x 4ft White Ceiling Tile	Misc.	No	No	No	---	None Detected	1800	Sq.Ft.
23	Pipe Insulation - Fiberglass	Thermal	Yes	No	No	---	None Detected	Not Quantified	Ln.Ft.
24	Pipe Insulation-Mudded Fitting - On Fiberglass Line	Thermal	Yes	Yes	Yes	---	Assumed	30	Ln.Ft.
25	Cove Base - 4in Grey	Misc.	No	No	No	---	None Detected	10	Sq.Ft.
26	Ceramic Tile & Grout - 1in Grey	Misc.	No	No	No	---	None Detected	170	Sq.Ft.
27	Ceramic Tile & Grout - 4in Grey	Misc.	No	No	No	---	None Detected	20	Sq.Ft.

*Non-Friable materials may become friable when damaged.

**May become regulated asbestos containing material (RACM) when damaged

Inspection Report

Northern Analytical Services

PO Box 1604, Big Rapids, Michigan 49307 - Phone (231) 268-0004 - Fax (866) 214-4739

Customer: Freeland Community School Dist
 Building: Freeland Elementary Schc
 Address: 710 Powley Drive
 Freeland, Michigan 4862

Inspection Report

<i>Room Number</i>	<i>Material Number</i>	<i>Homogeneous Material Description</i>	<i>Asbestos Detected</i>	<i>Asbestos Type</i>	<i>Quantity</i>	<i>Units</i>	<i>Comments</i>
Kitchen	10	Fire Rated Door -	Yes	Assumed	2	Each	Solid Wood
Kitchen	12	loor Tile & Mastic - 9x9, Off-White w/ Black Streaks, Black Mast	Yes	Chrysotile	65	Sq.Ft.	
Kitchen	15	Miscellaneous - Terrazzo - Off-White With White and Grey Stone:	No	None Detected	1700	Sq.Ft.	
Kitchen	16	Concrete Block -	No	None Detected	0	Sq.Ft.	Not Quantified
Kitchen	17	Wood Door -	Yes	Assumed	5	Sq.Ft.	1 Exterior Aluminum 4 Solid Wood
Kitchen	18	Pipe Insulation-Assumed in Walls/Ceiling Cavities -	Yes	Assumed	20	Ln.Ft.	5 At East Wall Sink 5 At North Wall Heater 10 At West Wall Sink and Heater
Kitchen	19	Caulk - On Interior Steel Door Frame	Yes	Chrysotile	2	Sq.Ft.	
Kitchen	20	Caulk - On Exterior Aluminum Door Frame	No	None Detected	1	Sq.Ft.	
Kitchen	21	Miscellaneous - Tar Assumed Inside Clock/Speaker Housing	Yes	Assumed	1	Each	East Wall
Kitchen	22	Drywall - 2ft x 4ft White Ceiling Tile	No	None Detected	1800	Sq.Ft.	
Kitchen	23	Pipe Insulation - Fiberglass	No	None Detected	0	Ln.Ft.	Not Quantified
Kitchen	24	Pipe Insulation-Mudded Fitting - On Fiberglass Line	Yes	Assumed	30	Ln.Ft.	Above Drop Ceiling
Kitchen	25	Cove Base - 4in Grey	No	None Detected	10	Sq.Ft.	
Kitchen A	3	Floor Tile & Mastic - w/ Black Mastic	Yes	Chrysotile	134	Sq.Ft.	Assumed Under Surface Layer
Kitchen Storage	10	Fire Rated Door -	Yes	Assumed	1	Each	Freezer Door
Kitchen Storage	18	Pipe Insulation-Assumed in Walls/Ceiling Cavities -	Yes	Assumed	20	Ln.Ft.	Above Concrete Deck

Northern Analytical Services

PO Box 1604, Big Rapids, Michigan 49307 - Phone (231) 268-0004 - Fax (866) 214-4739

Customer: Freeland Community School District
Building: Freeland Elementary School
Address: 710 Powley Drive
Freeland, Michigan 48623

Inspection Report

<i>Room Number</i>	<i>Material Number</i>	<i>Homogeneous Material Description</i>	<i>Asbestos Detected</i>	<i>Asbestos Type</i>	<i>Quantity</i>	<i>Units</i>	<i>Comments</i>
Kitchen Storage	26	Ceramic Tile & Grout - 1in Grey	No	None Detected	170	Sq.Ft.	
Kitchen Storage	27	Ceramic Tile & Grout - 4in Grey	No	None Detected	20	Sq.Ft.	Cove Base

Sample Location Report

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

Customer: Freeland Community School District
Building: Freeland Elementary School
Address: 710 Powley Drive
Freeland, MI 48623

Printed: January 29, 2025

Sample Location Report

<i>Sample Number</i>	<i>Material Number</i>	<i>Homogeneous Material Description</i>	<i>Room Number</i>	<i>Sample Location</i>
1201	12	Floor Tile & Mastic - 9x9, Off-White w/ Black Streaks, Black Mastic	Library C	2ft North of SE Corner
1202	12	Floor Tile & Mastic - 9x9, Off-White w/ Black Streaks, Black Mastic	Library	9ft West, 16ft North of SE Corner
1203	12	Floor Tile & Mastic - 9x9, Off-White w/ Black Streaks, Black Mastic	Kitchen	Southwest Corner
1301	13	Cove Base - 4 inch, Black	Library C	East side of South Door Frame
1302	13	Cove Base - 4 inch, Black	Library	5ft North of SE Corner
1501	15	Miscellaneous - Terrazzo - Off-White With White and Grey Stones	Kitchen	At Drain Damage
1502	15	Miscellaneous - Terrazzo - Off-White With White and Grey Stones	Kitchen	At Middle Pipe Opening
1601	16	Concrete Block -	Kitchen	9ft North 8ft West of Northeast Corner Above Ceiling Tile
1602	16	Concrete Block -	Kitchen	9ft North 16ft West of Northeast Corner Above Ceiling Tile
1901	19	Caulk - On Interior Steel Door Frame	Kitchen	South Side of South Frame
1902	19	Caulk - On Interior Steel Door Frame	Kitchen	North Side of North Frame
2001	20	Caulk - On Exterior Aluminum Door Frame	Kitchen	North Side of Frame
2002	20	Caulk - On Exterior Aluminum Door Frame	Kitchen	South Side of Frame
2201	22	Drywall - 2ft x 4ft White Ceiling Tile	Kitchen	24ft West 8ft North of Southeast Corner
2202	22	Drywall - 2ft x 4ft White Ceiling Tile	Kitchen	8ft West 4ft North of Southeast Corner
2301	23	Pipe Insulation - Fiberglass	Kitchen	12ft West 16ft North of Southeast Corner

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

Customer: Freeland Community School District
Building: Freeland Elementary School
Address: 710 Powley Drive
Freeland, MI 48623

Printed: January 29, 2025

Sample Location Report

<i>Sample Number</i>	<i>Material Number</i>	<i>Homogeneous Material Description</i>	<i>Room Number</i>	<i>Sample Location</i>
2302	23	Pipe Insulation - Fiberglass	Kitchen	8ft South 20ft West of Northeast Corner
2303	23	Pipe Insulation - Fiberglass	Kitchen	8ft West 8ft South of Northeast Corner
2401	24	Pipe Insulation-Mudded Fitting - On Fiberglass Line	Kitchen	8ft West 4ft South of Northeast Corner
2501	25	Cove Base - 4in Grey	Kitchen	North Side of Exterior Frame
2502	25	Cove Base - 4in Grey	Kitchen	South Side of Third South Most Frame
2601	26	Ceramic Tile & Grout - 1in Grey	Kitchen Storage	At Damage
2602	26	Ceramic Tile & Grout - 1in Grey	Kitchen Storage	At Damage
2701	27	Ceramic Tile & Grout - 4in Grey	Kitchen Storage	At Damage
2702	27	Ceramic Tile & Grout - 4in Grey	Kitchen Storage	At Damage

Laboratory Reports



The Identification Specialists

Analysis Report
prepared for
Northern Analytical Services, LLC

Report Date: 1/23/2025

Project Name: Freeland Elementary

Project #: 250002

SanAir ID#: 25004024



NVLAP LAB CODE 200870-0

10501 Trade Court, North Chesterfield, Virginia 23236
888.895.1177 | 804.897.1177 | fax: 804.897.0070 | LabReports@SanAir.com | SanAir.com



SanAir ID Number
25004024
FINAL REPORT
1/23/2025 1:24:25 PM

Name: Northern Analytical Services, LLC
Address: 14870 225th Avenue
Big Rapids, MI 49307
Phone: 231-679-0005

Project Number: 250002
P.O. Number:
Project Name: Freeland Elementary
Collected Date: 1/15/2025
Received Date: 1/21/2025 10:35:00 AM

Dear Joshua Christie,

We at SanAir would like to thank you for the work you recently submitted. The 21 sample(s) were received on Tuesday, January 21, 2025 via UPS. The final report(s) is enclosed for the following sample(s): 1203, 1501, 1502, 1601, 1602, 1901, 1902, 2001, 2002, 2201, 2202, 2301, 2302, 2303, 2401, 2501, 2502, 2601, 2602, 2701, 2702.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

A handwritten signature in black ink that reads "Sandra Sobrino". The signature is written in a cursive, flowing style.

Sandra Sobrino
Asbestos & Materials Laboratory Manager
SanAir Technologies Laboratory

Final Report Includes:

- Cover Letter
- Analysis Pages
- Disclaimers and Additional Information

Sample conditions:

- 21 samples in Good condition.



SanAir ID Number
25004024
 FINAL REPORT
 1/23/2025 1:24:25 PM

Name: Northern Analytical Services, LLC
Address: 14870 225th Avenue
 Big Rapids, MI 49307
Phone: 231-679-0005

Project Number: 250002
P.O. Number:
Project Name: Freeland Elementary
Collected Date: 1/15/2025
Received Date: 1/21/2025 10:35:00 AM

Analyst: Tallert, Jonathan

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic		Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous		
1203 / 25004024-001 Floor Tile Mastic, Floor Tile	Beige Non-Fibrous Homogeneous		95% Other		5% Chrysotile
1203 / 25004024-001 Floor Tile Mastic, Mastic	Black Non-Fibrous Homogeneous		98% Other		2% Chrysotile
1501 / 25004024-002 Terrazzo	Off-White Non-Fibrous Homogeneous		100% Other		None Detected
1502 / 25004024-003 Terrazzo	Off-White Non-Fibrous Homogeneous		100% Other		None Detected
1601 / 25004024-004 Concrete Block	Grey Non-Fibrous Homogeneous		100% Other		None Detected
1602 / 25004024-005 Concrete Block	Grey Non-Fibrous Homogeneous		100% Other		None Detected
1901 / 25004024-006 Caulk	Tan Non-Fibrous Homogeneous		95% Other		5% Chrysotile
1902 / 25004024-007 Caulk					Not Analyzed
2001 / 25004024-008 Caulk	Brown Non-Fibrous Homogeneous		100% Other		None Detected
2002 / 25004024-009 Caulk	Brown Non-Fibrous Homogeneous		100% Other		None Detected

Analyst:

Approved Signatory:

Analysis Date:

1/23/2025

Date:

1/23/2025



SanAir ID Number
25004024
 FINAL REPORT
 1/23/2025 1:24:25 PM

Name: Northern Analytical Services, LLC
Address: 14870 225th Avenue
 Big Rapids, MI 49307
Phone: 231-679-0005

Project Number: 250002
P.O. Number:
Project Name: Freeland Elementary
Collected Date: 1/15/2025
Received Date: 1/21/2025 10:35:00 AM

Analyst: Tallert, Jonathan

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic	Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous	
2201 / 25004024-010 Drywall	White Non-Fibrous Homogeneous	5% Cellulose	95% Other	None Detected
2202 / 25004024-011 Drywall	White Non-Fibrous Homogeneous	5% Cellulose	95% Other	None Detected
2301 / 25004024-012 Fiberglass, Insulation	Yellow Fibrous Homogeneous	98% Glass	2% Other	None Detected
2301 / 25004024-012 Fiberglass, Wrap	Off-White Fibrous Homogeneous	98% Cellulose	2% Other	None Detected
2302 / 25004024-013 Fiberglass, Insulation	Yellow Fibrous Homogeneous	98% Glass	2% Other	None Detected
2302 / 25004024-013 Fiberglass, Wrap	Off-White Fibrous Homogeneous	98% Cellulose	2% Other	None Detected
2303 / 25004024-014 Fiberglass, Insulation	Yellow Fibrous Homogeneous	98% Glass	2% Other	None Detected
2303 / 25004024-014 Fiberglass, Wrap	Off-White Fibrous Homogeneous	98% Cellulose	2% Other	None Detected
2401 / 25004024-015 Mudded Pipe Fitting, Mudded Fitting	Grey Non-Fibrous Homogeneous	10% Min. Wool	90% Other	None Detected
2401 / 25004024-015 Mudded Pipe Fitting, Wrap	Beige Fibrous Homogeneous	95% Cellulose	5% Other	None Detected

Analyst:

Approved Signatory:

Analysis Date:

1/23/2025

Date:

1/23/2025



SanAir ID Number
25004024
 FINAL REPORT
 1/23/2025 1:24:25 PM

Name: Northern Analytical Services, LLC
Address: 14870 225th Avenue
 Big Rapids, MI 49307
Phone: 231-679-0005

Project Number: 250002
P.O. Number:
Project Name: Freeland Elementary
Collected Date: 1/15/2025
Received Date: 1/21/2025 10:35:00 AM

Analyst: Tallert, Jonathan

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic	Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous	
2501 / 25004024-016 Cove Base, Cove Base	Grey Non-Fibrous Homogeneous		100% Other	None Detected
2501 / 25004024-016 Cove Base, Mastic	Various Non-Fibrous Heterogeneous		100% Other	None Detected
2502 / 25004024-017 Cove Base, Cove Base	Grey Non-Fibrous Homogeneous		100% Other	None Detected
2502 / 25004024-017 Cove Base, Mastic	Tan Non-Fibrous Homogeneous		100% Other	None Detected
2601 / 25004024-018 Ceramic Tile & Grout, Tile	Grey Non-Fibrous Homogeneous		100% Other	None Detected
2601 / 25004024-018 Ceramic Tile & Grout, Grout	Grey Non-Fibrous Homogeneous		100% Other	None Detected
2601 / 25004024-018 Ceramic Tile & Grout, Mortar	Grey Non-Fibrous Heterogeneous		100% Other	None Detected
2602 / 25004024-019 Ceramic Tile & Grout, Tile	Grey Non-Fibrous Homogeneous		100% Other	None Detected
2602 / 25004024-019 Ceramic Tile & Grout, Grout	Grey Non-Fibrous Homogeneous		100% Other	None Detected
2602 / 25004024-019 Ceramic Tile & Grout, Mortar/Thinset	White Non-Fibrous Homogeneous		100% Other	None Detected

Analyst:

Approved Signatory:

Analysis Date:

1/23/2025

Date:

1/23/2025



SanAir ID Number
25004024
 FINAL REPORT
 1/23/2025 1:24:25 PM

Name: Northern Analytical Services, LLC
Address: 14870 225th Avenue
 Big Rapids, MI 49307
Phone: 231-679-0005

Project Number: 250002
P.O. Number:
Project Name: Freeland Elementary
Collected Date: 1/15/2025
Received Date: 1/21/2025 10:35:00 AM

Analyst: Tallert, Jonathan

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic	Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous	
2701 / 25004024-020 Ceramic Tile & Grout, Tile	Off-White Non-Fibrous Homogeneous		100% Other	None Detected
2701 / 25004024-020 Ceramic Tile & Grout, Grout	Grey Non-Fibrous Homogeneous		100% Other	None Detected
2702 / 25004024-021 Ceramic Tile & Grout, Tile	Off-White Non-Fibrous Homogeneous		100% Other	None Detected
2702 / 25004024-021 Ceramic Tile & Grout, Grout	Grey Non-Fibrous Homogeneous		100% Other	None Detected

Analyst:

Approved Signatory:

Analysis Date: 1/23/2025

Date: 1/23/2025

Disclaimer and Additional Information:
Asbestos Bulk PLM EPA 600/R-93/116

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Samples are held for a period of 60 days. Fibers smaller than 5 microns cannot be seen with this method due to scope limitations. For NY state samples, method EPA 600/M4-82-020 is performed.

NYELAP Disclaimer:

Polarized-light microscopy is not consistently reliable in detecting asbestos in floor covering and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.

Asbestos Accreditations, Certifications, and Licenses

National Voluntary Laboratory Accreditation Program (NVLAP) Lab Code 200870-0
City of Philadelphia Department of Public Health Air Management Services, Certification#ALL-460
Commonwealth of Pennsylvania Department of Environmental Protection Number 68-05397
California State Environmental Laboratory Accreditation Program Certificate Number 2915
Colorado Department of Public Health and Environment Registration Number AL-23143
Connecticut Department of Public Health Environmental Laboratory Registration Number PH-0105
Massachusetts Department of Labor Standards Asbestos Analytical Services License Number:
AA000222
State of Maine Department of Environmental Protection License Number: LB-0075
New York State Department of Health Laboratory ID: 11983
State of Rhode Island Department of Health Certification No.: PLM00126
Texas Department of State Health Services License Number: 300440
Commonwealth of Virginia Department of Professional and Occupational Regulation Number:
3333000323
State of Washington Department of Ecology Laboratory ID: C989
State of West Virginia Bureau for Public Health Analytical Laboratory Number: LT000616
Vermont Department of Health License Number: Asb-Co-An-000006
Louisiana Department of Environmental Quality AI Number 212253, LELAP Lab ID #05088



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 N. Chesterfield, VA 23236
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 Fax 804.897.0070
 sanair.com

Asbestos
 Chain of Custody
 Form 140, Rev 7, 10/20/2022

SanAir ID Number

25004024

Company: Northern Analytical Services, LLC		Project #: 250002	Collected by: Joshua Christie
Address: 14870 225th Ave.		Project Name: <i>Freeland Elementary</i>	Phone #: (231) 679-0005
City, St., Zip: Big Rapids, MI, 49307		Date Collected: 1/15/2025	Fax #: 866-214-4739
State of Collection: MI	Account#: 2409	P.O. Number:	Email: john@northernas.com/kevindelancay@northernas.com

Bulk		Air		Soil	
ABB	PLM EPA 600/R-93/116 <input checked="" type="checkbox"/>	ABA	PCM NIOSH 7400 <input type="checkbox"/>	ABSE	PLM EPA 600/R-93/116 (Qual.) <input type="checkbox"/>
	Positive Stop <input checked="" type="checkbox"/>	ABA-2	OSHA w/ TWA* <input type="checkbox"/>	Vermiculite	
ABEPA	PLM EPA 400 Point Count <input type="checkbox"/>	ABTEM	TEM AHERA <input type="checkbox"/>	ABB	PLM EPA 600/R-93/116 <input type="checkbox"/>
ABBIK	PLM EPA 1000 Point Count <input type="checkbox"/>	ABATN	TEM NIOSH 7402 <input type="checkbox"/>	ABEPA3	PLM EPA 400 Point Count <input type="checkbox"/>
ABBN	PLM EPA NOB** <input type="checkbox"/>	ABT2	TEM Level II <input type="checkbox"/>	ABCM	Cincinnati Method <input type="checkbox"/>
ABBCH	TEM Chatfield** <input type="checkbox"/>	Other:	<input type="checkbox"/>	Dust	
ABBTM	TEM EPA NOB** <input type="checkbox"/>	New York ELAP		ABWA	TEM Wipe ASTM D-6480 <input type="checkbox"/>
ABQ	PLM Qualitative <input type="checkbox"/>	ABEPA2	NY ELAP 198.1 <input type="checkbox"/>	ABDMV	TEM Microvac ASTM D-5755 <input type="checkbox"/>
		ABENY	NY ELAP 198.6 PLM NOB <input type="checkbox"/>	Matrix Other	
		ABBNY	NY ELAP 198.4 TEM NOB <input type="checkbox"/>		<input type="checkbox"/>
			Positive Stop <input type="checkbox"/>		<input type="checkbox"/>

** Available on 24-hr. to 5-day TAT

Water		Turn Around Times	
ABHE	EPA 100.2 <input type="checkbox"/>	3 HR (4 HR TEM) <input type="checkbox"/>	6 HR (8HR TEM) <input type="checkbox"/>
		<input checked="" type="checkbox"/> 2 Days	<input type="checkbox"/> 3 Days
		<input type="checkbox"/> 4 Days	<input type="checkbox"/> 5 Days
		12 HR <input type="checkbox"/>	1 Day <input type="checkbox"/>

Special Instructions	POINT COUNT IF < 1%
-----------------------------	---------------------

Sample #	Sample Identification/Location	Volume or Area	Sample Date	Flow Rate*	Start - Stop Time*
1203	Floor Tiled Mastic				
1501	Terrazzo				
1502	Terrazzo				
1601	Concrete Block				
1602	Concrete Block				
1901	Caulk				
1902	Caulk				
2001	Caulk				
2002	Caulk				
2201	Drywall				
2202	Drywall				
2301	Fiberglass				

Relinquished by	Date	Time	Received by	Date	Time
Joshua Christie	1/15/2025	1800	<i>[Signature]</i>	1/21/25	10:35 AM

If no technician is provided, then the primary contact for your account will be selected. Unless scheduled, the turnaround time for all samples received after 3 pm EST will be logged in the next business day. Weekend or holiday work must be scheduled ahead of time and is charged at 150% of the 3hr TAT or a minimum charge of \$150. A courier charge will be applied for same day and one-day turnaround times for offsite work. SanAir covers Ground and Next Day Air shipping. Shipments billed to SanAir with a faster shipping rate will result in additional charges.



The Identification Specialists

Analysis Report
prepared for
Northern Analytical Services, LLC

Report Date: 1/28/2025

Project Name: Freeland Elementary

Project #: 250002

SanAir ID#: 25003856



10501 Trade Court, North Chesterfield, Virginia 23236

888.895.1177 | 804.897.1177 | fax: 804.897.0070 | LabReports@SanAir.com | SanAir.com



SanAir ID Number
25003856
FINAL REPORT
1/28/2025 9:26:44 AM

Name: Northern Analytical Services, LLC
Address: 14870 225th Avenue
Big Rapids, MI 49307
Phone: 231-679-0005

Project Number: 250002
P.O. Number:
Project Name: Freeland Elementary
Collected Date: 1/15/2025
Received Date: 1/21/2025 10:35:00 AM

Dear Josh Christie,

We at SanAir would like to thank you for the work you recently submitted. The 2 sample(s) were received on Tuesday, January 21, 2025 via UPS. The final report(s) is enclosed for the following sample(s): 1P, 2P.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

A handwritten signature in black ink that reads "Abisola Kasali".

Abisola Kasali
Metals Laboratory Director
SanAir Technologies Laboratory

Final Report Includes:

- Cover Letter
- Chemistry Analysis
- Disclaimers and Additional Information

Sample conditions:

- 2 samples in Good condition.



SanAir Technologies Laboratory, Inc.

10501 Trade Court, N. Chesterfield VA 23236
 804.897.1177 Toll Free 888.895.1177 Fax: 804.897.0070
www.sanair.com

email:labreports@sanair.com

SanAir ID Number
 25003856
 Final Report

Name: Northern Analytical Services, LLC
Address: 14870 225th Avenue
 Big Rapids, MI 49307
Phone: 231-679-0005

Project Number: 250002
P.O. Number:
Project Name: Freeland Elementary

Collected Date: 1/15/2025
Received Date: 1/21/2025 10:35 AM
Report Date: 1/28/2025 10:00 AM
Analyst: Marti Baird

Analyte Requested: Paint: Cadmium (Cd), Chromium (Cr), Lead (Pb)
Test Method: EPA M3050B /6010C

REPORT OF ANALYSIS

Lab Sample #	Field Sample #	Analyte	Sample Description	Results in ug/g	MRL ug/g
25003856-1	1P	Cadmium (Cd)	White/Kitchen	<10.0	10.0
		Chromium (Cr)		<25.0	25.0
		Lead (Pb)		59.0	25.0
25003856-2	2P	Cadmium (Cd)	Light Yellow/Kitchen Storage	<10.0	10.0
		Chromium (Cr)		<25.0	25.0
		Lead (Pb)		<25.0	25.0

ug/g=ppm MRL: Method Reporting Limit based on 1.0ug for Cd, 2.5ug for other metals aliquot

Signature: *Marti Baird*
 Date: 1/23/2025

Reviewed: *Alice Blair*
 Date: 1/24/2025

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LELAP Lab ID#05088

AIHA LAP, LLC Lab ID: LAP-162952

Commonwealth of VA Department of General Services DCLS, VELAP Laboratory ID#460251

New York State Department of Health Laboratory ID No: 11983

California State Environmental Laboratory Accreditation Program Certificate No: 2915

State of Connecticut Department of Public Health Environmental Laboratory Registration Number: PH-0105

Revision Date 2/16/2023



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 Fax 804.897.0070
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**Metals & Lead
 Chain Of Custody**
 Form #70, Revision 14, 05/06/24

SanAir ID Number
 25003852

Company: Northern Analytical Services, LLC	Project #: 250002	Collected By: Joshua Christie
Address: 14870 225th Ave.	Project Name: <i>Freeland Elementary</i>	Phone #: (231) 679-0005
City, St., Zip: Big Rapids, MI, 48604	Date Collected: 1/15/2025	Fax #: 866-214-4739
State Of Collection: MI Account#: 2409	P.O. Number:	Email: john@northernas.com

Matrix Types

Metals Analysis Types

<input type="checkbox"/> Air (ug/m3) <input type="checkbox"/> Wipe (ug/ft2)	<input type="checkbox"/> Total Concentration of Lead (AA)	<input type="checkbox"/> TCLP for Lead (TCLP)
<input checked="" type="checkbox"/> Paint <input type="checkbox"/> Soil <input type="checkbox"/> Bulk (ug/g or ppm)	<input type="checkbox"/> Total Concentration of RCRA 8 Metals (RCRA 8)	<input type="checkbox"/> TCLP for RCRA 8 Metals (RCRA)
<input type="checkbox"/> Other:	<input type="checkbox"/> Total Concentration of Mercury (Hg)	<input checked="" type="checkbox"/> ICP (Total Concentration of Metals) Please list metals: <i>Pb, Cd, Cr</i>

Turn Around Time	Same Day <input type="checkbox"/>	1 Day <input type="checkbox"/>	2 Days <input type="checkbox"/>	3 Days <input type="checkbox"/>	4 Days <input type="checkbox"/>	5 Days <input checked="" type="checkbox"/>
------------------	-----------------------------------	--------------------------------	---------------------------------	---------------------------------	---------------------------------	--

Special Instructions	
----------------------	--

Sample #	Collection Date & Time	Sample Identification/Location	Flow Rate	Start Time	Stop Time	Volume (L) Area (Sq ft)
1P	1/15/25	White / Kitchen	—	—	—	—
2P	1/15/25	Light Yellow / Kitchen Storage	—	—	—	—

Relinquished by	Date	Time	Received by	Date	Time
Joshua Christie	1/15/25	1900	SMC	1/21/25	1035AM

Photos



Floor tile and mastic contains asbestos

Floor Plans

FREELAND ELEMENTARY SCHOOL
710 Powley Drive
Freeland, MI 48623

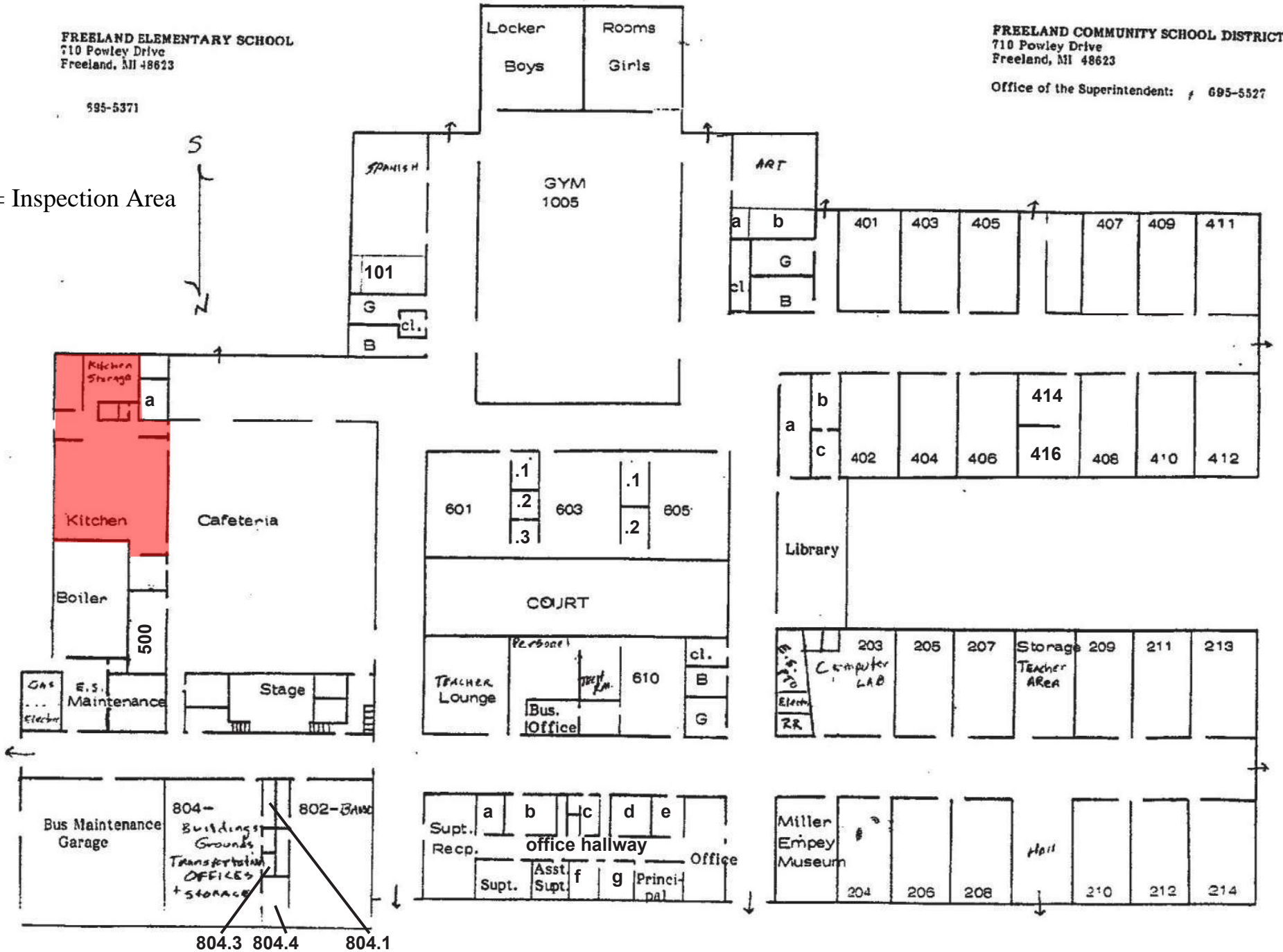
595-5371

FREELAND COMMUNITY SCHOOL DISTRICT
710 Powley Drive
Freeland, MI 48623

Office of the Superintendent: 695-5527

■ = Inspection Area

S
N



FREELAND TRANSPORTATION and BUILDINGS & GROUNDS
710 Powley Drive
Freeland, MI 48623

695-5101

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 amount 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

Elementary Cafeteria
For:
**Freeland Community
School District**
Freeland, Michigan

Specifications

Issued For:
Bidding / Permit
1/22/2025

Prepared by:

THE COLLABORATIVE

One SeaGate, Park Level 118
Toledo, Ohio 43604
Phone: 419-242-7405
Fax: 419-242-7400

Project No. 107289



TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

003100.0Available Project Information1

DIVISION 01 – GENERAL REQUIREMENTS

011000Summary3
012100Allowances2
012500Substitution Procedures3
013135Architect’s CADD Files5
016000Product Requirements6
016116Volatile Organic Compound (VOC) Content Restrictions3

DIVISION 02 – EXISTING CONDITIONS

024119Selective Demolition5

DIVISION 03 – CONCRETE (NOT USED)

DIVISION 04 – MASONRY

042000Unit Masonry10

DIVISION 05 – METALS (NOT USED)

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES (NOT USED)

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

070150.19Preparation for Re-Roofing3
076200Sheet Metal Flashing and Trim9
077200Roof Accessories4
079200Joint Sealants8

DIVISION 08 – OPENINGS

081113Hollow Metal Doors and Frames7
083326Overhead Coiling Grilles5

DIVISION 09 – FINISHES

090561Common Work Results for Flooring Preparation10
095113Acoustical Panel Ceilings6
096513Resilient Base and Accessories4
096700Fluid-Applied Flooring6
099123Interior Painting11

DIVISION 10 – SPECIALTIES (NOT USED)

DIVISION 11 – EQUIPMENT

114011Food Service Equipment.....27

DIVISION 12 – FURNISHINGS (NOT USED)

DIVISION 13 – SPECIAL CONSTRUCTION (NOT USED)

DIVISION 14 – CONVEYING EQUIPMENT (NOT USED)

DIVISION 21 – FIRE SUPPRESSION (NOT USED)

DIVISION 22 – PLUMBING

220500Plumbing Requirements.....19
 220510Plumbing Systems Testing, Cleaning, Water Treatment and Startup.....6
 220553Plumbing System Identification.....3
 220600Plumbing Specialties.....18
 220700Plumbing Pipe Insulation7
 221000Plumbing Piping23

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

230500HVAC Requirements.....20
 230553HVAC Identification.....3
 230593Testing, Adjusting and Balancing.....11
 230713External Duct Insulation6
 230714Internal Acoustical Duct Lining.....4
 230900Temperature Controls26
 232500HVAC Systems Testing, Cleaning, Water Treatment and Startup.....11
 233000Air Distribution.....14
 237400Rooftop HVAC Unit3

DIVISION 26 – ELECTRICAL

260000Basic Electrical Requirements7
 260505Selective Demolition for Electrical.....2
 260519Low-Voltage Electrical Power Conductors and Cables.....4
 260526Grounding and Bonding for Electrical Systems3
 260529Hangers and Supports for Electrical Systems2
 26053.13Conduit for Electrical Systems7
 260533.16Boxes for Electrical Systems5
 260553Identification for Electrical Systems4
 260583Wiring Connections.....3
 260923Lighting Control Devices4
 262200Low Voltage Transformers4
 262416Panelboards.....4
 262716Electrical Cabinets and Enclosures2
 262726Wiring Devices5
 262813Fuses2

262816Enclosed Switches and Circuit Breakers3
262913Enclosed Controllers.....3
265100Interior Lighting3

DIVISION 27 – COMMUNICATIONS

270528Pathways for Communication System2
271500Communications Horizontal Cabling.....4

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

284613Fire Alarm System13

DIVISION 31 – EARTHWORK (NOT USED)

DIVISION 32 – EXTERIOR IMPROVEMENTS (NOT USED)

DIVISION 33 – UTILITIES (NOT USED)

END OF DOCUMENT

SECTION 003100 - AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.1 EXISTING CONDITIONS

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:
- B. The contractor should review hazardous material testing reports with the owner and any found instances prior to demolition work taking place. No report has been provided or is included within these documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

A. END OF SECTION

SECTION 011000 - SUMMARY

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: Elementary School – Kitchen & Servery Renovations
- B. Owner's Name: Freeland Community School District
- C. Architect's Name: The Collaborative Inc.
- D. The Project consists of renovations to the existing kitchen, dishwashing and servery areas off of the existing Cafeteria that is to remain undisturbed.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 005200 - Agreement Form.

1.3 WORK BY OWNER

- A. Owner will supply and install items as noted within the contract documents.
- B. Owner will supply items as noted within the contract documents for installation by the Contractor.

1.4 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing building as indicated through the Construction Managers logistics planning.
- B. Owner intends to occupy portions of the Project at times indicated through the Construction Managers logistics planning.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.

2. Refer to the Construction Managers logistics planning for limitations on areas of construction operations during different construction phases.
- B. Material Deliveries: Coordinate schedule and locations for all on-site deliveries with Owner.
 1. Deliveries are prohibited during student drop-off, pick-up, and bussing times.
 - a. Prohibited hours for deliveries, unless approved in writing by Owner in advance:
 - 1) 7:30 AM to 8:30 AM, verify with owner
 - 2) 2:30 PM to 3:30 PM, verify with owner
- C. Arrange use of site and premises to allow:
 1. Owner occupancy in areas unaffected by renovation.
- D. Provide access to and from site as required by law and by Owner:
 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- E. Existing building spaces may not be used for storage.
- F. Time Restrictions:
 1. Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm, and days when school is not in session.
- G. Utility Outages and Shutdown:
 1. Limit disruption of utility services to hours the building is unoccupied.
 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
 3. Prevent accidental disruption of utility services to other facilities.

1.6 WORK SEQUENCE

- A. Refer to drawings for additional scope and milestone information for each phase.
- B. Milestone dates for each phase are essential to the Project. Contractor is responsible for completing phases by dates provided.
 1. Owner is not responsible for additional overtime or off-shift labor costs, or winter conditions costs incurred by Contractor to maintain the project schedule, defined by the complete project schedule approved by Contractor, Owner, and Architect in accordance with Section 013216 - Construction Progress Schedule.
 2. Refer to Instructions to Bidders for additional information.
- C. Coordinate construction schedule and operations with Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 012100 - ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cash allowances.

1.2 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts.
- B. Architect Responsibilities:
 - 1. Select products in consultation with Owner and transmit decision to Contractor.
- C. Contractor Responsibilities:
 - 1. Assist Architect in selection of products, and installers.
 - 2. Obtain proposals from suppliers and installers and offer recommendations.
 - 3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
 - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- D. Differences in costs will be adjusted by Change Order whether it be in addition to the stated amount or if less than or none of the amount is used throughout construction. Any and all dollars not utilized through construction need be returned to the Owner for the full amount not utilized with no additional mark-up associated by the contractor.

1.3 ALLOWANCES SCHEDULE

- A. The contractor is to hold an allowance in the amount of Ten Thousand dollars (\$10,000.00) for additional patching requirements throughout the areas of work. If a portion or all of the funds are not used the remaining amount should be returned to the owner at actual cost and with no associated mark-ups.
- B. The contractor is to hold an allowance in the amount of Ten Thousand dollars (\$10,000.00) for additional existing utility clean-up throughout the areas of work. If a portion or all of the funds are not used the remaining amount should be returned to the owner at actual cost and with no associated mark-ups.

- C. The contractor is to hold an allowance in the amount of Ten Thousand dollars (\$10,000.00) for additional epoxy flooring that may be needed in adjacent rooms to the area of work. If a portion or all of the funds are not used the remaining amount should be returned to the owner at actual cost and with no associated mark-ups.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.2 RELATED REQUIREMENTS

- A. Section 002113 - Instructions to Bidders: Restrictions on timing of substitution requests.
- B. Section 012100 - Allowances, for cash allowances affecting this section.
- C. Section 013000 - Administrative Requirements: Submittal procedures, coordination.
- D. Section 016000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.
- E. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Restrictions on emissions of indoor substitute products.

1.3 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.

1.4 REFERENCE STANDARDS

- A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage) Current Edition.
- B. CSI/CSC Form 13.1A - Substitution Request (After the Bidding/Negotiating Phase) Current Edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.
- D. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.2 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.
- B. Submittal Form (before award of contract):
 - 1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage). See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.3 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submittal Form (after award of contract):

1. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Substitutions will not be considered under one or more of the following circumstances:
 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 2. Without a separate written request.
 3. When acceptance will require revisions to Contract Documents.

3.4 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

3.5 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

END OF SECTION

SECTION 013135 - ARCHITECT'S CADD FILES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the Contractor's use of the Architect's CADD files.

1.2 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CADD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals on limited basis as indicated.

1.3 CONTRACTOR'S USE OF ARCHITECT'S CADD FILES

- A. General: At Contractor's written request, copies of Architect's CADD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 - 1. Review procedures as listed in the "Collaborative CADD File Transfer" form, found at the end of this section.
 - 2. Submit completed form to the Architect.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

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THE COLLABORATIVE INC. CADD FILE TRANSFER

As requested, The Collaborative Inc is providing electronic files containing data for Computer Aided Design and Drafting (CADD) drawings for your convenience and use in the preparation of shop drawings and/or site layout related to Renovations within the Freeland Elementary School, Architects Project No. 107289, subject to the following terms and conditions:

- A. Electronic files will be provided in .DWG format . We make no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.
- B. Further, we advise you that automated conversion of information and data from the system and format referenced above to an alternate system or format cannot be accomplished without the potential for the introduction of anomalies, errors, or misinterpretation.
- C. Data contained on these electronic files are part of our instruments of service and shall not be used by you or anyone else receiving these data through or from you for any purpose other than as a convenience in the preparation of shop drawings or site layout for the referenced project. The Collaborative Inc disclaims liability for any losses, damage costs, injuries or death arising out of or caused by (i) any changes made to the Drawings/Files by other than The Collaborative Inc, and (ii) any use of the Drawings/Files or portions thereof for any purpose other than for which said items were intended when prepared. Any use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or sub consultants that may arise out of or in connection with your use of the electronic files.
- D. Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold us harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from your use or the use of any person or entity that acquires or obtains the electronic files from or through you of these electronic files.
- E. These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed or sealed hard-copy construction documents prepared by us and the electronic files, the signed or sealed hard-copy construction documents, including all supplemental documentation (addenda, field & change orders, etc.), shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

- F. Because information presented on the electronic files can be modified, unintentionally or otherwise, we reserve the right to remove all indication of ownership, and/or involvement from each electronic display.
- G. No files will be transferred until this agreement is returned with signature.
- H. Once electronic files have been transferred to the General/Prime Contractor(s), it will be the Contractor's responsibility to field all requests for the electronic media on that particular project by Subcontractors.
- I. Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by us, and we make no warranties, either express or implied, on merchantability and fitness for any particular purpose. In no event shall we be liable for any loss of profit or any consequential damages as a result of your use or reuse of these electronic files.

_____	_____
Contractor (Firm Name)	(Date)
_____	_____
By (Signature)	(Typed Name)

Request for Electronic Files

Contractor Requesting Files: _____

Date: _____

Address: _____

Telephone Number: _____

E-mail: _____

Attention: _____

Project Name: _____

Requesting Additional Sheets (#'s): _____

Requesting Format Conversion To: _____

END OF SECTION

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Identification of Owner-supplied products.
- B. Section 012500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- D. Section 017419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.3 REFERENCE STANDARDS

- A. EN 15804 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products 2014.
- B. GreenScreen (LIST) - GreenScreen for Safer Chemicals List Translator; Clean Production Action Current Edition.
- C. GreenScreen (METH) - GreenScreen for Safer Chemicals Method v1.2; Clean Production Action Current Edition.
- D. ISO 14025 - Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures 2006.

- E. ISO 14040 - Environmental management - Life cycle assessment - Principles and framework 2006 (Amended 2020).
- F. ISO 14044 - Environmental management - Life cycle assessment - Requirements and guidelines 2006 (Amended 2020).
- G. ISO 21930 - Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services 2017.

1.4 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.5 QUALITY ASSURANCE

- A. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.
 - 1. Good: Product-specific; compliant with ISO 14044.
 - 2. Better: Industry-wide, generic; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
 - 3. Best: Commercial-product-specific; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
 - 4. Where demonstration of impact reduction below industry average is required, submit both industry-wide and commercial-product-specific declarations; or submit at least 5 declarations for products of the same type by other manufacturers in the same industry.
- B. GreenScreen Chemical Hazard Analysis: Ingredients of 100 parts-per-million or greater evaluated using GreenScreen (METH).
 - 1. Good: GreenScreen (LIST) evaluation to identify Benchmark 1 hazards; a Health Product Declaration includes this information.
 - 2. Better: GreenScreen Full Assessment.
 - 3. Best: GreenScreen Full Assessment by GreenScreen Licensed Profiler.

- 4. Acceptable Evidence: GreenScreen report.
- C. Health Product Declarations (HPD): Complete, published declaration with full disclosure of known hazards, prepared using one of the HPDC (HPD-OLT) online tools.
- D. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 100 miles from the Project site.

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.2 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Made of wood from newly cut old growth timber.
 - 3. Containing lead, cadmium, or asbestos.
- C. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 016116.
 - 2. If wet-applied, have lower VOC content, as defined in Section 016116.
 - 3. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 4. Have longer documented life span under normal use.
 - 5. Have a published Environmental Product Declaration (EPD).
 - 6. Have a published Health Product Declaration (HPD).
 - 7. Have a published GreenScreen Chemical Hazard Analysis.
 - 8. Have a published Manufacturer's Inventory of Chemical Content.

2.3 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- D. Products with a Basis of Design listed either in the specifications or in the Drawings: Use the Basis of Design product, or submit a request for substitution for a comparable product meeting the product requirements. Substitutions may be permitted from a list of named manufacturers, or by other manufacturers, depending on the specified product.

2.4 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 012500 - Substitution Procedures.

3.2 OWNER-SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
 - 1. Review Owner reviewed shop drawings, product data, and samples.
 - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 3. Handle, store, install and finish products.
 - 4. Repair or replace items damaged after receipt.

3.3 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 017419.
 - 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- G. For exterior storage of fabricated products, place on sloped supports above ground.

- H. Provide off-site storage and protection when site does not permit on-site storage or protection.
- I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- J. Comply with manufacturer's warranty conditions, if any.
- K. Do not store products directly on the ground.
- L. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- M. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- N. Prevent contact with material that may cause corrosion, discoloration, or staining.
- O. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- P. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 016116 - VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements for VOC-Content-Restricted products.

1.2 RELATED REQUIREMENTS

- A. Section 013000 - Administrative Requirements: Submittal procedures.

1.3 DEFINITIONS

- A. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
- B. Interior of Building: Anywhere inside the exterior weather barrier.
- C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- E. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
 - 1. Stone.
 - 2. Concrete.
 - 3. Clay brick.
 - 4. Metals that are plated, anodized, or powder-coated.
 - 5. Glass.
 - 6. Ceramics.
 - 7. Solid wood flooring that is unfinished and untreated.

1.4 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.

- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings 2005 (Reapproved 2018).
- C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board 2007.
- D. SCAQMD 1113 - Architectural Coatings 1977 (Amended 2016).
- E. SCAQMD 1168 - Adhesive and Sealant Applications 1989 (Amended 2017).

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

1.6 QUALITY ASSURANCE

- A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
 - b. Published product data showing compliance with requirements.
 - c. Certification by manufacturer that product complies with requirements.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 - 2. Joint Sealants: SCAQMD 1168 Rule.
 - 3. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. SCAQMD 1113 Rule.
 - c. CARB (SCM).

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Selective demolition of existing site elements.
- B. Selective demolition of building elements for alteration purposes.

1.2 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- D. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.3 DEFINITIONS

- A. Demolition (Demo): Dismantle, raze, destroy or wreck any building or structure or any part thereof.
- B. Remove: Detach or dismantle items from existing construction and dispose of them off site, unless items are indicated to be salvaged or reinstalled.
- C. Remove and Salvage: Detach or dismantle items from existing construction in a manner to prevent damage. Clean, package, label and deliver salvaged items to Owner in ready-for-reuse condition.
- D. Remove and Reinstall: Detach or dismantle items from existing construction in a manner to prevent damage. Clean and prepare for reuse and reinstall where indicated.
- E. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

1.6 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.7 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
 - 1. Minimum of five years of documented experience.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.1 DEMOLITION

- A. Remove portions of existing buildings as indicated on Drawings.
- B. Remove paving and curbs required to accomplish new work.
- C. Within area of new construction, remove existing foundation elements completely.
- D. Outside area of new construction, remove foundation walls and footings to minimum 2 feet below finished grade.
- E. Remove items specifically indicated for salvage, relocation, and recycling.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of NFPA 241.
 - 3. Use of explosives is not permitted.
 - 4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 5. Provide, erect, and maintain temporary barriers and security devices.

6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 8. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
 9. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
 10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Do not begin removal until existing elements to be salvaged or relocated have been removed.
- D. Do not begin removal until vegetation to be relocated has been removed and vegetation to remain has been protected from damage.
- E. Protect existing structures and other elements to remain in place and not removed.
1. Provide bracing and shoring.
 2. Prevent movement or settlement of adjacent structures.
 3. Stop work immediately if adjacent structures appear to be in danger.
- F. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. Hazardous Materials:
1. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCBs, and mercury.

3.3 EXISTING UTILITIES

- A. Protect existing utilities to remain from damage.
- B. Do not disrupt public utilities without permit from authority having jurisdiction.
- C. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

- D. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- E. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- F. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- G. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone. Identify and mark, in same manner as other utilities to remain, utilities to be reconnected.

3.4 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
 - 1. Verify construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from areas that remain occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction.
- C. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.
- D. Maintain building security; take care to prevent unauthorized entry.
- E. Remove existing work as indicated and required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction indicated.
 - 2. Remove items indicated on drawings.
 - 3. Core Drilling: Core drill slabs as required to install new items as detailed on Drawings. If required based on existing slab conditions, employ methods of detecting existing tensioned and un-tensioned reinforcing, and other embedded items, so as not to damage existing facilities and equipment.

4. Powder-Actuated Fasteners and Post-installed Anchors: Verify existing slab conditions employing methods of detection specified for core drilling; locate fasteners and anchors to avoid structural damage to existing slabs and existing tensioned reinforcing.
- F. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 3. See Section 011000 - Summary for limitations on outages and required notifications.
 4. Verify that abandoned services serve only abandoned facilities before removal.
 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.
- G. Protect existing work to remain.
1. Prevent movement of structure. Provide shoring and bracing as required.
 2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch to match new work.

3.5 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Remove from site all materials not to be reused on site; do not burn or bury.
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 024119

SECTION 042000 - UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete block.
- B. Mortar and grout.
- C. Reinforcement and anchorage.
- D. Lintels.
- E. Accessories.

1.2 REFERENCE STANDARDS

- A. ACI 315 - Details and Detailing of Concrete Reinforcement.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- D. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
- F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2023.
- G. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- H. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- I. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.
- L. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- M. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2023.
- N. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2019a.

- O. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).
- P. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).
- Q. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate placement of backing and substrates specified under other Sections for attachment of anchors.
- B. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.
 - 1. Require attendance by Contractor, Superintendent, all relevant installers, and parties directly affecting the work of this Section.
 - 2. Review locations of control joints joints.
 - 3. Review materials, conditions of installation, installation procedures, and coordination with related work.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Manufacturer's Certificates: Certify that masonry units meet or exceed specified requirements.
 - 1. Include material test reports substantiating compliance with requirements.
- 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 C109 for compressive strength, ASTM C1506 for water retention, and ASTM C91 for air content.
 - 2. Include test reports, according to ASTM C 1019 for grout mixes required to comply with compressive strength requirement.

- E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

1.5 QUALITY ASSURANCE

- A. Conform to TMS 602 for masonry inspection and testing requirements.
- B. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
 - 1. Maintain one copy of each document on project site.
- C. Fire Rated Assemblies: Comply with applicable code for specified requirements for fire rated masonry construction.
- D. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.
- E. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Store materials on elevated platforms, under cover, and in a dry location. Do not install damp materials.

1.7 FIELD CONDITIONS

- A. Hot- and Cold-Weather Requirements: Comply with construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS (CMU)

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on the Drawings for specific locations.
 - 2. Special Shapes: Provide nonstandard blocks configured for corners, lintels, headers, control joint edges, and other detailed conditions.
 - a. Provide bullnose units for outside corners.

- b. Provide special shapes for lintels, corners, jambs, sashes, movement joints, bond beams, and other special conditions indicated on drawings.
3. Load-Bearing Units: ASTM C90, normal weight.
- a. Hollow block.
 - b. Unit Compressive Strength: 2,000 psi, average net area, minimum.
 - c. Fire Ratings: Fire rated concrete masonry units shall be in compliance when the masonry has been certified through the equivalent thickness method contained in Chapter 3 of ACI 216.1 for concrete masonry and Chapter 5 for effects of finish materials.

2.2 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction.
 - 1. Not more than 0.60 percent alkali.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Mortar Aggregate: ASTM C144.
- D. Grout Aggregate: ASTM C404.
- E. Water: Clean and potable.
- F. Admixtures: Not permitted unless specified, or requested by Contractor in writing and approved in writing by Architect.
- G. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Color: Standard gray.
- H. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.
 - 1. Type: Fine.

2.3 REINFORCEMENT AND ANCHORAGE

- A. Acceptable Manufacturers:
 - 1. Blok-Lok Limited: www.blok-lok.com.

2. Hohmann & Barnard, Inc.: www.h-b.com/sle.
 3. WIRE-BOND www.wirebond.com/#sle.
 4. Substitutions: See Section 016000 - Product Requirements.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; uncoated.
- C. Single Wythe Joint Reinforcement: ASTM A951/A951M.
1. Type: Ladder.
 2. Material:
 - a. Interior Walls: ASTM A1064/A1064M steel wire, mill galvanized to 16 CFR 1201 Class 3.
 - b. Exterior Walls: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to 16 CFR 1201 Class B.
 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- D. Ties and Anchors, General: Provide hot dip galvanized ties and anchors as specified, except use Type 304 stainless steel ties and anchors in swimming pool, seating area, locker room, chemical storage rooms, and rooms subject to high humidity and wetting.
- E. Flexible Anchors for Connecting to Structure: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
1. Concrete Frame: Dovetail anchors of bent steel strap, nominal 1 inch width x 0.024 in thick, with triangle wire ties 0.1875 inch thick, hot dip galvanized to ASTM A153/A153M Class B.
 2. Steel Frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A153/A153M Class B.

2.4 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell neoprene or urethane; oversized 50 percent to joint width; self expanding; in maximum lengths available.
 1. Complying with ASTM D 1056, Grade 2A1.

2. Acceptable Manufacturers:
 - a. Hohmann & Barnard, Inc.: www.h-b.com/sle.
 - b. WIRE-BOND: www.wirebond.com/#sle.
 - c. Substitutions: See Section 016000 - Product Requirements.
- C. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- D. Sealants: Types required by flashing manufacturer to suit indicated installation and service conditions.
- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.5 LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMU matching adjacent CMU in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure lintels before handling and installing. Temporarily support build-in-place lintels until cured.
 1. Use masonry lintels in concrete masonry unit walls where lintel is exposed, and as specified in Structural Drawings.

2.6 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 1. Masonry Below Grade in Contact With Earth: Type M.
 2. Interior Masonry: Type S.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
- C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other Sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave unless otherwise required for work in other Sections.

3.5 PLACING AND BONDING

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.6 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. Unless otherwise indicated on Drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Place continuous reinforcement around corners.
- E. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.
- F. Lap joint reinforcement ends minimum 12 inches.
- G. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on Drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 16 inches horizontally and 16 inches vertically.
- H. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

3.7 LINTELS

- A. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
 - 1. Reinforced Lintels: Place reinforcing as indicated on Drawings.
- B. Maintain minimum 8 inch bearing on each side of opening.

3.8 GROUTED COMPONENTS

- A. Reinforce bond beams as indicated on Drawings.
- B. Grout solid all hollow concrete unit masonry located below grade, at bond beams, and at other locations indicated.
- C. At bearing locations, fill masonry cores with grout for a minimum 8 inches both sides of opening unless otherwise indicated in drawings.

3.9 CONTROL AND EXPANSION JOINTS

- A. Size control joints as indicated on Drawings; if not shown, 3/8 inch wide.
- B. Do not continue horizontal joint reinforcement through control or expansion joints.

- C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- D. If control joint locations are not indicated on drawings, locate control joints in CMU walls complying with the NCMA TEK note recommendations and at wall height changes; within ten feet of corners; at wall thickness changes; at bond beam breaks; at abutments of columns and walls; at abutment of cold garages to warm basements or walls; at openings in walls such as doors and windows; and at intervals in continuous walls not exceeding 20 feet in length, unless more restrictive spacing is recommended in the NCMA TEK notes.

3.10 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames, fabricated metal frames, anchor bolts, and plates and other items to be built into the work and furnished under other Sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.11 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation from Alignment of Columns: 1/4 inch.
- C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- G. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/8 inch, plus 1/8 inch.
- H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.12 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other Sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
 - 1. See Structural Drawings for additional requirements.
- B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
- C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.14 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with specified cleaning solution, at low pressure or by hand methods only; do not introduce excessive moisture into masonry wall surfaces during cleaning operations.
- D. Use non-metallic tools and stiff brushes in cleaning operations.

3.15 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
 - 1. Install required protection of installed work at the end of each work day.

END OF SECTION 042000

SECTION 070150.19 - PREPARATION FOR RE-ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Patching of existing roofing system in designated areas as indicated on Drawings.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with affected mechanical and electrical work associated with roof penetrations.
- B. Preinstallation Meeting: Convene one week before starting work of this section.
 - 1. Attendees:
 - a. Contractor.
 - b. Installer.
 - c. Roofing system manufacturer's field representative.
 - 2. Meeting Agenda: Provide agenda to participants prior to meeting in preparation for discussions on the following:
 - a. Necessary preparatory work.
 - b. Protection before, during, and after roofing system installation.
 - c. Partial removal of existing roofing system.
 - d. Installation of new roofing materials.
 - e. Temporary roofing and daily terminations.
 - f. Transitions and connection to and with other work.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit for each type of material.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
 - 1. Approved by existing roofing system warrantor to work on existing warranted roof system.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

1.6 FIELD CONDITIONS

- A. Existing Roofing System: PVC roofing.
- B. Do not remove existing roofing membrane when weather conditions threaten the integrity of building contents or intended continued occupancy.
- C. Maintain continuous temporary protection prior to and during installation of new roofing system.
- D. Provide notice at least three days before starting activities that will affect normal building operations.
- E. Verify that occupants have been evacuated from building areas when work on structurally impaired roof decking is scheduled to begin.

1.7 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Existing Warranties: Perform this work using methods and materials that will maintain existing roof system warranties.
 - 1. Notify existing roof system warrantor prior to starting this work and obtain written instructions for procedures necessary to maintain this existing warranty.
 - 2. Upon completion of this work, notify warrantor of reroofing completion and obtain documentation to verify that existing roofing system has been inspected and warranty is still in effect.
 - a. Submit documentation upon project closeout.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Patching Materials: Provide necessary materials in accordance with requirements of existing roofing system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing roof surface has been cleared of materials being removed from existing roofing system and ready for next phase of work as required.

3.2 PREPARATION

- A. Sweep roof surface clean of loose matter.
- B. Remove loose refuse and dispose of properly off-site.

3.3 MATERIAL REMOVAL

- A. Remove only existing roofing materials that can be replaced with new materials the same day.

3.4 INSTALLATION

- A. Install patching materials according to manufacturer's requirements to preserve existing roofing system warranty.

3.5 PROTECTION

- A. Provide protection of existing roofing system that is not having work performed on it.
- B. Provide temporary protective sheeting over uncovered deck surfaces.
- C. Do not permit traffic over unprotected or repaired deck surface.

END OF SECTION 070150.19

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings and counterflashings.
- B. Sealants for joints within sheet metal fabrications.

1.2 RELATED REQUIREMENTS

- A. Section 077200 - Roof Accessories: Manufactured metal roof curbs and hatches.

1.3 REFERENCE STANDARDS

- A. ASTM B32 - Standard Specification for Solder Metal; 2020.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- C. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).
- D. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.
- C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.
- C. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.6 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion. Defective work includes failure of watertightness or seals.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sheet Metal Assemblies:
 - 1. Capable of withstanding structural movement and exposure to wind and weather without failure or permanent deformation.
 - a. Design Pressure: Conforming with ASCE 7 or as indicated on structural drawings, whichever is most restrictive.
 - 2. Physically protect building elements and systems from damage that would permit water leakage into building enclosure assemblies under all weather conditions.
- B. Sheet Metal Standards: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET MATERIALS

- A. Stainless Steel: ASTM A240, Type 304 alloy, soft temper, fully annealed, minimum gage and finish as scheduled.
 - 1. Finish: 2D (dull, cold rolled).

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats and starter strips of same material as sheet, minimum 12 inches wide, one gage thickness heavier than exposed sheet, and interlocking with exposed sheet.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

- E. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

2.4 SEAMS AND JOINTS

- A. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- B. Non-Moving Seams:
 - 1. For metal greater than 0.040 inch thick, fabricate with butt seams with backup plates, fastened one side (SMACNA Figure 3-3, Type 19); seal with butyl sealant concealed within joint.
 - 2. For metals 0.040 inch thick or less, fabricate with flat-lock seams (SMACNA Figure 3-2, Type 2); treat as follows:
 - a. Prepainted Steel and Aluminum: Form seams and seal with elastomeric sealant. Rivet joints where necessary for strength.
 - b. Unpainted Aluminum (includes mill finish and anodized: Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.
 - c. Other Metals: Tin edges to be seamed, form seams, and solder.
- C. Moving Seams:
 - 1. For metal greater than 0.040 inch thick: Form expansion joints of butt seams with backup plates fastened to substrate (SMACNA Figure 3-3, Type 18) with no fasteners exposed through covers. Seal seams with butyl sealant concealed within joints.
 - 2. For metal 0.040 inch thick or less: Form expansion joints of intermeshing hooked flanges (SMACNA Figure 3-2, Type 1), not less than 1 inch deep, filled with butyl sealant concealed within joint.
- D. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches except where pre-tinned surface would show in finished Work.
 - 1. Do not solder prepainted metal sheet.

2.5 ROOF SHEET METAL FABRICATIONS

- A. Counterflashings: Factory fabricated and finished sheet metal that overlaps top edges of base flashing by at least 4 inches, and designed to snap into thru-wall flashing or reglets with lapped joints. Provide spring action pressure at bottom edge against base flashings.

1. Type and Finish: See Sheet Metal Schedule.
- B. Roof Equipment Support Flashing: Cover raised bases and equipment supports. Fabricate with seamed and soldered joints and corners. Extend flashings over roof base flashings 4 inches minimum, and fold back bottom edge 1/2 inch. Where metal is penetrated for bolt or other fastener connections, use 4 lb sheet lead washers 2 inches larger than fastener hole.
1. Comply with SMACNA (ASMM) Figure 8-11B.
 2. Type and Finish: See Sheet Metal Schedule.

2.6 ACCESSORIES

- A. Fasteners: Non-corrosive type.
1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I (No. 15).
- C. Synthetic Underlayment: Polyethylene or polypropylene sheet.
- D. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
1. Thermal Stability: Stable after testing at 220 deg F; ASTM D 1970.
 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
 3. Acceptable Products:

- a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC; MetShield.
 - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.
 - f. Polyguard Products, Inc.; Deck Guard HT.
 - g. Substitutions: See Section 016000 - Product Requirements.
- E. Slip Sheet: Rosin sized building paper, 3 lb/100 sq. ft.minimum.
- F. Primer: Zinc chromate type.
- G. Protective Backing Paint: Zinc molybdate alkyd.
- H. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15 mil dry film thickness per coat.
- I. Concealed Sealants: Non-curing butyl sealant.
- J. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- K. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- L. Plastic Cement: ASTM D4586/D4586M, Type I.
- M. Solder: ASTM B32; Provide type as described:
- 1. For Stainless Steel: Grade Sn96, with acid flux of type recommended by stainless-steel sheet manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

- C. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

3.3 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
 - 1. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.
- B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal. Apply in shingle fashion to shed water, with lapped and taped joints of not less than 2 inches.
 - 1. Do not use plastic underlayment where metals will be site soldered or where plastic sheet will be in direct contact with metal sheets exposed to solar daytime heating.
- C. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

3.4 INSTALLATION - GENERAL

- A. Comply with SMACNA Architectural Sheet Metal Manual.

- B. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 4. Torch cutting of sheet metal flashing and trim is not permitted.
 5. Do not use graphite pencils to mark metal surfaces.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
1. Coat back side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where concealed flashing and trim will contact wood, ferrous metal, or cementitious construction.
 2. Coat concealed surfaces of aluminum downspout that come into contact with dissimilar metals with two coats of clear lacquer.
 3. Underlayment: Where installing metal directly on cementitious or wood substrates, install underlayment.
- D. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
- E. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance, but in no case less than 1-1/4 inches for nails and 3/4 inch for wood screws in wood blocking or sheathing.
- F. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- G. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder metallic-coated steel and aluminum sheet.
 2. Do not use torches for soldering.
 3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
- I. Rivets: Rivet joints where necessary for strength.

3.5 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Recessed Reglet Flashings and Counterflashings: Insert flashings full depth into recessed reglet. Anchor by mechanical means, including driven wedges of lead or other compatible metal spaced at 12 inches on center. Seal joint with elastomeric sealant specified in Section 079200.
- C. Surface Mounted Reglet Flashings and Counterflashings: Place surface mounted reglet not less than 9 inches above top of cant strip. Place sealant in preformed groove on back of reglet and on lap before installation. Secure reglet to wall with power driven pins through neoprene washers spaced not less than 16 inches on center. Fill top groove with elastomeric sealant specified in Section 079200. After roofing is installed, install snap-lock counterflashing.

1. Lap counterflashing end joints minimum 3 inches. Do not solder joints. Provide continuous counterflashings at angles and corners, and lap over roof base flashings minimum 4 inches, unless detailed otherwise.
- D. Apply plastic cement compound between metal flashings and felt flashings.
- E. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- F. Seal metal joints watertight.
- G. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.6 SCHEDULE

- A. Counterflashings, Concealed:
 1. Stainless Steel: 0.0187 inch.
 2. Finish: 2D dull annealed.
- B. Flashing Receivers, Concealed:
 1. Stainless Steel: 0.0187 inch.
 2. Finish: 2D dull annealed.
- C. Equipment Support Cap Flashing, Roof Penetration Flashing, and Umbrella Flashing:
 1. Stainless Steel: 0.0187 inch.
 2. Finish: 2D dull annealed.

END OF SECTION 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof curbs.
- B. Equipment rails.
- C. Non-penetrating pedestals.

1.2 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate with installation of roofing system and related flashings for weather tight installation.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- C. Warranty Documentation:
 - 1. Submit manufacturer warranty.
 - 2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

1.6 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Extended Correction Period: Correct defective work within 5-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1 ROOF CURBS

- A. Acceptable Manufacturers:
 - 1. AES Industries Inc.: www.aescurb.com.
 - 2. The Pate Company: www.patecurbs.com.
 - 3. LMCurbs: www.lmcurbs.com/#sle.
 - 4. MKT Metal Manufacturing: www.mktduct.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- B. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
 - 1. Applications: Roof curbs used for roof penetrations/openings as indicated on drawings, HVAC units, exhaust fans, and duct openings.
 - 2. Sheet Metal Material:
 - a. Galvanized Steel: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33; G60 coating designation; 18 gauge, 0.048 inch thick.
 - 3. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb of size and spacing required to meet wind uplift requirements.

4. Platform Cap: Where portion of equipment support is not covered by equipment, provide weathertight platform cap formed from 3/4-inch thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
 5. Metal Counterflashing: See Section 076200.
 6. Provide layouts and configurations indicated on drawings.
- C. Curbs Adjacent to Roof Openings: Provide curb on each side of opening, with top of curb horizontal for equipment mounting.
1. Provide preservative treated wood nailers along top of curb.
 2. Insulate inside curbs with 3 inch thick fiberglass insulation.
 3. Height Above Finished Roof Surface: 12 inches, minimum.
- D. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.
1. Provide preservative treated wood nailers along top of rails.
 2. Height Above Finished Roof Surface: 12 inches, minimum.

2.2 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES

- A. Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.
1. Design Loadings and Configurations: As required by applicable codes.
 2. Height: Provide minimum clearance of 6 inches under supported items to top of roofing.
 3. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 4. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
 5. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.
- B. Pipe Supports: Provide attachment fixtures complying with MSS SP-58 and as indicated.
1. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.

2. See relevant piping system specification Section for additional requirements.
- C. Duct Supports: Provide extruded aluminum supports and sized in accordance with diameter of supported ducts, and with base that is non-penetrating of roofing membrane.
- D. Non-Penetrating Pedestals: Steel pedestals with square, round, or rectangular bases.
 1. Bases: High density polypropylene.
 2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 3. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.
- B. Apply bituminous paint on surfaces of units in contact with cementitious materials or dissimilar metals.

3.4 CLEANING

- A. Clean installed work to like-new condition.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 077200

SECTION 079200 - JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 092116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

1.3 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).
- B. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- E. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.
- F. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).
- G. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Backing material recommended by sealant manufacturer.

4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 5. Substrates the product should not be used on.
 6. Substrates for which use of primer is required.
 7. Substrates for which laboratory adhesion and/or compatibility testing is required.
 8. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
 9. Sample product warranty.
 10. Certification by manufacturer indicating that product complies with specification requirements.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- F. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
 2. Joint-sealant manufacturer and product name.
 3. Joint-sealant formulation.
 4. Joint-sealant color.
- G. Executed warranty.
- 1.5 QUALITY ASSURANCE**
- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.6 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.
- C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Interior Joints:
 - a. Do not seal interior joints indicated on drawings as not sealed.
 - b. Do not seal through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
 - c. Seal the following joints:
 - 1) Joints between door frames and window frames and adjacent construction.
 - 2. Do Not Seal:
 - a. Intentional weep holes in masonry.
 - b. Joints indicated to be covered with expansion joint cover assemblies.
 - c. Joints where sealant is specified to be furnished and installed by manufacturer of product to be sealed.
 - d. Joints where sealant installation is specified in other sections.
 - e. Joints between suspended ceilings and walls.
- B. Type P - Interior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
 - 1. Type L - Wall and Ceiling Joints in Nonwet Areas: Acrylic emulsion latex sealant.
 - 2. Type Sm - Joints between plumbing fixtures and adjoining walls, floors, and counters: Mildew-resistant silicone sealant.

3. Type Sm - Joints between Tile in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant.
4. Type Esr - Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.
5. Type Psl - Other Floor Joints: Self-leveling polyurethane traffic-grade sealant.

C. Definitions:

1. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

2.2 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
- B. Colors for Concealed Locations: Manufacturer's standard.
- C. Colors for Locations Exposed to View: As selected by Architect from Manufacturer's Full Range.
- D. Custom Color-Matched Colors: Where indicated.

2.3 NONSAG JOINT SEALANTS

- A. Type Sm - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
 1. Color: To be selected by Architect from manufacturer's standard range.
 2. Products:
 - a. Momentive Performance Materials, Inc/GE Silicones; SCS1700 Sanitary Sealant: www.siliconeforbuilding.com.
 - b. Pecora Corporation; 860: www.pecora.com.
 - c. Sika Corporation; Sikasil GP: www.usa.sika.com/#sle.
 - d. Dow Corning Corporation; 786-M.
 - e. Tremco Incorporated; Tremsil 200.
- B. Type P - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 50 percent, minimum.
 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
 3. Color: To be selected by Architect from manufacturer's standard range.
 4. Service Temperature Range: Minus 40 to 180 degrees F.
 5. Products:
 - a. Pecora Corporation; Dynatrol I-XL: www.pecora.com.
 - b. Sika Corporation; Sikaflex-1a: www.usa.sika.com/#sle.
 - c. Tremco Incorporated; Dymonic FC.
- C. Type L - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
1. Color: To be selected by Architect from manufacturer's standard range.
 2. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).
 3. Products:
 - a. Momentive Performance Materials, Inc/GE Silicones; RCS20 Acoustical Latex Sealant: www.siliconeforbuilding.com.
 - b. Pecora Corporation; AC-20+: www.pecora.com.
 - c. Sherwin-Williams Company; 950A Siliconized Acrylic Latex Caulk: www.sherwin-williams.com/#sle.
 - d. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.
 - e. BASF Building Systems; Sonolac.

2.4 SELF-LEVELING JOINT SEALANTS

- A. Type Psl - Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
1. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
 2. Color: To be selected by Architect from manufacturer's standard range.
 3. Service Temperature Range: Minus 40 to 180 degrees F.

4. Products:
 - a. Sika Corporation; Sikaflex-1c SL: www.usa.sika.com/#sle.
 - b. W. R. Meadows, Inc; POURTHANE SL: www.wrmeadows.com/#sle.
 - c. Tremco Incorporated; Vulkem 45SSL.
 - d. Pecora Corporation; NR-201.
 - e. Substitutions: See Section 016000 - Product Requirements.

- B. Type Esr - Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
 1. Composition: Multicomponent, 100 percent solids by weight.
 2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
 3. Color: To be selected by Architect from manufacturer's standard colors.
 4. Joint Width, Minimum: 1/8 inch.
 5. Joint Width, Maximum: 1/4 inch.
 6. Products:
 - a. Adhesives Technology Corporation; CRACKBOND JF-90 HD: www.atcepoxy.com/#sle.
 - b. Euclid Chemical Company; EUCCO 700: www.euclidchemical.com/#sle.
 - c. Mapei; Mapeiflex Joint Sealant EP 90/50: www.mapei.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.

2.5 ACCESSORIES

- A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.

- B. Sealant Backing Rod, Closed-Cell Type: For exterior applications and joints subject to pedestrian or vehicular traffic.
 1. Cylindrical flexible sealant backings complying with ASTM C1330 Type C.
 2. Size: 25 to 50 percent larger in diameter than joint width.

- C. Sealant Backing Rod, Open-Cell Type: For interior applications not subject to pedestrian or vehicular traffic.
- D. Sealant Backing Rod, Bi-Cellular Type: For exterior applications and joints subject to pedestrian or vehicular traffic.
 - 1. Cylindrical flexible sealant backings complying with ASTM C1330 Type B.
 - 2. Size: 25 to 50 percent larger in diameter than joint width.
- E. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- F. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- G. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- H. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in an inconspicuous area to verify that it does not stain or discolor slab.

3.3 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.

1.2 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2024.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2024.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023, with Editorial Revision.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.
- J. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- K. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- M. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- N. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

- O. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.
- P. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- Q. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025.
- R. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate with wall construction for anchor placement.
 - 2. Coordinate installation of hardware.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Door Schedule: Provide schedule coordinated with numbering on drawings and hardware schedule. Indicate door types and openings receiving electrified hardware.
- D. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- F. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of ANSI A250.8 - SDI-100, and as supplemented in this Section.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.
- C. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: <https://steeldoor.org/sdi-certified/#sle>.

- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- E. Maintain at project site copies of reference standards relating to installation of products specified.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable Building Code for fire rated assemblies.
- B. Accessibility: Conform to ADA and applicable building codes.
- C. Fire rated assembly construction to conform to UL 10C.
- D. Installed Frame and Door Assemblies: Comply with NFPA 80 for fire rated class indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.
- C. Inspect hollow metal products upon delivery for damage. Minor damage may be repaired provided refinishing is equal in all respects to new work and is acceptable to Architect; otherwise replace damaged items with new products as specified.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Curries, an ASSA ABLOY Group company: www.assaabloydss.com.
 - 3. Deansteel Manufacturing, Inc.: www.deansteel.com.
 - 4. Mesker, dormakaba Group: www.meskeropeningsgroup.com/#sle.
 - 5. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - 6. Steelcraft, an Allegion brand: www.allegion.com/#sle.

2.2 GENERAL DOOR AND FRAME REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:

1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 3. Door Edge Profile: Manufacturers standard for application indicated.
 4. Typical Door Face Sheets: Flush, unless otherwise indicated on Drawings.
 5. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
 - a. Prepare doors and frames for hardware in accordance with templates provided under Section 087100 - Door Hardware.
 6. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 - a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; where two requirements conflict, comply with the most stringent.

2.3 HOLLOW METAL DOORS

A. Interior Doors, Non-Fire-Rated:

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.

2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inches, nominal.
4. Door Finish: Factory primed and field finished.

2.4 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum, for doors up to 42 inches wide.
 2. Frame Metal Thickness: 14 gage, 0.067 inch, minimum, for doors greater than 42 inches wide.
 3. Frame Metal Thickness: 14 gage, 0.067 inch, minimum, for doors with continuous hinges, regardless of width.
 4. Frame Finish: Factory primed and field finished.
- C. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- D. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
- E. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.5 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.6 ACCESSORIES

- A. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.

- B. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- C. Silencers: Resilient rubber or vinyl, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- D. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. For frame installation, use concealed anchors where possible. Where exposed frame anchors are required, countersink fasteners, fill, and sand smooth.
- C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- D. Install door hardware as specified in Section 087100 - Door Hardware.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- E. Touch up damaged factory finishes.

3.4 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.5 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.6 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION 081113

SECTION 083326 - OVERHEAD COILING GRILLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Overhead coiling metal grilles and operating hardware; electrically operated.

1.2 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- B. ITS (DIR) - Directory of Listed Products; Current Edition.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- D. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).
- E. NEMA MG 1 - Motors and Generators; 2021.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL (DIR) - Online Certifications Directory; Current Edition.
- H. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction, component connections and details, electrical equipment, and other pertinent information.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Manufacturer's Installation Instructions: Indicate installation sequences and procedures, adjustment and alignment procedures.
- E. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. C.H.I. Overhead Doors: www.chiohd.com/#sle.
 - 2. Cornell Iron Works, Inc.: www.cornelliron.com.
 - 3. The Cookson Company: www.cooksondoor.com.
 - 4. Raynor Garage Doors: www.raynor.com/#sle.
 - 5. Wayne-Dalton, a Division of Overhead Door Corporation: www.waynedalton.com.
 - 6. Overhead Door Corporation: www.overheaddoor.com.
 - 7. Substitutions: See Section 016000 - Product Requirements.

2.2 GRILLES AND COMPONENTS

- A. Grille: Stainless steel; horizontal bar curtain, coiling on overhead counterbalanced shaft.
 - 1. Finish: No. 4 - Brushed.
 - 2. Lock Devices: Lock and latch handle on outside.
 - 3. Electric operation.
 - 4. Mounting: As indicated on drawings.
- B. Curtain: Round horizontal bars connected with vertical links.
 - 1. Horizontal Bars: 5/16 inch diameter.
 - 2. Bar spacing: 1-1/2 inch on center.
 - 3. Tube Spacers: 1/2 inch diameter.
 - 4. Spacer spacing: 3-1/4 inch on center.

5. Link spacing: 6 inch on center.
 6. Bar Ends: Provide with nylon runners for quiet operation.
 7. Bottom Bar: Back-to-back angles with tubular resilient cushion.
- C. Guides: Stainless steel angles, of profile to retain grille in place, mounting brackets of same metal.
- D. Hood Enclosure and Trim: Sheet metal; completely covering operating mechanisms; internally reinforced to maintain rigidity and shape.
1. Material: Same metal as grille.
- E. Lock Hardware:
1. For motor operated units, additional lock or latching mechanisms are not required.
 2. Latch Handle: Manufacturer's standard.
- F. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

2.3 MATERIALS

- A. Stainless Steel: ASTM A666 Type 304, with rollable temper.

2.4 ELECTRIC OPERATION

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
1. Provide interlock switches on motor operated units.
- B. Electric Operators:
1. Motor Enclosure:
 - a. Interior Grilles: NEMA MG 1, Type 1; open drip proof.
 2. Motor Rating: As recommended by manufacturer based on application; continuous duty.
 3. Motor Voltage: 208 volts, single phase, 60 Hz.
 4. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.

5. Controller Enclosure: NEMA 250 Type 1.
 6. Brake: Adjustable friction clutch type, activated by motor controller.
 7. Manual override in case of power failure.
- C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.
- D. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
1. 24 volt circuit.
 2. Surface mounted, at interior door jamb.
 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. Primary Device: Provide electric sensing edge, wireless sensing, or NEMA 1 photo eye sensors as required with momentary-contact control device.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that opening sizes, tolerances and conditions are acceptable.

3.2 INSTALLATION

- A. Install grille unit assembly in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Complete wiring from disconnect to unit components.
- F. Install enclosure and perimeter trim.

3.3 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.

- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.4 ADJUSTING

- A. Adjust grille, hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING

- A. Clean grille and components.
- B. Remove labels and visible markings.

END OF SECTION 083326

SECTION 090561 - COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
 - 1. Resinous flooring.
 - 2. Other adhesively applied flooring.
- B. Preparation of new and existing concrete floor slabs for installation of floor coverings.
- C. Testing of concrete floor slabs for moisture and alkalinity (pH).
- D. Adhesive bond testing.
- E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
 - 1. Perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- F. Patching compound.
- G. Remedial floor coatings.

1.2 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2023.
- B. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2019.
- C. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
- D. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete; 2020.
- E. ASTM D4259 - Standard Practice for Preparation of Concrete by Abrasion Prior to Coating Application; 2018.
- F. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.

- G. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
- H. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- I. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 - 1. Moisture and alkalinity (pH) limits and test methods.
 - 2. Manufacturer's required bond/compatibility test procedure.
- C. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
 - 1. Manufacturer's qualification statement.
 - 2. Certificate: Manufacturer's certification of compatibility with types of flooring and adhesive applied over remedial product.
 - 3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
 - 4. Manufacturer's installation instructions.
 - 5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.
- D. Testing Agency's Report:
 - 1. Description of areas tested; include floor plans and photographs if helpful.
 - 2. Summary of conditions encountered.
 - 3. Moisture and alkalinity (pH) test reports.
 - 4. Copies of specified test methods.

5. Recommendations for remediation of unsatisfactory surfaces.
 6. Product data for recommended remedial coating.
 7. Submit report to Architect.
 8. Submit report not more than two business days after conclusion of testing.
- E. Adhesive Bond and Compatibility Test Report.
- F. Floor Moisture Testing Technician Certificate: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician- Grade I certificate.
- G. Copy of RFCI (RWP).

1.5 QUALITY ASSURANCE

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.
- C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- D. Contractor's Responsibility Relating to Independent Agency Testing:
1. Provide access for and cooperate with testing agency.
 2. Confirm date of start of testing at least 10 days prior to actual start.
 3. Allow at least 4 business days on site for testing agency activities.
 4. Achieve and maintain specified ambient conditions.
 5. Notify Architect when specified ambient conditions have been achieved and when testing will start.
- E. Floor Moisture Testing Technician Qualifications: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician Certification- Grade I.
- F. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

1.8 WARRANTY

- A. Provide manufacturer's warranty covering flooring delamination failures for 10 years minimum.
 - 1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Self-Leveling Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product
 - 1. Compressive Strength: Minimum 5000 pounds per square inch after 28 days, tested per ASTM C109/C109M.
 - 2. Flexural Strength: Minimum 1000 psi after 28 days, tested according to ASTM C348.
 - 3. Thickness: Capable of thicknesses from 1/2 inch minimum to maximum [10] inch.
- B. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:

1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
 4. Acceptable Manufacturers:
 - a. ARDEX Engineered Cements; ARDEX Feather Finish:
www.ardexamericas.com/#sle.
 - b. H.B. Fuller Construction Products, Inc; TEC Feather Edge Skim Coat:
www.tecspecialty.com/#sle.
 - c. LATICRETE International, Inc; SKIM LITE: www.laticrete.com/#sle.
 - d. USG Corporation; Durock Brand Advanced Skim Coat Floor Patch:
www.usg.com/#sle.
 - e. Schonox HPS North America; Schonox SL Moisture Resistant Floor Patch and Skim Coat.
 - f. Custom Building Products.
 - g. Henry Company.
 - h. Sika; Level SkimCoat.
 - i. Mapei.
 - j. Substitutions: See Section 016000 - Product Requirements.
- C. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- D. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
1. Thickness: As required for application and in accordance with manufacturer's installation instructions.

2. Use product recommended by flooring manufacturer. In the absence of a recommendation from flooring manufacturer, use testing agency recommendation. In the absence of testing agency recommendation, use one of the following systems.
3. Acceptable Products:
 - a. Allied Construction Technologies, Inc; AC Tech 2170 FC:
www.actechperforms.com/#sle.
 - b. ARDEX Engineered Cements; ARDEX VB 100:
www.ardexamericas.com/#sle.
 - c. Custom Building Products; TechMVC Moisture Vapor and Alkalinity Barrier:
www.custombuildingproducts.com/#sle.
 - d. Floor Seal Technology, Inc; MES 100: www.floorseal.com/#sle.
 - e. ISE Logik Industries; MVEC 710 with MVBP 600.
 - f. LATICRETE International, Inc; LATICRETE VAPOR BAN E:
www.laticrete.com/#sle.
 - g. Sika Corporation; Sikafloor Moisture Tolerance Epoxy Primer:
www.sikafloorusa.com/#sle.
 - h. SINAK Corporation; VECT-R: www.sinak.com/#sle.
 - i. USG Corporation; Durock CoverPrep: www.usg.com/#sle.
 - j. UZIN UTZ NORTH AMERICA, INC; UZIN PE 460 with UZIN PE 280:
<https://us.uzin.com/#sle>.
 - k. Substitutions: See Section 016000 - Product Requirements.
- E. Remedial Colloidal Silica Floor Treatment: Clear, penetrating floor treatment intended by its manufacturer to vapor-proof concrete slabs by closing capillary system of concrete, and eliminating route of moisture vapor emission while preserving mechanical key for adhesive bonding.
 1. Acceptable Products:
 - a. Spray-Lock Concrete Protection; SCP 327: www.concreteprotection.com.
 - b. Substitutions: See Section 016000 - Product Requirements.
- F. Water Vapor Emission Controlling Curing Compound: Single-component curing compound for preventative water vapor emission control for newly placed concrete.

1. Coordinate with curing requirements specified in 033000 - Cast-in-Place Concrete.
2. Comply with ASTM C309 and ASTM C1315, Type I Class A or C.
3. Acceptable Products:
 - a. Creteseal Concrete Waterproofing Products, Inc.; Creteseal 2000: www.creteseal.com.
 - b. Floor Seal Technology, Inc.; VaporSeal 309 System: www.floorseal.com.
 - c. SINAK Corporation; VC5: www.sinak.com.
 - d. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.1 CONCRETE SLAB PREPARATION

- A. Perform following operations in the order indicated:
 1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
 - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
 - b. Removal of existing floor covering.
 2. Existing concrete slabs with coatings or penetrating sealers/hardeners/dustproofers:
 - a. Remove existing coatings and curing agents from surface according to recommendations of remedial coating manufacturer.
 - b. Prepare surface according to recommendations of remedial coating manufacturer and according to ASTM D4259.
 3. Preliminary cleaning.
 4. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
 5. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 6. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.

7. Specified remediation, if required.
8. Patching, smoothing, and leveling, as required.
9. Other preparation specified.
10. Adhesive bond and compatibility test.
11. Protection.

B. Remediations:

1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.2 REMOVAL OF EXISTING FLOOR COVERINGS

- A. Comply with local, State, and federal regulations and recommendations of RFCI (RWP), as applicable to floor covering being removed.
- B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.3 PRELIMINARY CLEANING

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.4 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

3.5 INTERNAL RELATIVE HUMIDITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
 - 1. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- D. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- E. Report: Report the information required by the test method.

3.6 ALKALINITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
 - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.

2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.
- C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.7 PREPARATION

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Do not fill expansion joints, isolation joints, or other moving joints.

3.8 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.9 APPLICATION

- A. Comply with requirements and recommendations of manufacturer.
- B. Curing compounds and membrane forming products are usually considered unacceptable by flooring and adhesive manufacturers. If such materials are used, either obtain the approval of the flooring and adhesive manufacturers prior to use.

3.10 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION 090561

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.2 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- B. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023a.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit two samples minimum 6 x 6 inch in size illustrating material and finish of acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.4 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.
- C. System Installer Qualifications: Company specializing in the installation of products specified in this Section with minimum three years documented experience.

1.5 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 20 to 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer:
 - 1. As scheduled.
- B. Other Acceptable Manufacturers - Acoustic Panels:
 - 1. Armstrong World Industries, Inc.: www.armstrong.com.
 - 2. CertainTeed Corporation: www.certainteed.com/#sle.
 - 3. Rockfon, LLC: www.rockfon.com.
 - 4. USG Corporation: www.usg.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- C. Acceptable Manufacturers - Suspension Systems:
 - 1. Same as for acoustical units.

2.2 PERFORMANCE REQUIREMENTS

- A. Interior Suspended Ceilings, Soffits, and Bulkheads: Maintain deflection of not more than L/360 of distance between supports.
- B. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

2.3 ACOUSTICAL CEILINGS

- A. Acoustical Units - General: ASTM E1264, Class A.
 - 1. Provide units with manufacturer's proprietary anti-humidity, sag-resistant composition and anti-microbial treatment to inhibit the propagation of mold and mildew.

- B. Acoustical Panels: Mineral fiber with scrubbable finish, with the following characteristics:
1. Classification: ASTM E1264 Type IX.
 - a. Form: 2, water felted.
 - b. Pattern: "G" - smooth.
 2. Size: 24 by 24 inches.
 3. Thickness: 5/8 inches.
 4. Light Reflectance: 89 percent, minimum, determined in accordance with ASTM E1264.
 5. Ceiling Attenuation Class (CAC): 33, minimum, determined in accordance with ASTM E1264.
 6. Panel Edge: Square.
 7. Color: White.
 8. Suspension System: Exposed grid.
 9. Basis of Design:
 - a. Armstrong World Industries, Inc; Kitchen Zone:
www.armstrongceilings.com

2.4 SUSPENSION SYSTEMS

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G30 coating, except provide not less than G60 coating for severe or wet environments.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid.
1. Structural Classification: Heavy-duty, when tested in accordance with ASTM C635/C635M.
 2. Profile: Tee; 15/16 inch face width unless otherwise scheduled.
 3. Finish: Baked enamel.
 4. Color: White, unless otherwise indicated.

2.5 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Perimeter Moldings: Same metal and finish as grid.
 - 1. Size: As required for installation conditions.
 - 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
 - 3. At Circular Penetrations: Provide edge moldings fabricated to diameter required to fit penetration precisely.
- D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.
- C. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

3.3 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.

- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

3.4 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges; finish cut edges to match factory finished edges if cut edge is exposed to view.
 - 3. Double cut and field paint exposed reveal edges to match factory finished edges.
- F. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.5 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.6 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 096513 - RESILIENT WALL BASE AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient wall base.

1.2 REFERENCE STANDARDS

- A. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: If basis of design color is not provided, submit manufacturer's complete set of color samples for Architect's selection.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Deliver and store materials in manufacturer's original unopened containers, with brand names and production lot numbers clearly marked.
- E. Protect roll materials from damage by storing on end.
- F. Do not double stack pallets.

1.6 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a minimum temperature of 65 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.
- B. Install resilient accessories after other finishing operations, including painting have been completed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturers:
 - 1. Manufacturers and products specified on Drawings.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 RESILIENT BASE

- A. General: Comply with adhesives and sealants and flooring system product requirements specified.
- B. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set, Style B, Cove.
 - 1. Acceptable Manufacturers:
 - a. Mannington Commercial: www.manningtoncommercial.com.
 - b. Johnsonite, a Tarkett Company: www.commercial.tarkett.com
 - c. Roppe Corp.: www.roppe.com.
 - d. ShawContract: www.shawcontract.com.
 - e. Substitutions: See Section 016000 - Product Requirements.
 - 2. Group: I (solid, homogeneous).
 - 3. Height: 4 inch.
 - 4. Thickness: 0.125 inch.
 - 5. Finish: Satin.
 - 6. Color: As indicated on drawings.

2.3 ACCESSORIES

- A. Adhesives: Waterproof; types recommended by flooring manufacturer.
 - 1. Compatible with materials being adhered; maximum VOC content of 50 g/L.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

3.2 PREPARATION

- A. Prepare substrates as recommended by flooring and adhesive manufacturers.
- B. Clean substrate.

3.3 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Fit joints and butt seams tightly.

3.4 INSTALLATION - RESILIENT BASE

- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Fit joints tightly and make vertical. Install in longest lengths possible; maintain minimum dimension of 18 inches between joints.
- C. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold.
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
- D. Install base on solid backing. Bond tightly to wall and floor surfaces.
- E. Do not stretch wall base during installation.
- F. Scribe and fit to door frames and other interruptions.

3.5 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.6 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 096513

SECTION 096700 - FLUID-APPLIED FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fluid-applied flooring and base.

1.2 RELATED REQUIREMENTS

- A. Section 090561 - Common Work Results For Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

1.3 REFERENCE STANDARDS

- A. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.4 DEFINITIONS

- A. DCOF: Dynamic Coefficient of Friction.
- B. Slip-Resistant: Installed flooring surface which has a wet coefficient of friction of 0.42, minimum, as measured according to ANSI B101.3 (DCOF Slip Resistance Test).

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this Section; require attendance by all affected installers, manufacturer, Contractor, and Architect.
 - 1. Discuss installation testing, prep, procedures, details, and other pertinent issues.

1.6 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- C. Samples for Selection: Submit samples showing range of options for color, texture, and aggregate for each system.
- D. Samples for Verification: Submit two samples, 12 x 12 inch in size illustrating color and pattern for each floor material for each color specified.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

- F. Manufacturer's Certificate: Provide letter of certification from manufacturer stating that installer is a certified applicator and is familiar with manufacturers required procedures for application of specified finish system.
 - 1. Slip-Resistance: Certify that specified floor finish system, when installed, comply with specified requirements for slip-resistance.
- G. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- H. Manufacturer's Qualification Statement.
- I. Applicator's Qualification Statement.
- J. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this Section.
 - 1. Minimum five years of documented experience.
 - 2. Approved by manufacturer.
- C. Basis of Design: Specifications are based on flooring types by the specified basis of design manufacturer. Flooring types manufactured by other acceptable manufacturers are permitted, subject to compliance with all specified requirements; and provided that deviations in composition, construction, performance, and finish are minor and do not detract substantially from the indicated design intent.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
- B. Store resin materials in a dry, secure area.
- C. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.9 FIELD CONDITIONS

- A. Maintain minimum temperature in storage area of 55 degrees F.

- B. Store materials in area of installation for minimum period of 24 hours prior to installation.
- C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.
- D. Concrete substrate shall be properly cured for a minimum of 28 days.

1.10 WARRANTY

- A. Fluid-applied Flooring: Provide manufacturer's warranty, as follows:
 - 1. Materials: Minimum 2 years from Date of Substantial Completion.
 - 2. Installation: Minimum 2 years from Date of Substantial Completion; warrant entire installation against loss of adhesion to substrates.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer:
 - 1. Tnemec Company: www.tnemec.com.
- B. Other Acceptable Manufacturers:
 - 1. Dur-A-Flex, Inc.: www.dur-a-flex.com.
 - 2. Key Resin Company: www.keyresin.com.
 - 3. PPG Paints Megaseal Fluid Applied Flooring: www.ppgpaints.com/#sle and www.ppgpmc.com/home.aspx/#sle.
 - 4. Sherwin-Williams Company: General Polymers Brand: www.generalpolymers.com.
 - 5. Terrazzo & Marble Supply Companies: www.tmsupply.com.

2.2 FLOORING APPLICATIONS - GENERAL

- A. Slip-Resistance: Installed flooring must be slip resistant.

2.3 FLOORING MATERIALS

- A. Fluid-Applied Flooring: Epoxy base coat(s) with embedded vinyl flakes.
 - 1. Aggregate: Vinyl flakes.
 - 2. Top Coat: Polyurethane.

3. System Thickness: 1/8 inch, nominal, when dry.
4. Base: Integral 4 inch cove base with metal cap.
5. Color: As selected by Architect.
6. Basis of Design Products: Tnemec Company
 - a. 224-503 Deco-Fleck and 284-0000 Deco-Clear.

2.4 ACCESSORIES

- A. Base Caps: Zinc with projecting base of 1/8 inch; color as selected.
- B. Cant Strips: Molded material compatible with flooring.
- C. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.
- D. Primer: Type recommended by fluid-applied flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
 1. Test in accordance with Section 090561.
 2. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- B. Prepare concrete surfaces according to ICRI 310.2R.
- C. Prepare concrete surfaces according to manufacturer's guidelines.

- D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
- E. Vacuum clean substrate.
- F. Apply primer to surfaces required by flooring manufacturer.

3.3 INSTALLATION - ACCESSORIES

- A. Install cant strips at base of walls where flooring is to be extended up wall as base.
- B. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and top coating of cove base. Round internal and external corners.
- C. Install terminating cap strip at top of base; attach securely to wall substrate.

3.4 INSTALLATION - FLOORING

- A. Apply in accordance with manufacturer's instructions.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
 - a. Apply joint sealant to comply with manufacturer's written recommendations.
- B. Apply primer to surfaces required by flooring manufacturer at manufacturer's recommended rate.
- C. Waterproofing: Apply waterproofing membrane and broadcast aggregate as recommended by manufacturer.
- D. Apply each coat to minimum thickness required by manufacturer.
 - 1. Mix and apply mortar and base coat(s) as indicated for flooring system and at coverage rates recommended in writing by manufacturer. Screed mortar materials, compact and smooth, with steel finishing trowels.
 - 2. Aggregate: Broadcast in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer
 - 3. Apply topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

- E. Finish to uniform, level surface.

3.5 TERMINATIONS

- A. Chase edges to “lock” the coating system into the concrete substrate along lines of termination.
- B. Penetration Treatment: Lap and seal coating onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.
- C. Treat floor drains by chasing the coating to lock in place at point of termination.

3.6 JOINTS AND CRACKS

- A. Treat control joints to bridge potential cracks and to maintain monolithic protection.
- B. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.
- C. Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.7 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Barricade area to protect flooring until fully cured.

END OF SECTION 096700

SECTION 099123 - INTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Materials for backpriming woodwork.
- D. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Prime surfaces to receive wall coverings.
 - 3. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - d. Paint dampers exposed behind louvers, grilles, and convactor and baseboard cabinets to match face panels.
- E. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.

6. Marble, granite, slate, and other natural stones.
7. Floors, unless specifically indicated.
8. Ceramic and other tiles.
9. Brick, architectural concrete, cast stone, integrally colored plaster, and stucco.
10. Glass.
11. Acoustical materials, unless specifically indicated.
12. Concealed pipes, ducts, and conduits.

1.2 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.3 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2023.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- E. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).
- F. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- G. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- H. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
- I. SSPC-SP 13 - Surface Preparation of Concrete; 2018.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").

2. MPI product number (e.g., MPI #47).
 3. Cross-reference to specified paint system products to be used in project; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
1. Where sheen is specified, submit samples in only that sheen.
 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
 4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as factory finished metals, wood cabinets, and wood doors, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. Extra Paint and Finish Materials: 1 gal of each color; from the same product run, store where directed.
 2. Label each container with color in addition to the manufacturer's label.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.7 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 fc measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. PPG Paints: www.ppgpaints.com/#sle.
 - 2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
 - 3. Benjamin Moore: www.benjaminmoore.com.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 016000 - Product Requirements.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
4. Supply each paint material in quantity required to complete entire project's work from a single production run.
5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:

1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. SCAQMD 1113 Rule.
 - c. Architectural coatings VOC limits of the State in which the Project is located.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: As indicated on drawings.

1. Extend colors to surface edges; colors may change at any edge as directed by Architect.
2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

2.3 PAINT SYSTEMS - INTERIOR

A. WATERBASED EPOXY PAINTS

1. Paint I-OP-3EW - Waterbased Epoxy.

a. Products:

- 1) PPG Paints Pitt-Glaze WB1 Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-310 Series, Eggshell. (MPI #151)
- 2) PPG Paints Pitt-Glaze WB1 Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-510 Series, Semi-Gloss. (MPI #153)
- 3) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #151)
- 4) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss. (MPI #153)
- 5) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy, V342, Eggshell. (MPI #151)
- 6) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy, V341, Semi-Gloss. (MPI #153)

B. ACRYLIC PAINTS

1. Paint MI-OP-3LA - Acrylic Enamel.

a. Products:

- 1) PPG Paints Pitt-Tech Plus WB DTM Industrial Enamel, 90-1210 Series, Semi-Gloss. (MPI #153)
- 2) Sherwin-Williams Pro Industrial DTM Acrylic, B66 Series, Semi-Gloss (MPI #153)
- 3) Benjamin Moore Super Spec HP DTM Acrylic, Semi-Gloss. (MPI #153)

2.4 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

1. Interior/Exterior Latex Block Filler.

a. Products:

- 1) Kilz Pro-X p50 Block Filler Primer.
- 2) PPG Paints Speedhide Masonry Hi Fill Latex Block Filler, 6-15XI .
- 3) Sherwin-Williams PrepRite Block Filler.

2. Interior Drywall Primer Sealer.
 - a. Products:
 - 1) PPG Paints Speedhide Zero Interior Latex Sealer, 6-4900XI.
 - 2) Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28 Series.
 - 3) Benjamin Moore Ultra Spec 500 Primer 534.
3. Interior Rust-Inhibitive Water Based Primer.
 - a. Products:
 - 1) PPG Paints Pitt-Tech Plus Interior/Exterior EP DTM Waterborne Acrylic Primer/Finish, 90-1908. (MPI #107)
 - 2) Sherwin-Williams Pro-Cryl Universal Waterbased Primer.
 - 3) Benjamin Moore Ultra Spec HP Acrylic Metal Primer, HP04.
4. Interior Water Based Primer for Galvanized Metal.
 - a. Products:
 - 1) PPG Paints Pitt-Tech Plus EP DTM Industrial Primer, 90-1912. (MPI #134)
 - 2) Sherwin-Williams Pro-Cryl Universal Waterbased Primer.
 - 3) Benjamin Moore Ultra Spec HP Acrylic Metal Primer, HP04.

2.5 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been adequately prepared.

- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
 - 3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi at 6 to 12 inches. Allow to dry.
- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- I. Galvanized Surfaces:

1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 2. Prepare surface according to SSPC-SP 2.
- J. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.
- K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- G. Sand metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Mechanical Work: Painting of mechanical work includes the following:
 1. Interior Occupied Areas: Unless otherwise indicated, paint the following when exposed to view in finished construction:
 - a. Structural supports for mechanical equipment.

- b. Mechanical equipment (except pre-finished equipment).
 - c. Piping, pipe hangers, and supports.
 - d. Ductwork.
 - e. Insulation on pipe and ductwork.
 - f. Accessory items.
 - g. Fire suppression system piping.
- J. Electrical Work: Painting of electrical work includes the following:
- 1. Interior Occupied Areas: Unless otherwise indicated, paint the following when items exposed to view in finished construction:
 - a. Structural supports for electrical equipment.
 - b. Electrical equipment (except pre-finished equipment).
 - c. Conduit and fittings, panels and boxes, and wiremold.
 - d. Panelboards, including telephone equipment.
 - e. Accessory items.
- K. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.5 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.6 SCHEDULE - PAINT SYSTEMS

- A. Paint I-OP-3WE - CMU Substrates, Waterbased Epoxy (Semi-gloss):

1. Block Filler: Masonry Epoxy Block Filler 10 mils DFT.
 2. Intermediate Coat: Waterbased Epoxy, 2.5-3.0 mils DFT.
 3. Topcoats: Waterbased Epoxy, 2.5-3.0 mils DFT.
- B. Paint MI-OP-3LA - Steel Substrates, Acrylic Enamel (Semi-gloss):
1. Prime Coat: Rust-Inhibitive Water Based Primer, 3.0 mils DFT.
 2. Intermediate Coat: Acrylic Enamel, 1.4 mils DFT.
 3. Topcoats: Acrylic Enamel, 1.4 mils DFT.
- C. Paint I-OP-3EW - Gypsum Board Substrates, Waterbased Epoxy (Walls - Eggshell):
1. Prime Coat: Interior Latex Primer Sealer, 1.4 mils DFT.
 2. Intermediate Coat: Waterbased Epoxy, 1.6 mils DFT.
 3. Topcoats: Waterbased Epoxy, 1.6 mils DFT.

END OF SECTION 099123

SECTION 114011 – FOOD SERVICE EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes food service equipment indicated on Drawings and schedules.
- B. Related Sections include the following:
 - 1. Division 05 5000 Section "Metal Fabrications" for equipment supports.
 - 2. Division 23 Sections "Mechanical" for supply and exhaust fans; exhaust ductwork; service roughing-ins; drain traps; atmospheric vents; valves, pipes, and fittings; fire-extinguishing systems (unless specified herein); and other materials required to complete food service equipment installation.
 - 3. Division 26 Sections "Electrical" for connections to fire alarm systems, wiring, disconnects, and other electrical materials required to complete food service equipment installation.
- C. Allowances: Furnish food service equipment under the allowances indicated as specified in Division 01 2100 Section "Allowances."
- D. Work by Others:
 - 1. Final utilities connections and interconnections by Mechanical Technical Division #15 and Electrical Technical Division #16 Contractors.
 - 2. Furnishing and installation of disconnect switches, stop clocks, traps, strainers or other fittings, and accessories required to permit removal of equipment for adjustment or repairs, unless specifically called for otherwise. The Contractor shall, however, provide any required information and direct on-site supervision to allow proper completion by other trades.
 - 3. Installation of sleeves in floors and walls.
 - 4. Masonry bases, fireproof hearths, flues, and vents unless specifically called for otherwise.
 - 5. Flushing out of lines before making final connections. It is the responsibility of this Contractor to verify, however, that lines are properly flushed before final connection.
 - 6. Temporary electric power during installation for power tools, lighting, and so on or for testing prior to commissioning of permanent service.
 - 7. Handling, improvement, or modification to existing equipment not included in this specification.
 - 8. Demolition.

9. Other trades must review complete project specifications for definition of their total responsibilities.

1.3 DEFINITIONS

- A. Terminology Standard: Refer to NSF 2, "Food Equipment" or other applicable NSF standards for definitions of food service equipment and installation terms not otherwise defined in this Section or in other referenced standards.
- B. General: The following define the intent and context as it applies to this section of the specifications, and does not supersede or in any way replace definitions found in other sections.
 1. Furnish: The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations".
 2. Install: The term "install" is used to describe operations at the project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations".
 3. Provide: The term "provide" means "to furnish and install, complete and ready for intended use".

1.4 SUBMITTALS

- A. Floor Plans and Rough-ins
 1. The Contractor shall submit copies of the following drawings to the Owner or his designated representative for review:
 - a. A floor plan of all food service areas showing all items of equipment and sufficient dimensions to indicate placement of equipment from walls, other items, etc. This sheet shall include an equipment schedule indicating item number, quantity, and description.

This sheet shall also include an equipment schedule, and the appropriate item number shall accompany each utility description on the body of the sheet. It is expected that the Contractor will refer to the data prepared by the Architect and Consultant to complete this requirement; however, it is the Contractor's responsibility to verify information shown thereon, and the Contractor's submittal will warrant that he is fully satisfied that the information shown on the submittal is totally correct, complete, and ready for use in the field by other trades. On a new project, rough-in dimensions shall be calculated from column centerlines or other established datum points. On a project in an existing space, calculations shall be from finished walls. Indicate all interconnections by other trades.
 - b. A completely and clearly dimensioned electrical rough-in plan indicating exact locations, heights, and services required for each item of food service equipment, as well as any incidental services (for example, convenience receptacles) shown on the Consultant's spot connection plan.

- c. A plumbing rough-in plan conforming to the requirements noted in (b) above.
 - d. A ventilation rough-in plan conforming to the requirements noted in (b) above.
 - e. A building conditions plan conforming to the requirements noted in (b) above, and including all pertinent information regarding masonry bases, curbs, recesses, critical dimensions of walls and openings, wall anchorages and overhead supports, and any other special information required to insure a properly completed installation.
 - f. Electronic copies of the Consultant's work, which is copyrighted, shall not be authorized for use by the Contractor. The Consultant assumes no responsibility for any use, whether authorized or not, or whether electronically editable or not, for the use of his documentation by the Contractor.
2. The scale of these drawings shall be $1/4" = 1'-0"$, and it shall be the responsibility of the Contractor to insure that his drawings are properly coordinated and that there are no conflicts between sheets. The Contractor may, at his option, combine [(b) and (c)] and [(d) and (e)], providing that the scale of all drawings is increased to $1/2" = 1'-0"$.
 3. The review of these drawings by the Owner or his designated representative is for design purposes only, and that review and/or the reviewer's election to review drawings submitted not in accordance with the above directions will not relieve the Contractor from responsibility for the consequences of not having prepared the drawings as above described.

B. Manufacturer's Drawings

1. It is the responsibility of the Contractor to insure that drawings required from his vendors are received and submitted so as to allow review, correction, resubmittal, and production within the requirements of the project schedule.
2. The Contractor shall review, coordinate, and correct these drawings before submitting them for review.
3. The Contractor is responsible for verifying that notes and revisions on these drawings do not conflict with his rough-in drawings, and shall immediately notify the Owner or his representative of any such conflicts.

C. Shop Fabrication Drawings

1. The Contractor shall submit copies of drawings showing complete fabrication details of custom fabricated equipment.
2. The scale of these drawings shall be $3/4" = 1'-0"$, with sufficient cross sections to accurately describe construction. Sections shall be at a scale of $1-1/2" = 1'-0"$. Each drawing shall show name and address of fabricator.
3. These drawings shall indicate locations of utilities and interconnections in relation to the custom equipment. Junction boxes and breaker panels shall be presented in schedule form showing individual connections and total load. If requested by the Owner, provide complete wiring diagrams.

D. Manufacturers' Illustrations

1. Within 30 days from award of contract, the Contractor shall submit a **single, complete, hard copy bound brochure in a suitable binder with front and rear cover.**
 2. Provide a cover sheet for each item number, indicating item number, quantity, description, manufacturer, model number, utilities required, and accessories.
 3. **To insure manageable file size, electronic brochure submittals will be accepted only under the following conditions:**
 - a. **There are no repeated sheets in reference to a specific item;**
 - b. **The file size does not exceed 100 MB;**
 - c. **Manufacturers' literature related to equipment for which shop drawings will be submitted may, at the FSE Contractor's option, be deleted if they are not necessary to augment the shop drawing information.**
 - d. **In the event these conditions are not met, the FSE Contractor shall submit a payment in the amount of \$1,000 to reimburse the FSE Consultant as reimbursement for making the necessary size reductions.**
- E. The review of these items by the Owner or his representative is for the assistance of the Contractor, and does not relieve the Contractor of any responsibility for accuracy and completeness. When the Contractor is notified that further resubmittals will not be required, he shall provide to the Owner a reasonable number of copies of prints and brochures without charge.

1.5 QUALITY ASSURANCE

- A. Contractor Qualifications: It is the intent of these specifications that fabricated equipment be manufactured by a contractor who has the plant, personnel, and engineering facilities to properly detail and manufacture best quality kitchen equipment in accordance with the specifications. The manufacturer shall be subject to the approval of the Architect or Consultant.
1. All fabricated equipment must be fabricated by one contractor in his own plant and shall be of uniform quality, design, and finish. Millwork fabrication need not be provided by the sheet metal fabricator, however.
 2. The Contractor shall not sublet any portion of the fabricated equipment unless the names of the subcontractors have been submitted with the bid. The Contractor shall be fully responsible for the entire performance of his subcontractors.
 3. Upon demand, the bidder shall submit evidence of having successfully executed contracts of similar size and scope. He shall also be prepared to submit a financial statement giving evidence of his ability to properly execute this project.
 4. The Contractor shall be a recognized and qualified distributor of buy-out kitchen equipment.
- B. The Contractor shall be a recognized and qualified distributor of buy-out kitchen equipment.

- C. Manufacturer Qualifications: Engage a firm in continuous business at least ten (10) years, experienced in manufacturing food service equipment similar to that indicated for this Project and with a record of successful in-service performance.
- D. Source Limitations: Obtain each type of food service equipment through one source from a single manufacturer.
- E. Product Options: Various items are specified by brand, trade name, or name of manufacturer and model number. The base bid must include the price for the manufacturer and model number exactly as specified.
1. Specifications may include the suffix *C004 as part of the model number or elsewhere in the individual item description. This identifies the specifying office of the Food Service Consultant to insure that equipment vendors receiving information from bidders can communicate questions, clarifications, and comments which will serve to help resolve any specification issues before bid award. **The bidder shall not remove this number from the specifications**, and it is to be included in all correspondence regarding the item.
 2. The Specification Identification System described above is administrated through the auspices of the North American Association of Foodservice Equipment Manufacturers (NAFEM). The use of the SIS code does not modify model numbers recognized by the National Sanitation Foundation (NSF) or other listing bodies. Additional information is available from NAFEM at 312-644-6610.
 3. The Contractor may propose equivalent equipment for substitution, supplying full data and illustration sheet for each item. Alternate prices on all substitute equipment shall be submitted on a SEPARATE SHEET attached to the base proposal and shall state the amount to be added to or deducted from the base bid, as well as any other benefits that may accrue to the owner (delivery, maintenance, warranty, utility savings, and so on) if the alternate item is accepted. Refer to the “Application for Substitution of Specified Food Service Equipment” in this specification.
 4. The Contract Documents are based on the named (or first-named, in the case of additional named alternates) manufacturer and model number in regard to size, utility requirements, interface with other equipment, and so on. Where the Contractor elects to employ approved products other than the named (or first-named), whether included in the specifications or approved during the submittal process, it is the Contractor’s responsibility to verify any differences in requirements and so advise the Architect.
 5. The Contractor shall be responsible for any additional costs incurred by any parties as the result of using any manufacturer other than the named (or first-named).
 6. The Architect or the Consultant or their representatives shall be the sole judge of the quality and acceptability of the substitute offered.
 7. Alternates or substitutions shall be considered only at the time of bidding.
 8. Following is the Application for Substitution of Specified Food Service Equipment.

APPLICATION FOR SUBSTITUTION OF SPECIFIED FOOD SERVICE EQUIPMENT

This form is to be submitted in support of each suggestion or request to substitute a manufacturer and/or model number that is not included as the only-named, first-named, or additionally-named product in the Division 11400 (Food Service Equipment) specifications. Refer to Section 1.5.E in those specifications for additional information.

The decision to accept an unnamed alternate will be based exclusively on the information provided hereon and the Owner's or his designee's research and verifications of the claims, which may include sharing the information with the manufacturer(s) of the originally specified equipment. Accordingly, any proprietary information regarding the proposed substitution should be so identified and submitted as an addendum to this form.

By submitting this application the Contractor guarantees that the information is correct and accepts total responsibility for any and all additional costs that may directly or indirectly result from acceptance of the proposed substitution. It is in the interest of the Contractor to declare on this form ALL benefits that will accrue to the Owner, as additional information provided after this form is submitted will not be considered. Include the proposed manufacturer's catalog information.

The original specifications describe the minimum standards of the equipment – proposed substitutions that do not exceed this minimum standard or otherwise benefit the Owner will not be considered except in the case of an originally specified item that is no longer available. The Owner or his designee is the sole authority in regard to identifying specific features, capacities, and so on that are operationally critical (for instance, pan capacity). Acceptance of a proposed substitution does not in any way relieve the Contractor of responsibility for any and all direct or indirect costs associated with the substitution.

- 1. Date submitted _____
- 2. Item Number _____ Description _____ Quantity _____
- 3. Specified Manufacturer _____ Specified Model Number _____
- 4. Proposed Manufacturer _____ Proposed Model Number _____
- 5. Does the proposed equipment incorporate all features and options expressed or implied by the specifications, including features and options that are provided as standard by the specified item number?
 Yes No (describe – attach additional sheets if necessary) _____

6. Compare the utilities of the specified equipment with the proposed equipment:

Specified: Hot water _____ Cold water _____ Electrical (w/ amps) _____
Gas (w/ BTUH) _____ Exhaust/supply volume w/ duct connections _____

Proposed: Hot water _____ Cold water _____ Electrical (w/ amps) _____
Gas (w/ BTUH) _____ Exhaust/supply volume w/ duct connections _____

7. Compare the dimensions of the specified equipment with the proposed equipment:

Specified: Left to right _____ Front to rear _____ Height _____

Proposed: Left to right _____ Front to rear _____ Height _____

8. Does the proposed equipment require any changes to the work to be provided by other trades?

No Yes (describe – attach additional sheets if necessary) _____

9. Does the proposed equipment require any changes or create any issues in regard to adjacent or associated equipment (for instance: door swing interference; stretch/shrink of established dimensions; service access clearances; air circulation space)?

No Yes (describe – attach additional sheets if necessary) _____

10. What benefits will the owner realize as a result of this substitution being approved (for instance: capital expense; energy savings; future flexibility; warranty terms; shipping time)? Provide specific information (how much less energy will be necessary? How much capital expense will be saved? How much longer is the warranty?).

There are no benefits to the Owner

The following will benefit the Owner (attach additional sheets if necessary): _____

11. What are the actual or potential disadvantages to the substitution being approved?

There are no actual or potential disadvantages

The following are actual or potential disadvantages (attach additional sheets if necessary): _____

12. Are there any other considerations that should be evaluated? _____

13. Signature of Contractor's representative _____

- F. Regulatory Requirements: Comply with the following National Fire Protection Association (NFPA) codes:
1. NFPA 70, "National Electrical Code."
 2. NFPA 17: Standard for Dry Chemical Extinguishing Systems
 3. NFPA 17A: Standard for Wet Chemical Extinguishing Systems
 4. NFPA 96: Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
- G. Listing and Labeling: Provide electrically operated equipment or components specified in this Section that are listed and labeled.
1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- H. NSF Standards: Comply with applicable NSF International (NSF) standards and criteria and provide NSF Certification Mark on each equipment item, unless otherwise indicated.
- I. ANSI Standards: Comply with applicable ANSI standards for electric-powered and gas-burning appliances; for piping to compressed-gas cylinders; and for plumbing fittings, including vacuum breakers and air gaps, to prevent siphonage in water piping.
- J. SMACNA Standard: Where applicable, fabricate food service equipment to comply with the Sheet Metal and Air Conditioning Contractors National Association's (SMACNA) "Kitchen Equipment Fabrication Guidelines," unless otherwise indicated.
- K. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 01 3100 Section "Project Management and Coordination."
- L. Warranty: All equipment shall be warranted in writing from the date of final acceptance for a minimum period of one (1) year (regardless of the duration of the manufacturer's warranty) from defective parts, material, design, and workmanship, whether furnished by the Contractor or any of his subcontractors. The Contractor will be responsible for the cost of the affected equipment and/or its parts as well as any related costs of affected structural, electrical, mechanical, or other work requiring removal or replacement as a direct or indirect result of the failure of the equipment.
1. The warranty shall also include start-up and one (1) years' service for all refrigeration equipment, with an additional four (4) year warranty on compressors.
 2. Neither the final certificate nor payment will relieve the Contractor of responsibility for honoring the warranty.
 3. The Contractor shall forward all manufacturers' warranty information to the Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall furnish all labor, materials, equipment, and services necessary for all items specified. These shall be delivered prepaid; uncrated; assembled with all components within the equipment proper completely connected; set in place; leveled;

fastened to the walls, floor, and ceiling if required; and left ready for final connections by other trades, which shall extend utility lines from rough-in locations to the final connection points on the equipment.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of food service equipment installation areas by field measurements before equipment fabrication and indicate measurements on Shop Drawings and Coordination Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish required dimensions and proceed with fabricating equipment without field measurements. Other trades are responsible for coordinating construction to ensure actual dimensions correspond to established dimensions.
- B. Should it become necessary to schedule construction so that partitions and other structural features are erected prior to the delivery of equipment, equipment shall be fabricated so that it can be handled through available openings. The Contractor will be responsible for checking delivery access into the building and arranging delivery details as required.

1.8 COORDINATION

- A. Coordinate equipment layout and installation with other work, including light fixtures, HVAC equipment, and fire-suppression system components.
- B. Coordinate location and requirements of service-utility connections.
- C. Where interfacing with food service equipment, coordinate size, location, and requirements of concrete bases, floor depressions, and insulated floors. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- D. All work is to be performed by the proper trades using skilled labor. All work shall be performed at hours required to maintain consistent work schedules with all other trades without additional cost to the Architect, Consultant, or Owner.
- E. If any work specified under this Contract must be done by others as a result of jurisdictional trade agreements or other restrictions, this Contractor shall sublet such work as necessary or make other satisfactory arrangements at his own expense and with the understanding that such work shall be done in accordance with the specifications and work schedule.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Stainless-Steel Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304, stretcher leveled, and in finish specified in "Stainless-Steel Finishes" Article.
- B. Stainless-Steel Tube: ASTM A 554, Grade MT-304, and in finish specified in "Stainless-Steel Finishes" Article.
- C. Sealant: ASTM C 920; Type S, Grade NS, Class 25, Use NT. Provide elastomeric sealant NSF certified for end-use application indicated. Provide sealant that, when cured and washed, meets requirements of Food and Drug Administration's 21 CFR, Section 177.2600 for use in areas that come in contact with food.
 - 1. Color: As selected by Architect from manufacturer's full range of colors.
 - 2. Backer Rod: Closed-cell polyethylene, in diameter larger than joint width.

2.2 ACCESSORIES

- A. The Contractor is responsible for providing the following accessories for all equipment, either mounted on the equipment or clearly identified if the accessory is to be mounted by others:
 - 1. Plumbing Accessories- crumb cup strainer waste outlets, lever handle wastes with strainers, tailpieces, faucets, standing or connected overflows, vacuum breakers, and other specialty fittings standard or necessary for the item specified. Where such accessories are mounted by the Contractor, this shall be done in the Contractor's shop whenever possible.
 - 2. Steam Fitting Accessories- steam supply valves with composition handles which shall remain reasonably cool to the touch in service, gauges, thermostats, pressure reducing valves, tinned copper coils, and injectors, as specified.
 - 3. Electrical Accessories- terminal blocks, conduit, wiring, signal lamps, on-off switches, control panels, heating elements, junction boxes, cords and plugs as required, and control switches.
 - 4. Refrigeration Accessories- refrigerant tubing, valves, fittings, hangers, pipe covering, thermometers, combined high and low pressure control switches, solenoid valves, thermostats, condensate evaporators, insulation, heaters, and condensate heater wires.
- B. Install an appropriately sized Superior, Everpure, or equal water conditioner/filter for all ice makers, coffee makers, water coolers, compartment steamers, and drink dispensers specified herein. These shall be concealed and accessible. Where possible, install a single such unit in the line prior to branching to individual items.
- C. The Contractor shall provide neoprene cords and plugs for all items requiring same, and shall coordinate his work with the electrical contractor to insure proper receptacle match. Shorten all cords to an appropriate length.
- D. The Contractor shall install fluorescent light fixtures, lamps, ballasts, and protective non-breakable sleeves for all equipment requiring fluorescent lighting.

- E. The Contractor shall provide refrigeration systems included in the specifications, self-contained and remote, completely installed, charged, tested, and operating properly. The scope of this requirement includes all compressors, racks, coils, vibration eliminators, moisture-indicating sight glasses, expansion valves, filters, separators, thermostats, controls, control wiring between compressor and coil (self-contained only; remote by electrical contractor), liquid line dryers, refrigeration grade copper tubing with all sweat joints, and 1/2" or equal Armaflex or equal insulation.

2.3 FABRICATION, GENERAL

- A. Fabricate food service equipment according to NSF 2 requirements. Factory assemble equipment to greatest extent possible.
- B. Welding: Use welding rod of same composition as metal being welded. Use methods that minimize distortion and develop strength and corrosion resistance of base metal. Provide ductile welds free of mechanical imperfections such as gas holes, pits, or cracks.
 - 1. Welded Butt Joints: Provide full-penetration welds for full-joint length. Make joints flat, continuous, and homogenous with sheet metal without relying on straps under seams, filling in with solder, or spot welding.
 - 2. Grind exposed welded joints flush with adjoining material and polish to match adjoining surfaces.
 - 3. Where fasteners are welded to underside of equipment, finish reverse side of weld smooth and undepressed.
 - 4. Coat unexposed stainless-steel welded joints with suitable metallic-based paint to prevent corrosion.
 - 5. Tack welds shall have at least 1/2" of welding material at a maximum spacing of 4" with the exception of channel ends where a minimum of two welds will be required regardless of spacing.
 - 6. Field joints will be performed only when accessibility or transportation considerations prohibit a single unit. Such joints will be welded whenever a welded joint would otherwise be required, and shall be equal in quality to welds performed in the shop.
 - 7. Any welding of galvanized metal shall be followed by treating to prevent rusting or corrosion at the weld.
- C. Fabricate field-assembled equipment prepared for field-joining methods indicated. For metal butt joints, comply with referenced SMACNA standard, unless otherwise indicated.
- D. Where stainless steel is joined to a dissimilar metal, use stainless steel welding material or fastening devices.
- E. Form metal with break bends that are not flaky, scaly, or cracked in appearance; where breaks mar uniform surface appearance of material, remove marks by grinding, polishing, and finishing.
- F. Sheared edges shall be ground and polished to eliminate the possibility of injury or damage to personnel or equipment. Raw corners shall be ground to a minimum 1/4" radius. Overlapping materials will not be acceptable.

- G. Provide surfaces in food zone, as defined in NSF 2, free from exposed fasteners.
- H. Cap exposed fastener threads, including those inside cabinets, with stainless-steel lock washers and stainless-steel cap (acorn) nuts.
- I. The Contractor shall provide suitable pipe chases and pockets and/or perform all necessary drilling, punching, and cutting of his equipment for work or connections performed by other trades. This includes grinding to eliminate any possibility of injury to damage or equipment. Such work shall be performed in the Contractor's shop whenever possible, and if done in the field shall be of the same quality as if shop performed.
- J. Provide enclosures, including panels, housings, and skirts, to conceal service lines, operating components, and mechanical and electrical devices including those inside cabinets, unless otherwise indicated.
- K. Rivets are not acceptable under any circumstances, nor are manufacturers' name plates except in the case of catalog equipment, where a name plate must appear bearing the model number of the equipment along with all pertinent mechanical and electrical data.

2.4 STAINLESS-STEEL EQUIPMENT

- A. Edges and Backsplashes: Provide equipment edges and backsplashes indicated complying with referenced SMACNA standard, unless otherwise indicated.
- B. Tables: Fabricate with reinforced tops, legs, and reinforced under-shelves or cross bracing to comply with referenced SMACNA standard, unless otherwise indicated, and as follows:
 - 1. Tops: Minimum #14 gauge 0.0781-inch- (1.984-mm-) thick stainless steel, unless otherwise indicated.
 - 2. Legs: 1-5/8 inch (41.3 mm) OD, minimum #16 gauge 0.0625-inch- (1.588-mm-) thick stainless steel with stainless-steel gusset and adjustable insert bullet-type feet with minimum adjustment of 1 inch (25 mm) up or down without exposing threads, unless otherwise indicated.
 - 3. Undershelves: Minimum #16 gauge 0.0625 (1.588-mm-) thick stainless steel, unless otherwise indicated.
 - 4. Top and Undershelf Reinforcement: Provide minimum #12 gauge 0.1094 inch thick, stainless-steel reinforcing, unless otherwise indicated.
 - 5. Cross Bracing: 1-1/4 inch (31.75 mm) OD, minimum #16 gauge 0.0625-inch- (1.588-mm-) thick stainless steel, unless otherwise indicated.
- C. Sinks: Fabricate of minimum #14 gauge 0.0781-inch- (1.984-mm-) thick stainless steel with fully welded, 1-piece construction. Construct 2 sides and bottom of sink compartment from 1 stainless-steel sheet with ends welded integral and without overlapping joints or open spaces between compartments. Provide double-wall partitions between compartments with 1/2-inch- (13-mm-) radius rounded tops that are welded integral with sink body. Cove horizontal, vertical, and interior corners with 3/4-inch (19-mm) radius. Pitch and crease sinks to waste for drainage without pooling. Seat wastes in die-stamped depressions without solder, rivets, or welding.

1. Wastes: 2-inch (50-mm) nickel-plated bronze, rotary-handle waste assembly with stainless-steel strainer plate and nickel-plated brass, connected overflow.
 2. Drainboards: Minimum #14 gauge 0.0781-inch- (1.984-mm-) thick stainless steel, pitched to sink at 1/8 inch/12 inches (3 mm/300 mm) of length. Reinforce drainboards with minimum #14 gauge 0.0781-inch- (1.984-mm-) thick stainless steel, unless otherwise indicated.
 3. Legs: 1-5/8 inch (41.3 mm) OD, minimum #14 gauge 0.0625-inch- (1.588-mm-) thick stainless steel with stainless steel gusset welded to #12 gauge 0.1094-inch- (2.779-mm-) thick, stainless steel support plate. Provide adjustable insert bullet-type feet with minimum adjustment of 1 inch (25 mm) up or down without exposing threads, unless otherwise indicated.
 4. Drainboard Braces: 1 inch (25 mm) OD, minimum #16 gauge 0.0625-inch- (1.588-mm-) thick stainless steel, unless otherwise indicated.
 5. Cross Bracing: 1-1/4 inch (31.75 mm) OD, minimum #16 gauge 0.0625-inch- (1.588-mm-) thick stainless steel, unless otherwise indicated.
- D. Wall Shelves and Overshelves: Fabricate to comply with referenced SMACNA standard, unless otherwise indicated, and with minimum #16 gauge 0.0625-inch- (1.588-mm-) thick, stainless steel shelf tops.
- E. Refer to the sheets in the drawing set which describe specific fabrication details to be used in the course of construction.

2.5 STAINLESS-STEEL FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
1. Remove or blend tool and die marks and stretch lines into finish.
 2. Grind and polish surfaces to produce uniform, directional textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- B. Concealed Surfaces: No. 2B finish (bright, cold-rolled, unpolished finish).
- C. Exposed Surfaces: No. 4 finish (bright, directional polish).
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- E. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

2.6 MILLWORK

- A. Core materials shall be 3/4" exterior or marine grade plywood unless otherwise specified.
- B. Particle board or other pressed wood products are not acceptable.

- C. Plastic laminate shall be by Formica, Wilson Art, or approved equal, applied according to manufacturer's recommendations with a urea-based adhesive. Rubber based adhesives are not acceptable. Plastic laminate shall be NSF listed.

2.7 PRESENTATION OF BIDS

- A. It is intended that the contract be awarded as a whole to the successful bidder. An itemized breakdown is required so that the Owner may, at his option, delete the item in its entirety, supply any part or portion thereof, or increase the quantity, making a suitable adjustment in the contract price based on the breakdown.
- B. Fill out the following Itemized Price List.

ITEM	QTY.	DESCRIPTION	PRICE
1	Lot	Unaffected Equipment (Existing – Remain in Place)	XXXXXXXXXXXXXXXXXXXXX
2	3	Hand Sink	.....
3	1	Clean Ware Table	.....
4	1	Rack Shelf	.....
5	1	Washer	.....
6	1	Steam Exhaust Hood	.....
7	1	Soiled Ware Table / 3 Compartment Sink	.....
8	1	Disposer	.....
9	3	Wall Shelf "A"	.....
10	1	Pot Rack	.....
11	-	Unassigned	XXXXXXXXXXXXXXXXXXXXX
12	-	Unassigned	XXXXXXXXXXXXXXXXXXXXX
13	2	Mobile Clean Ware Shelf	.....
14(I)	1	Mobile Work Table (Existing – Relocated)	XXXXXXXXXXXXXXXXXXXXX
15(E)	1	Sheet Pan Dolly (Existing – Relocated)	XXXXXXXXXXXXXXXXXXXXX
16(J)	1	Storage Shelf "A" (Existing – Relocated)	XXXXXXXXXXXXXXXXXXXXX
17(H)	1	Ice Maker and Bin (Existing – Relocated)	XXXXXXXXXXXXXXXXXXXXX
18(D)	2	Reach-In Refrigerator (Existing – Relocated)	XXXXXXXXXXXXXXXXXXXXX
19(C)	2	Mobile Heated Holding Unit (Existing – Relocated)	XXXXXXXXXXXXXXXXXXXXX
20	1	Mobile Work Table with Overshelf	.....
21	-	Unassigned	XXXXXXXXXXXXXXXXXXXXX
22	1	Utility Distribution System	.....
23	1	Exhaust Ventilator	.....
24	1	Fire Suppression System	.....

Freeland Schools – Elementary Cafeteria
Freeland Community School District

25	1	Double Deck Convection Oven "A"	.....
26	2	Nesting Sheet Pan Rack	.....
27	1	Pot Filler	.....
28(G)	1	Six Burner Range with Oven (Existing – Relocated)	.....
29(F)	1	Double Deck Steamer (Existing – Relocated)	XXXXXXXXXXXXXXXXXXXX
30	-	Unassigned	XXXXXXXXXXXXXXXXXXXX
31	1	Double Deck Convection Oven "B" (Add Second Deck)	.....
32	-	Unassigned	XXXXXXXXXXXXXXXXXXXX
33	1	Work Table with Sinks	.....
34	1	Wall Shelf "B"	.....
35	1	Work Table	.....
36	-	Unassigned	XXXXXXXXXXXXXXXXXXXX
37	2	Ice Cream Cabinet (By Owner's Vendor)	XXXXXXXXXXXXXXXXXXXX
38	2	Hot Food Serving Counter	.....
39	Lot	Office Equipment (By Owner)	XXXXXXXXXXXXXXXXXXXX
40	1	Cold Food Serving Counter	.....
41	2	Air Screen Refrigerator	.....
42	-	Unassigned	XXXXXXXXXXXXXXXXXXXX
43	1	Cashier Counter "A"	.....
44	1	Cashier Counter "B"	.....
45	2	P.O.S. Terminals (By Owner)	XXXXXXXXXXXXXXXXXXXX
46	1	Condiment Counter	.....
47	Lot	Traffic Guide System (Not by FSE Contractor)	XXXXXXXXXXXXXXXXXXXX
48	1	Overhead Closure (Not by FSE Contractor)	XXXXXXXXXXXXXXXXXXXX
49	-	Unassigned	XXXXXXXXXXXXXXXXXXXX
50	-	Unassigned	XXXXXXXXXXXXXXXXXXXX

Subtotal _____

Any extra charges (describe)

TOTAL COST (excluding taxes) _____

Taxable amount

2.8 EXISTING EQUIPMENT

- A. The term "existing equipment" as used in this specification shall mean food service equipment now in storage or active use by the Owner. Equipment identified as "existing" that is not being relocated may or may not need to be removed to accommodate construction in the area.
- B. Where the documents indicate that an item is to be installed by the Contractor, it is the Contractor's responsibility to carefully examine the item in place to ascertain that it operates properly and will properly fit in its new location.
- C. The Contractor shall also: disassemble (if required) the items; remove and store in a properly bonded and protected storage facility; deliver, reassemble (if required) and install in its new location where indicated on the drawings; and verify that the equipment operates properly. The Contractor is responsible for scheduling of delivery and installation of all existing items, whether delivered by the Contractor or the Owner.
- D. Where the documents indicate that an item is to be installed by the Owner, the Owner shall be responsible for removal, storage, and delivery to the installation area. Final installation and coordination between items shall be by the Contractor. The Contractor shall notify the Owner of the necessary delivery dates no less than 14 days prior to the delivery date.
- E. If the documents do not indicate if an existing item is to be installed by the Contractor or Owner, it shall be assumed that the Contractor shall install it.
- F. The Contractor shall verify and indicate on his rough-in plan all utility connections required for the proper installation of all existing equipment to be reused.
- G. If any items are indicated to require reconditioning, the Contractor shall submit a time and materials proposal for any reconditioning, which shall be in addition to the base bid.
- H. Reconditioning (where specifically called for) shall be interpreted to mean:
 - 1. A thorough scraping and steam cleaning to remove scale and all foreign material;
 - 2. Repainting of all items having exposed, worn, or scarred surfaces, which are not of rustproof materials;
 - 3. Furnishing any required filler pieces, braces, hardware, and so on necessary to complete the installation in a workmanlike manner.
 - 4. Repainting of the understructure (legs, shelves, drawers, etc.) when required shall be aluminum lacquer or other chip resistant finish. Other items shall be completely repainted or touched up, as required by their condition, in their original color.
 - 5. Refrigeration equipment shall have all components checked for efficient operation, and all worn or malfunctioning items shall be replaced.
 - 6. Items containing heating elements shall be checked and any electrical components not functioning properly shall be replaced.
- I. Disposition of existing equipment:
 - 1. Equipment to be reused by the Owner at other locations: the Contractor shall disassemble if necessary and relocate from the existing location to an area adjacent to

or nearby in the facility as identified by the Owner. Further services may be performed through a separate arrangement between the Contractor and Owner.

2. Equipment identified for re-use at the current location: the Contractor shall disassemble if necessary and relocate from the existing location to an area adjacent to or nearby in the facility as identified by the Owner. The Contractor is responsible for ensuring adequate isolation and protection during construction and post-installation until accepted by the Owner. Alternatively, the Contractor may store this equipment off-site at their expense.
3. Equipment not identified for further use: the Contractor shall solicit the Owner to identify any equipment (not already identified per paragraphs 1 and 2 above) that the Owner wishes to retain, and for those items follow the procedure described in paragraph 1. Otherwise, the Contractor shall remove and dispose of this equipment as they choose.

2.9 ITEM SPECIFICATIONS

2.9.1 ITEM #1 UNAFFECTED EQUIPMENT LOT REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.2 ITEM #2 HAND SINK (3) REQUIRED

- A. Install the ADVANCE-TABCO #7-PS-51*C004 (refer to Section 1.5.E in regard to the “*C004” suffix) complete with all standard accessories including lever drain with overflow and P-trap, and with #7-PS-36*C004 wall support brackets. Where this manufacturer is specified, comparable equipment by PRS (Professional Restaurant Services, Warren, Michigan) is also acceptable unless otherwise indicated. Provide a bolted-on side splash at the right side of the unit adjacent to Item #3, and both sides of the unit between Items #33 and #36. No side splashes are required for the unit on the south wall.
- B. In lieu of the standard unit furnish the T&S BRASS #EC-3101*C004 hands-free electronic splash-mounted gooseneck faucet system with adjustable shut-off timer.

2.9.3 ITEM #3 CLEAN WARE TABLE (1) REQUIRED

- A. Provide the ADVANCE-TABCO #DTC-S30-84-L*C004 (or PRS) for right-to-left work flow, measuring approximately 7'-0" left to right by 2'-6" front to rear by 2'-10" to the working surface. As part of this item provide the optional stainless steel undershelf, sized as required to avoid conflict with the adjacent warewasher. Provide the left side with a backsplash in lieu of the standard raised rolled rim.

2.9.4 ITEM #4 RACK SHELF (1) REQUIRED

- A. Provide the ADVANCE-TABCO #DT-6R-23*C004 (or PRS).

2.9.5 ITEM #5 WAREWASHER (1) REQUIRED

- A. Install the HOBART #AM16T-ADV*C004 for right-to-left straight-through operation, complete with rear splash shield, booster heater, end of cycle audible alarm, delime notification, drain water tempering system, water shock absorber kit, and common electrical connection.

2.9.6 ITEM #6 STEAM EXHAUST HOOD (1) REQUIRED

- A. Install the AVTEC #SSA-DISH48064*C004, with drain nipple oriented so as to be above Item #7.

2.9.7 ITEM #7 SOILED WARE TABLE/3 COMPARTMENT SINK (1) REQUIRED

- A. Install the ADVANCE-TABCO #94-83-60-36RL*C004 (or PRS), modified as described below. The Food Service Equipment Contractor is responsible for verifying that the space available in the field will accommodate the unit.
- B. The unit shall be in a “U” shape, and the process flow shall be from left to right toward the manual warewashing area and right to left toward the automatic warewasher. The left leg shall measure approximately 14'-6" left to right by 2'-6" front to rear, the right leg shall measure approximately 6'-6" left to right by 2'-6" front to rear, and the base leg shall measure approximately 15'-0" left to right by 2'-11" front to rear. Provide a backsplash where this item abuts a wall at the rear, and a marine edge with 3" turn-down at the opening to the dining area. The left side shall be constructed as required to accommodate Item #5.
- C. The sink bowls shall each be provided with a twist handle drain with overflow. Provide a T&S BRASS #B-0133-01*C004 mixing faucet with pre-rinse centered behind the left and center sinks, and #B-0231*C004 mixing faucet centered behind the right and center sinks. Provide (3) interchangeable Poly-Vance flush-fitting cutting boards, and a horizontally-mounted cutting board storage bracket below the drainboard. Verify locations of grease traps, solids separators, and similar items being provided by other trades to insure that there are no conflicts with table legs or other portions of the equipment by the FSE Contractor.
- D. The left drainboard shall be constructed as required to accommodate Item #8, Disposer. Provide a T&S BRASS #B-0133*C004 pre-rinse unit centered behind the waste collector.
- E. As part of this item provide stainless steel wall protection from the top of the backsplash to a point 5'-0" a.f.f. (or as high as practical), starting 6" to the left of the left-hand sink and extending 6" to the right of the right-hand sink. Also provide similar wall protection starting 6" to the right of the disposer cone and extending 6" to the left of Item #5, Warewasher, which shall extend vertically to the bottom of Item #6, Steam Exhaust Hood.

2.9.8 ITEM #8 DISPOSER (1) REQUIRED

- A. Install the SALVAJOR #300-CA-18-ARSS-LD*C004.

2.9.9 ITEM #9 WALL SHELF “A” (3) REQUIRED

- A. Provide the ADVANCE-TABCO #WS-12-120-16*C004 (or PRS). The Food Service Equipment Contractor is responsible for verifying that the space available in the field will accommodate the unit.

2.9.10 ITEM #10 POT RACK (1) REQUIRED

- A. Provide the ADVANCE-TABCO #SW-60*C004 (or PRS) complete with (18) hooks. The Food Service Equipment Contractor is responsible for verifying that the space available in the field will accommodate the unit.

2.9.11 ITEM #11 UNASSIGNED

2.9.12 ITEM #12 UNASSIGNED

2.9.13 ITEM #13 MOBILE CLEAN WARE SHELF (2) REQUIRED

- A. Provide the following METRO components in the sizes and configurations shown. The Food Service Equipment Contractor is responsible for verifying that the space available in the field will accommodate the units:
- B. (10) #MQ2448G*C004 shelves;
(8) #MQ63UPE*C004 posts;
(4) 5” x 1.25” threaded stem casters;
(4) 5” x 1.25” threaded stem casters with brakes.

2.9.14 ITEM #14 MOBILE WORK TABLE (1) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.15 ITEM #15 SHEET PAN DOLLY (1) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.16 ITEM #16 STORAGE SHELF “A” (1) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.17 ITEM #17 ICE MAKER AND BIN (1) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.18 ITEM #18 REACH-IN REFRIGERATOR (2) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.19 ITEM #19 MOBILE HEATED HOLDING UNIT (2) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.20 ITEM #20 MOBILE WORK TABLE WITH OVERSHELF (1) REQUIRED

- A. Provide the ADVANCE-TABCO #MS-367*C004 (or PRS) measuring 7'-0" left to right by 3'-0" front to rear by 3'-0" to the working surface. Provide with (4) casters, the (2) at the front provided with brakes. Provide a full-size undershelf and (2) #ADT-3-2020*C004 (or PRS) drawer with concealed side and rear panels. Also provide the #PT-15-84*C004 (or PRS) adjustable mid-mounted overshelf measuring 7'-0" left to right by 1'-3" front to rear. The Food Service Equipment Contractor is responsible for verifying that the space available in the field will accommodate the unit.

2.9.21 ITEM #21 UNASSIGNED

2.9.22 ITEM #22 UTILITY DISTRIBUTION SYSTEM (1) REQUIRED

- A. Install the AVTEC #EID*C004 utility distribution system in accordance with NSF, UL, and any other locally applicable codes, standards, and regulations, measuring approximately 11'-0" left to right by 1'-0" front to rear, including uprights at each end constructed as required to accommodate Item #23, Exhaust Ventilator.
- B. The system shall provide single connection electrical and water service, and dual looped gas service, for all equipment included with and served by Item #23, including necessary interface, signal capability, and so on for the Demand Control Kitchen Ventilation system, fire protection system, and similar building infrastructure.
- C. As part of this item provide ground fault protection, main electrical service circuit breaker with shunt trip, remote status indicator lights, dual-colored LED circuit breaker indicator,

vent light switch in service tower, and shut-off gas solenoid valves. Also mount Item #27, Pot Filler, where shown.

- D. The system shall be ready to accept flexible quick-disconnect assemblies and restraining cables (provided by the FSE Contractor) for equipment located under Item #23.
- E. The summaries of loads shown on Sheet #FS1.03 are for general guidance – actual loads and distribution to be calculated by the manufacturer.

2.9.23 ITEM #23 EXHAUST VENTILATOR (1) REQUIRED

- A. Install the AVTEC #EA2-PBB*C004, NSF and NFPA compliant, UL 710 listed, back-to-back island-style type, 300-series stainless steel, exhaust ventilator. Each side of the hood shall measure 11'-0" left to right by 4'-6" front to rear (capture area), not including the Utility Distribution System (Item #22) or make-up air plenum.
- B. Grease-laden exhaust air shall pass through individual removable U.L. classified grease filters. The hood shall include a separately installed PBB*C004 make-up air plenum measuring full length by 1'-4" front to rear, located in front of and in line with the hood in the most appropriate location as determined by the Mechanical Engineer. *Do not secure the make-up air plenum to the front of the hood until all duct connection requirements, locations, and clearances have been verified.*
- C. Joints between adjacent sections, if any, shall be hemmed seams, not full "end" panels. As part of this item, install all necessary mounting brackets and hardware, matching stainless steel enclosure panels and/or trim strips to extend from the top perimeter to the finished ceiling, vaporproof LED light fixtures complete with bulbs, and any other accessories as may be required by applicable codes and regulations. Provide as required for installation and mounting of Item #24, Fire Suppression System, including the cabinet.
- D. The unit shall be provided with a total of (4) 8" by 11" exhaust duct connections for 965 CFM (each) at 0.75" static pressure, and (4) 10" by 16" tempered supply duct connections for 750 CFM (each) at 0.25" static pressure. The Food Service Equipment Contractor shall confirm these values with the manufacturer before preparation of shop drawings.
- E. Provide a Demand Control Kitchen Ventilation (DCKV) system utilizing optic sensors and associated processors and other components capable of measuring smoke, steam, particulate levels, and temperature, and signaling appropriate exhaust fan speed accordingly. The DCKV system shall also be capable of sending a signal when cooking operations have commenced, to activate the exhaust and supply fans (not included in the Food Service Equipment Contract) serving the hood.
- F. Provide (4) insulated end panels with a vertical front 2'-6" from the Utility Distribution System, provided with a 6" adjustable foot at the front and supported by the utility distribution system at the rear.

2.9.24 ITEM #24 FIRE SUPPRESSION SYSTEM (1) REQUIRED

- A. Install the ANSUL #R-102*C004 liquid chemical fire protection system to provide required protection of duct, plenum, and cooking surfaces associated with Item #23. All piping shall be concealed and run within the hood wherever possible, and any exposed piping or conduit shall be stainless steel or chrome-plated, with seams and penetrations through the hood to be grease-tight. Activation shall be through: manual activation of the push button at the control cabinet, or; manual activation of the remote manual pull station, or; through the automatic action of the fusible links or thermostatic detectors located in the hood. The control cabinet shall be canopy-mounted to Item #23, Exhaust Ventilator.
- B. As part of the fire protection system install a dual microswitch, one side of which shall accommodate any alarm or other devices that may be provided by other trades. The second side shall be used for electrical activation of the gas shut-off solenoid valve(s) and/or shunt trip breaker for shut-off of electrical service. Mechanically activated gas solenoid valves are also acceptable. The Food Service Equipment Contractor shall furnish the required gas shut-off solenoid valve(s) to the General Contractor for installation by other trades, and shall coordinate with the other trades to insure that installation is in the line before branching to individual items and in an accessible location. This item shall accommodate necessary signaling to and/or from the Demand Control Kitchen Ventilation system specified as part of Item #23.
- C. As part of this item, provide the necessary services of a factory-authorized installer, and include all initial testing and certification as well as complete inspections at six months and twelve months after turnover to Owner. Installation and operation shall be in compliance with NFPA and any applicable local requirements.

2.9.25 ITEM #25 DOUBLE DECK CONVECTION OVEN “A” (1) REQUIRED

- A. This is an existing double-deck BLODGETT Zephair-100-G mounted on feet. Replace the existing feet with casters and provide (1) pair Dormont #PS*C004 “Safety-Set” positioning wheel chocks, and flexible utility quick-disconnect(s) with restraining chain/cable(s).

2.9.26 ITEM #26 NESTING SHEET PAN RACK (2) REQUIRED

- A. Provide the CHANNEL #401AN*C004.

2.9.27 ITEM #27 POT FILLER (1) REQUIRED

- A. Furnish the T&S BRASS #B-0581*C004 mounted to Item #22, Utility Distribution System.

2.9.28 ITEM #28 SIX BURNER RANGE WITH OVEN (1) REQUIRED

- A. This is an existing SOUTHBEND unit mounted on feet. Replace the existing feet with casters and provide (1) pair Dormont #PS*C004 “Safety-Set” positioning wheel chocks, and flexible utility quick-disconnect(s) with restraining chain/cable(s).

2.9.29 ITEM #29 DOUBLE DECK STEAMER (1) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.30 ITEM #30 UNASSIGNED

2.9.31 ITEM #31 DOUBLE DECK CONVECTION OVEN “B” (1) REQUIRED

- A. This is an existing single-deck BLODGETT unit mounted on legs. Provide a new identical unit complete with mobile stand and stacking kit, and mount the existing unit above the new one. Also provide (1) pair Dormont #PS*C004 “Safety-Set” positioning wheel chocks, and flexible utility quick-disconnect(s) with restraining chain/cable(s).

2.9.32 ITEM #32 UNASSIGNED

2.9.33 ITEM #33 WORK TABLE WITH SINKS (1) REQUIRED

- A. Install the ADVANCE-TABCO #KTMS-3015-MOD*C004 (or PRS) measuring approximately 15'-0" left to right along the left leg by approximately 5'-0" left to right along the right leg by 2'-6" front to rear by 3'-0" to the working surface.
- B. Provide the #TA-11D-2*C004 (or PRS) sink complete with faucet and drain hardware. Also provide (2) Poly-Vance flush-fitting interchangeable sink cutting boards, with storage bracket located horizontally below the table top to accommodate the sink cover. Also provide the #ADT-3-2020*C004 (or PRS) three-tier drawer unit with side panels where shown. The Food Service Equipment Contractor is responsible for verifying that the space available in the field will accommodate the unit.

2.9.34 ITEM #34 WALL SHELF “B” (1) REQUIRED

- A. Provide the ADVANCE-TABCO #WS-12-60-16*C004 (or PRS). The Food Service Equipment Contractor is responsible for verifying that the space available in the field will accommodate the unit.

2.9.35 ITEM #35 WORK TABLE (1) REQUIRED

- A. Provide the ADVANCE-TABCO #KMS-3011*C004 (or PRS) measuring approximately 11'-0" left to right by 2'-6" front to rear by 3'-0" to the working surface.
- B. Provide (2) #ADT-3-2020*C004 (or PRS) three-tier drawer units with side panels where shown. The Food Service Equipment Contractor is responsible for verifying that the space available in the field will accommodate the unit.

2.9.36 ITEM #36 UNASSIGNED

2.9.37 ITEM #37 ICE CREAM CABINET (2) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.38 ITEM #38 HOT FOOD SERVING COUNTER (2) REQUIRED

- A. Provide the ATLAS #CAIH-5*C004 complete with #SLF*C004 tray slide, (2) #EPA*C004 end panels, #US*C004 undershelf, #PCS*C004 extended power cord, #DME*C004 individual drains with manifold to single valve with rear valve extension, #AMC*C004 apron mounted controls, and all locking casters. Also provide the #AT11A-5*C004 convertible/adjustable food shield. The Food Service Equipment Contractor shall verify preferred plastic laminate color and pattern.

- B. Mount the tray slide 6” below the normal height.

2.9.39 ITEM #39 OFFICE EQUIPMENT LOT REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.40 ITEM #40 COLD FOOD SERVING COUNTER (1) REQUIRED

- A. Provide the ATLAS #CARM-6*C004 complete with (2) #SLF*C004 tray slide, (2) #EPA*C004 end panels, #US*C004 undershelf, #RPS rear sliding doors, #2060-1 condensate evaporator, #RS remote on/off switch, and all locking casters. Also provide the #AT4D-6*C004 dual-sided food shield. The Food Service Equipment Contractor shall verify preferred plastic laminate color and pattern.

- B. Reduce the counter and tray slide 6” below the normal height.

2.9.41 ITEM #41 AIR SCREEN REFRIGERATOR (2) REQUIRED

- A. Provide the STRUCTURAL CONCEPTS #B35R*C004 complete with roll-down locking security cover.

2.9.42 ITEM #42 UNASSIGNED

2.9.43 ITEM #43 CASHIER COUNTER “A” (1) REQUIRED

- A. As Item #44 provide the ATLAS #CACS-2*C004 complete with (2) #SLF*C004 tray slide, #EPA*C004 panels on the front and both sides, ferruled hole for cord drop, and all locking

casters. The Food Service Equipment Contractor shall verify preferred plastic laminate color and pattern.

- B. As Item #43 provide a similar unit based on the ATLAS #CAFT-4*C004 overall dimensions, reduced by 24” on one side to allow a cashier position and access. Include (2) #SLF*C004 tray slides of differing lengths, #EPA*C004 panels on the front and both sides, ferruled hole for cord drop, and all locking casters. Also provide the locking cash drawer and foot rest supplied as standard components of the #CACS*C004 unit specified as Item #44. The Food Service Equipment Contractor shall verify preferred plastic laminate color and pattern.
- C. Mount the tray slides 6” below the normal height.

2.9.44 ITEM #44 CASHIER COUNTER “B” (1) REQUIRED

- A. This item is included in the specification for Item #43. The Food Service Equipment Contractor shall verify preferred plastic laminate color and pattern.

2.9.45 ITEM #45 P.O.S. TERMINALS (2) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.46 ITEM #46 CONDIMENT COUNTER (1) REQUIRED

- A. Provide the ATLAS #CAFT-4*C004 complete with (2) #SLF*C004 tray slide, (2) #EPA*C004 end panels, #US*C004 undershelf, #RPS rear sliding doors with locks, and all locking casters. The Food Service Equipment Contractor shall verify preferred plastic laminate color and pattern.
- B. Reduce the counter and tray slide 6” below the normal height.

2.9.47 ITEM #47 TRAFFIC GUIDE SYSTEM LOT REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.48 ITEM #48 OVERHEAD CLOSURE (1) REQUIRED

- A. This item is not included in the Food Service Equipment Contract and is provided with an item number for reference only.

2.9.49 ITEM #49 UNASSIGNED

2.9.50 ITEM #50 UNASSIGNED

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances, service-utility connections, and other conditions affecting installation and performance of food service equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Examine roughing-in for piping, mechanical, and electrical systems to verify actual locations of connections before installation.

3.2 INSTALLATION, GENERAL

- A. A minimum of three (3) weeks before the job opening, the Contractor shall provide three (3) copies of original maintenance and repair manuals, giving operating and maintenance instructions, parts lists, and names and addresses of local service agencies and representatives for each piece of equipment having electrical and/or mechanical components. Provide wiring and connection diagrams where one or more items are interconnected.
- B. Indicate field joints and methods of connection on Drawings. Correlate with NSF 2 requirements.
- C. Complete equipment field assembly, where required, using methods indicated.
 - 1. Provide closed butt and contact joints that do not require a filler.
 - 2. Grind field welds on stainless-steel equipment smooth, and polish to match adjacent finish. Comply with welding requirements in "Fabrication, General" Article.
- D. Any field cutting or welding shall comply with the provisions of the National Fire Protection Association's "National Fire Codes" or local requirement, whichever is more stringent, pertaining to such work, and the Contractor shall be responsible for any damage resulting from failure to comply.
- E. Verify equipment maintenance-clearance requirements of authorities having jurisdiction and of local sanitation and health codes. Reflect minimum clearances on Drawings and revise below to suit Project.
- F. Install equipment with access and maintenance clearances according to manufacturer's written instructions and requirements of authorities having jurisdiction.
- G. Except for mobile and adjustable-leg equipment, securely anchor and attach items and accessories to walls, floors, or bases with stainless-steel fasteners, unless otherwise indicated.

- H. Install cabinets and similar equipment on concrete or masonry bases in a bed of sealant.
- I. Install trim strips and similar items requiring fasteners in a bed of sealant. Fasten with stainless-steel fasteners at 48 inches (1200 mm) o.c. maximum.
- J. Install sealant in joints between equipment and abutting surfaces with continuous joint backing, unless otherwise indicated. Provide airtight, watertight, vermin-proof, sanitary joints.
- K. Prior to turning completed areas over to the Owner, the Contractor shall clean and polish all equipment herein specified and make it ready for use, including commissioning and demonstration to the Owner.

3.3 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure food service equipment is without damage or deterioration at the time of Substantial Completion.
- B. Care shall be taken to prevent any damage whatsoever to the equipment, building, or previous work. Such damage will be repaired at the expense of the Contractor causing it.
- C. Tile, terrazzo, and finished floors and walls shall be protected by the Contractor with suitable planking or other material prior to movement or installation of equipment on it.

3.4 DEMONSTRATION AND TURNOVER

- A. The Contractor shall retain title and responsibility for all equipment until accepted by the Owner. Any items lost or damaged shall be immediately replaced or repaired to a new condition to the satisfaction of the Architect and/or Consultant.
- B. Prior to acceptance by Owner the Contractor shall commission and test all equipment in the presence of the Owner or his agent to his satisfaction that the equipment is operating properly.
- C. Prior to Owner's acceptance, the Contractor shall have a qualified representative on hand to instruct the Owner's employees in the proper operation and maintenance of the equipment.

END OF SECTION 11 4011

SECTION 22 05 00 - PLUMBING 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 22 - 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 22 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 22 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 plumbing, 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 plumbing systems as specified under Division 22 and as called for on the drawings. 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 plumbing 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, plumbing fixtures, 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, which 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.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in pipe 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.
- F. The following are industry abbreviations for plastic materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
 - 2. CPVC: Chlorinated polyvinyl chloride plastic.
 - 3. PE: Polyethylene plastic.
 - 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

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. American Gas Association (AGA)

2. American National Standard Institute (ANSI)
3. American Society of Mechanical Engineers (ASME)
4. American Society for Testing materials (ASTM)
5. American Water Works Association (AWWA)
6. American Welding Society
7. ANSI code of Pressure Piping and Unified Pressure Vessels
8. Cast Iron Soil Pipe Institute
9. National Electrical Manufacturer's Association (NEMA)
10. Standards of the Hydraulic Institute
11. Underwriters' Laboratories (UL)
12. 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 plumbing equipment and materials associated with Division 22 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.

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, plumbing piping, 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.

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. 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, plumbing, 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 warranty 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 plumbing systems as is intended by these drawings and specification.

1.18 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.
- C. All equipment, plumbing piping, 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, 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, plumbing, 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, equipment etc. is adequate for the intended purpose and will result in a first class installation. Regardless 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 plumbing 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, 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.
- Q. The Mechanical Trade shall be responsible for all coordination of all site utilities, the gas company, etc. including coordination of all new and existing natural gas loads.

1.19 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. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

- C. 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.

1.20 COOPERATION WITH ARCHITECT/ENGINEER AND OTHERS

- A. Coordinate all aspects of the plumbing 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.

1.21 WORK INVOLVING OTHER TRADES

- A. Equipment or materials specified in Division 22 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.

1.22 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.

1.23 CUTTING AND PATCHING

- A. Unless noted otherwise, the Mechanical Trades shall be responsible for all cutting, patching and associated work required under Division 22. 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.

1.24 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, plumbing, piping, 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 plumbing, 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.).

1.25 ACCESS TO EQUIPMENT, 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, valves, etc.
- B. Where access panels are required, valves, equipment etc. shall be located as to require the least number of access panels.

1.26 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.

1.27 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.

1.28 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 22, 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.

1.29 EXCAVATION AND BACKFILLING

- A. Furnish all excavation, backfilling and removal of excess dirt to accomplish installation of Division 22 mechanical work unless otherwise noted on drawings.
- B. All excavation shall be by open cut from the surface. Contractor shall determine whether excavation shall be by machine or by hand except where existing utilities may be located where excavation shall be by hand. Contractor shall be responsible for all damage to existing facilities and services. Excavation shall be to a depth of at least 6" to allow granular bedding below pipe or duct.
- C. If for any reason the work is suspended, the contractor shall properly protect the excavation and leave the areas unobstructed.
- D. Trench width shall allow sufficient width at centerline of pipe to allow at all times a first class construction/installation method but in no case should be less than 12" larger than the nominal pipe or duct size. This shall especially be true in areas that joints must be connected. Joint holes may have to be made with overhanging sides to make installation safe for workmen.
- E. The excavation shall be at all times finished and backfilled to the required grade after completion and approval of work. Not more than 100 feet of trench shall be excavated and open unless written approval is given by the Architect/Engineer.
- F. The subgrade shall be 4" to 6" below the pipe of granular bedding graded and tamped by hand or mechanical means to the exact elevation required at the bottom of the pipe. Granular materials shall be approved fine aggregate meeting MDOT #2NS specifications. This material shall pass a ½" sieve but will be retained on a #4 sieve. If poor soil conditions exist which will not give proper support to the pipe, duct or structure, furnish granular fill as required to remedy this situation and give proper support.
- G. Furnish and install properly sloped sheet piled, shored and braced in areas that the soil requires this to maintain a proper excavation and prevent any movement of earth which could in any way damage the work under construction. When removing the sheeting and bracing, special care should be taken to prevent any caving of the sides of the excavation and injury to the completed work or adjacent property.
- H. Take all necessary action to keep trenches and other excavation areas free from water at all times. Use such methods as pumping, ditching, well pointing, etc. to prevent water in trench or excavation. Dewatering of trench shall have constant supervision.
- I. Backfill excavation and trenches with approved granular material around sides of pipe and at least 12 inches above the top of the pipe laid not more than in 6 inch layers that are thoroughly tamped to 95% of its maximum density. There shall be no backfilling by any mechanical means until the granular material has been firmly tamped around the entire pipe to 12 inches above the pipe. All material used for backfilling shall be approved by the Architect/Engineer. Wherever trenching crosses walks or roadways or isolated inside of building, backfill top 6'-0" of trench with sand or bank run gravel in layers not to exceed 6 inches in depth and carefully compact by hand or machine. Do not backfill with frozen materials.
- J. No piping shall be covered until it has been tested, inspected and approved. Upon completion of backfilling, grade shall be restored in indicated elevation and left in reasonable condition for finish grade by others unless otherwise noted on drawings.

- K. Before final acceptance of work, all disturbed streets, drives, curbs, walks, parking areas, etc. shall be paved, graveled or other to as near their original condition as possible. All unused excavated material shall be removed from site if directed by the Architect/Engineer.

1.30 BASES AND SUPPORTS

- A. This contractor shall be responsible for furnishing all equipment pads and supports for equipment and materials required by Division 22 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 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 22. 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, plumbing, 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 plumbing, piping 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).

1.31 SLEEVES, PLATES AND COLLARS

- A. Furnish all sleeves, plates and collars for plumbing piping, etc. passing through walls, floor ceilings, foundations, etc. Coordinate with the General Contractor the exact location and size of required openings. No pipe 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. 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.
- F. 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-rated assembly, seal all voids with non-hardening sealant.
- G. 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.
- H. Where piping penetrates an outside wall, below grade, utilize a mechanical sleeve, similar to Link-Seal, with stainless steel nuts and bolts on fasteners.

1.32 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 22 whether furnished by this contractor or by the Owner or other trades.

1.33 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.

1.34 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.

1.35 COMMON PIPE MATERIALS AND INSTALLATION INSTRUCTIONS

- A. Refer to individual Division 22 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 22 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.
 - b. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
 - 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.

1.36 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 Grinnel/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"

- C. Conform to ASME B31.9, ASTM F708, MSS SP58, MSS SP69 and MSS SP89.

- D. Hangers for Pipe Sizes ½ to 1½ Inch: Malleable iron, adjustable swivel, split ring.
- E. Hangers for 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. Wall Support for Pipe Sizes up thru 3 Inches: Cast iron hook.
- J. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
- K. Vertical Support: Steel riser unistrut clamps at high, mid, and low locations.
- L. 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.
- M. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- N. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
- O. 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.

1.37 PLUMBING, PIPING, 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.

1.38 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 toilet rooms, areas or wings of the building, etc.

1.39 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 floor drains, cleanouts, and plumbing fixtures. Clean all trays and strainers.
- 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 22 equipment which has been scratched or damaged shall be finished equal to the original finish.

1.40 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.

1.41 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.

1.42 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: 2024-9508

SECTION 22 05 10 - PLUMBING SYSTEMS TESTING, CLEANING, WATER TREATMENT & STARTUP

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Testing of piping systems.
- B. Cleaning of piping systems.
- C. Chemical treatment.
- D. Substantial completion check list and sign-off forms.

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 SCOPE OF WORK

- A. The work covered by this specification consists of furnishing all labor, equipment, material, chemicals or methods that are mentioned, listed or scheduled on drawings or are in this specification. This includes all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the cleaning, flushing, testing and chemical treatment of the piping systems for this project. The work covered under this section of the specification is in no way complete within itself, but is supplementary to the entire specification and drawings.
- B. The substantial completion forms shall be required to be signed and submitted to the Architect/Engineer for approval prior to any insulation of piping systems or installation of ceiling tiles. The person that signs the substantial completion forms shall witness the testing, flushing and chemical treatment of the systems. The signature person's company shall be responsible for all cost incurred with future work by the Architect/Engineer or Owner due to inadequate testing, cleaning, operation or chemical treatment of the piping systems.

1.4 SUBMITTALS

- A. Submit electronic copies of the completed and signed substantial completion forms included in this section. Submit to the Architect/Engineer as system flushing, testing, and chemical treatment occurs. The Mechanical Trade shall maintain one set of substantial completion forms and submit them to the Architect/Engineer prior to the Architect/Engineer final project walk-through.

- B. Submit electronic copies of all equipment, chemicals and product data being furnished to this project for approval.
- C. Submit electronic copies of manufacturer's installation instructions, including placement of equipment in systems, piping configuration, and connection requirements.
- D. Submit certificate of compliance from authority having jurisdiction, indicating approval of systems that require review by local and state authorities.

1.5 PROJECT RECORD DOCUMENTS

- A. Record actual installation locations of piping and equipment including sampling points and location of chemical injectors.

1.6 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.

1.7 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.

1.8 MAINTENANCE MATERIALS

- A. Provide sufficient chemicals for treatment and testing during warranty period.

PART 2 PRODUCTS

2.1 WATER METER

- A. Displacement type cold water meter with sealed, tamper-proof magnetic drive, impulse contact register, single pole, double throw dry contact switch.

2.2 WATER SOFTENERS

- A. Softener Tank: Glass fiber reinforced plastic tank.
- B. Brine Tank: Glass fiber reinforced plastic tank.
- C. Control: Brass control valve cycled to regenerate from one to twelve day period.

PART 3 - EXECUTION

3.1 SANITARY AND STORM PIPING SYSTEMS

- A. Testing
 - 1. Conduct a water, air or peppermint test on the entire system in accordance with the State Plumbing Code. Test underground sanitary, storm and vent piping with at least a 10 foot head of water.

3.2 DOMESTIC COLD WATER, HOT WATER & HOT WATER RETURN PIPING SYSTEMS

- A. Testing
 - 1. Before any fixtures are connected, hydrostatically test piping system at 1.5 times the maximum system pressure, but not less than 100 psig in excess of working pressure for (4) hours. This pressure to be on piping only, not equipment.
- B. Cleaning, flushing and disinfection.
 - 1. All domestic water piping and equipment shall be completely flushed out and disinfected before placing system in service. Disinfection procedure and results shall be in accordance with all applicable codes and State Department of Public Health. (Piping shall be flushed until water is clear).
 - 2. Ensure pH of water to be used as treatment is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or Acid (hydrochloric).
 - 3. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L (50ppm) minimum residual.
 - 4. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
 - 5. Maintain disinfectant in system for 2 hours.
 - 6. If final disinfectant residual tests less than 25 mg/L, repeat test.
 - 7. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L or 0.5 ppm maximum.
 - 8. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and water entry, and analyze in accordance with AWWA-C51.
 - 9. Verify that all tests and results are in accordance with local and state health codes and regulations.

3.3 NATURAL GAS PIPING SYSTEMS

A. Pressure Test

1. Pressure test shall be per the current adopted edition of the International Fuel Gas Code.
2. The test pressure shall not be less than 1.5 times the working pressure but not less than 3 PSIG. Where the test pressure exceeds 125 psig, the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe. The test duration shall be not less than ½ hour for each 500 FT³ of pipe volume. If testing a system with less than 10 FT³ of pipe volume the test shall not be less than 10 minutes.
3. The test medium shall be air, nitrogen, carbon dioxide or an inert gas. Oxygen shall not be used.

3.4 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: 2024-9508

Freeland Schools – Elementary Cafeteria
Freeland Community School District

**SYSTEMS COMPLETION
CHECKLIST**

Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
Plumbing Systems						
Testing of Sanitary and Storm Systems	48 hours					Tested per specification
Testing of Domestic CW, HW and HWR Piping.	48 hours					Tested per specification
Disinfection of Domestic CW, HW & HWR Piping.	48 hours					Disinfect per specification and all applicable codes.
Domestic Water Sample and Approval	When submitted					Submit sample for review and approval by local authorities.
Natural Gas Piping	7 days					Tested per specifications.
Domestic water heater system, completely installed, checked, tested and started	7 days					Verify system installation complete, operation correct. Includes verification of hot water recirculating pump system and flow balance. Check, test and startup by Manufacturer's Rep.
Valving	When completed					Verify that valves have been installed at all branch piping locations
Piping and Fitting Insulation	When Completed					Verify all piping and fitting are insulated per specification.
Reduced Pressure Backflow Preventer Tested	48 hours					Verify Reduced Pressure Backflow Preventer installed and completely operational.
Sump Pumps and Sewage	48 hours					Verify system installation complete and

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

All items are to be signed off on and submitted to MacMillan Associates Inc. before a final project walk-thru by the Engineer is requested. If the Engineer discovers items incomplete and/or not in accordance with this checklist, the drawings, or the specifications, the Contractor will be backcharged for the Engineer's time and expenses.

Freeland Schools – Elementary Cafeteria
Freeland Community School District

Ejectors						operational.
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SYSTEMS COMPLETION CHECKLIST						
Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
Plumbing Systems, Continued						
Pipe Labeling and Valve Tagging Identification	When completed					Verify system identification is complete per specification and valve chart submitted.
Owner's Training	7 days					Verify that Owner has been instructed on operation and maintenance of systems.

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

All items are to be signed off on and submitted to MacMillan Associates Inc. before a final project walk-thru by the Engineer is requested. If the Engineer discovers items incomplete and/or not in accordance with this checklist, the drawings, or the specifications, the Contractor will be backcharged for the Engineer's time and expenses.

SECTION 22 05 53 - PLUMBING SYSTEM IDENTIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe Markers.

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. ANSI or equal standards for the Identification of Piping Systems.

1.4 SUBMITTALS

- A. Submit list of working, symbols, letter size, and color coding for mechanical identification.
- B. Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- C. Product Data: Provide manufacturers catalog literature for each product required.
- D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

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. $\frac{3}{4}$ to $1\frac{1}{4}$ inch Outside Diameter of Insulation or Pipe: 8 inch long color field, $\frac{1}{2}$ inch high letters.
 2. $1\frac{1}{2}$ to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, $\frac{3}{4}$ inch high letters.
 3. $2\frac{1}{2}$ to 6 inch Outside Diameter of Insulation or Pipe: 12 inch long color field, $1\frac{1}{4}$ inch high letters.
 4. 8 to 10 inch Outside Diameter of Insulation or Pipe: 24 inch long color field, $2\frac{1}{2}$ inch high letters.
 5. Over 10 inch Outside Diameter of Insulation or Pipe: 32 inch long color field, $3\frac{1}{2}$ inch high letters.
 6. Ductwork and Equipment: $2\frac{1}{2}$ 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 $\frac{3}{4}$ inch diameter color coded head.
- B. Color code as follows:
1. Green - Plumbing 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 valves in main and branch piping with tags.
- H. 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.
- I. Provide ceiling tacks to locate valves above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

MAI: 2024-9508

SECTION 22 06 00 - PLUMBING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General information for piping systems, plumbing fixtures, backflow preventers, water heaters, sump and sewage pumps, etc. and general installation information.

1.2 FIELD MEASUREMENTS

- A. Field verify all equipment and fixture locations.
- B. Confirm that mill work is constructed with adequate provisions for the installation of countertop plumbing fixtures.
- C. Confirm all mounting heights and locations of plumbing fixtures to meet all barrier free and American Disabilities Act codes and regulations.

1.3 EQUIPMENT, FIXTURE & MISCELLANEOUS SPECIFICATIONS

- A. All equipment, plumbing fixtures, specialties, etc. that have been scheduled on drawings shall have the manufacturer's specification automatically included as part of this specification. All "approved substitute" or "voluntary alternate" equipment fixtures, etc. shall meet the capacities, quality, etc. of the scheduled items specification and capacities.

PART 2 PRODUCTS

2.1 PIPE AND PIPE FITTINGS

- A. See Section 22 10 00 for Plumbing Piping.

2.2 MATERIALS AND FINISH

- A. Fixtures shall be of best quality vitreous china, acid resisting enameled cast iron or stainless steel, free from discoloration, chips, dents, warps, flaws, cracks, scratches, etc. or other blemishes. All vitreous china and enamel shall be white unless otherwise noted. Fixtures shall have manufacturer's guarantee label or trademark indicating first quality.
- B. All exposed pipe, fittings, traps, wastes, faucets, valves, handles, escutcheons, bolts, screws and accessories shall be polished chrome plated brass unless noted otherwise. Exposed traps shall be chrome plated brass, adjustable with cleanout plug and escutcheon.

2.3 PLUMBING FIXTURES - GENERAL

- A. Furnish all fixtures as shown and scheduled on drawings.

- B. Unless noted as “no substitutions”, similar fixtures by the following manufacturers with equal or better qualities will be accepted as equal for:
1. Drainage Specialties - Josam, Sioux Chief, Smith, Wade, Watts, Zurn
 2. Plumbing Fixtures - American Standard, Bradley, Crane, Elkay, Fiat, Florestone, Just, Kohler, Mansfield, Moen Commercial, ProFlo, Sloan, Stern-Williams, Zurn.
 3. Plumbing Specialties – Schier, Watts, Wilkins, Zurn.
 4. Flush Valves - Delany, Delta, Sloan (Royal), Zurn, American Standard.
 5. Faucets - American Standard, Chicago, Delta, Sloan, T & S, Woodford, Zurn.
 6. Toilet Seats - Bemis, Centoco, Church, Olsonite, Kohler.
 7. Mixing Valves and Accessories - Powers, Symmons, Watts, Zurn, Reliance, Conbraco Appollo.
 - a. See 2.22 (this section) for emergency showers and eyewash stations.
 8. Electric Water Coolers and Drinking Fountains: Elkay, Halsey Taylor, Haws, Oasis.
- C. Provide all chair carriers, mounting hardware, etc. as required by the plumbing fixtures and wall construction. Where fixtures are located on walls, furnish and install suitable steel shapes well anchored in place and supported from floor as necessary to support fixtures. Each fixture shall be supported solidly and shall be sufficiently strong to withstand severe usage.
- D. Where plumbing fixtures occur in walls with pipe spaces in back of same, the supports for fixtures shall consist of chair carriers built into the wall with bolt projecting through face of wall for attachments of fixture brackets.

2.4 BACKFLOW PREVENTER

- A. Furnish and install type and quantity as shown on drawings or required by code. The Mechanical Trades shall furnish certification of all backflow preventers.
- B. Reduced Pressure Backflow Preventers: ANSI/ASSE 1013 and AWWA C506; bronze body with bronze and plastic internal parts and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve which opens under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer and four test cocks.
- C. Double Check Valve Assemblies: ANSI/ASSE 1012 and AWWA C506; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

2.5 WATER HAMMER ARRESTORS

- A. Furnish and install on systems as required by local and state plumbing codes, latest edition.
- B. ANSI A112.26.1; sized in accordance with PDI WH-201, precharged suitable for operation in temperature range -100 to 300 degrees F and maximum 250 psig working pressure.

2.6 DOMESTIC WATER HEATER

- A. Refer to drawings and furnish all.

2.7 NATURAL GAS FIRED DOMESTIC HOT WATER HEATER

- A. Tank construction shall be of multi-flue design and shall have an approved working pressure of 150 psig.
- B. The Tank shall be glass-lined and fired to 1600°F for complete fusion of glass to steel and shall have two or more magnesium anodes to provide electrolytic protection.
- C. The entire water heater shall be AGA approved and shall meet or exceed the ASHRAE Standard for energy efficiency. Insulation shall be foam type.
- D. Controls shall consist of an operational thermostat, automatic reset high limit, secondary overheat control, and gas valve with 100% safety feature.
- E. Water heaters up to 400,000 BTUH shall have self-generating controls and require no external power source. Water heaters over 400,000 BTUH shall be provided with a flame safeguard pilot supervision providing for second gas shut-down on pilot failure (in accordance with AGA).
- F. Water heaters shall have hand hole cleanouts and slide-out burner tray to allow inspection cleaning and servicing.
- G. Water heater shall have a 3 year limited warrantee.
- H. Domestic hot water heaters shall be Lochinvar Charger commercial gas water heaters or approved equal. See drawing schedules for capacities.

2.8 DOMESTIC WATER HEATER

- A. A domestic hot water supply shall be provided by a Lochinvar Efficiency-Pac Packaged Water System. The system shall consist of an Efficiency+ EW Series Water Heater, a jacketed and insulated Lock-Temp Storage Tan and a bronze fitted circulating pump. The components shall be factory assembled as a unit with the water heater mounted on top of the tan, pre-piped, pressure tested and ready for installation. See drawing schedule for model numbers and capacities.

- B. The water containing section shall be of a “Fin Tube” design, with straight copper tubes having extruded integral fins spaced seven (7) fins per inch. The tubes shall terminate into a one piece, lined, cast iron header. There shall be no bolts, gaskets or “O” rings in the header configuration. There shall be access to the front header of the heat exchanger for the purposes of inspection, cleaning or repair. The heat exchanger shall be mounted in a stress free jacket assembly in order to provide a “free floating design” able to withstand the effects of thermal shock. The assembled heat exchanger shall be hydrostatically tested to 240 psi water pressure. The water heater shall bear the ASME “H” stamp for 160 psi working pressure and shall be National Board listed. The complete heat exchanger assembly shall carry a five (5) year limited warranty. The heat exchanger shall be equipped with an outlet thermometer to monitor discharge water temperature.
- C. The combustion chamber shall be sealed and completely enclosed with “Loch-Heat” ceramic fiberboard insulation. A burner/flame observation port shall be provided. The burners shall be a premix design, constructed of high temperature stainless steel and fire on a horizontal plane. The water heater shall have an integral combustion air blower to precisely control the fuel/air mixture for maximum efficiency.
- D. The water heater shall be constructed with a heavy gauge galvanized steel jacket assembly. All steel jacket components must be galvanized on both sides. The exterior of the jacket assembly shall be finished in a 3-coat acrylic enamel finish. The jacket design shall allow single unit venting connection without the use of external draft hood devices.
- E. The water heater shall be certified and listed by the American Gas Association under the latest edition of the applicable ANSI test standard. The water heater shall comply with the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard. The water heater shall be certified and listed in Canada by the Canadian Gas Association under the latest edition of applicable CGA Standards. The water heater shall operate at a minimum of 85% thermal efficiency.
- F. Standard operating controls shall include an immersion type operating aquastat and high limit control. The control panel shall have a master power switch. The ignition control shall have four LED lights to indicate sequential operation and diagnostics on control sensed malfunctions. The control panel shall have a terminal strip for easy field connection of remote temperature controls and field installed safety controls.
- G. The standard control system shall include a hot surface ignition system with full flame monitoring capability. The main combination gas valve shall have redundant valve seats and a built in low gas pressure regulator as standard. The gas pressure regulator portion of the main gas valve shall be referenced to the combustion air fan. Additional standard controls shall include a combination low air and blocked flue pressure switch to monitor fan operation, low voltage transformer for the control circuit and an ASME temperature and pressure relief valve. The manufacturer shall verify proper operation of the burners, all controls and the heat exchanger by connection to water and venting for a factory fire test prior to shipping. A quality test report shall be shipped with each unit.

- H. A 24 VAC control circuit and components shall be used. All components shall be easily accessed and serviceable from the front of the jacket. Access to the controls shall be provided by a quick access, quarter turn knob on the control panel cover.
- I. The water heater shall be installed and vented with a E+ vent system with a conventional negative draft stack terminating at the rooftop and a separate pipe to supply combustion air directly to the heater from the outside. The vent pipe and all accessories shall be Type “B” double wall material. The air inlet pipe may be PVC, CPVC, ABS, dryer vent or sealed Type “B” or galvanized vent pipe. The air inlet may terminate on the (rooftop) (sidewall) with the manufacturers specified air inlet cap assembly. Direct Vent system with sidewall termination of both the vent and combustion air. The flue shall be an AL29-4C sealed vent material and accessories terminating at the sidewall with the manufacturers specified vent cap. A separate pipe shall supply combustion air directly to the heater from the outside. The air inlet pipe may be PVC, CPVC, ABS, dryer vent or sealed Type “B” or galvanized vent pipe. The air inlet must terminate on the sidewall with the manufacturers specified air inlet cap; (d) Direct Vent system with vertical rooftop termination of both the vent and combustion air. The flue shall be AL29-4C sealed vent material, cap and accessories terminating at the rooftop. A separate pipe shall supply combustion air directly to the heater from the outside. The air inlet pipe may be PVC, CPVC, ABS or sealed Type “B” or galvanized vent pipe. The air inlet must terminate on the rooftop with the manufacturers specified air inlet cap assembly.
- J. The water heater shall be certified for low emissions of oxides of nitrogen (NOX).
- K. The water heater shall be mounted on top of the storage tank, pre-piped to the tank with copper pipe and equipped with a factory installed 1/6 hp circulating pump to insure scale-free heater performance. The pump shall be bronze-fitted and provided for operation on 120 volt, 60 cycle, 1 phase power supply. The assembled heater shall have a 2” copper cold water inlet connection and a 1½” copper outlet connection. The water heater will have a 150 psi pressure only relief valve and the storage tank will have a 150 psi temperature and pressure relief valve. All relief valves are sized per ASME requirements and factory installed.
- L. The storage tank shall be a vertical Lochinvar Lock-Temp “Energy Saver” tank having a storage capacity OF (85) (100). The tank shall be constructed with a baffled inlet, designed to receive all circulation from the water heater and eliminate turbulence in the tank. The baffled tank shall supply 80% of tank capacity without a drop in outlet temperature, regardless of rate of draw.
- M. The storage tank shall be constructed in accordance with standard construction requirements. The tank shall be designed to withstand a hydrostatic test pressure of two times the working pressure without leakage. The storage tank shall be independently tested and certified by a nationally recognized test agency and shall have a working pressure of 150 psi. The tank shall be furnished with the following connections, two circulating connections pre-piped to the water heater, one 1½” copper hot water outlet, one relief valve connection, one ¾” NPT aquastat opening and one ¾” NPT drain connection. The tank shall be furnished with a handhole for ease of inspection, clean out and service. The interior of the storage tank shall be glass lined

and fired to 1600°F to insure a molecular fusing of glass and steel, furnished with a magnesium anode and carry a five (5) year limited warranty.

- N. The Lock-Temp storage tank shall be furnished with a factory installed heavy gauge steel jacket finished with three coats of acrylic enamel. The storage tank shall be completely encased in a minimum of 2" thick, high density polyurethane R-16 foam insulation to meet the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard.

The (Optional) Firing Control System shall be M-9 electronic control with hot surface ignition with Two-Stage Firing.

2.9 DOMESTIC WATER HEATER AND STORAGE TANK

- A. Refer to drawings and furnish all. Water heater shall be a Lochinvar Copper-fin II Model 990,000-2,070,000 BTU.

1. The water containing section shall be of a "Fin Tube" design, with straight copper tubes having extruded integral fins spaced seven (7) fins per inch. The tubes shall terminate into a one piece, glass-lined, cast iron header. There shall be no bolts, gaskets or "O" rings in the head configuration. There shall be access to the front header of the heat exchanger for the purposes of inspection, cleaning or repair. The heat exchanger shall be mounted in a stress free jacket assembly in order to provide a "free floating design" able to withstand the effects of thermal shock. The water heater shall bear the ASME "HLW" stamp for 160 psi working pressure and shall be National Board listed. The complete heat exchanger assembly shall carry a five (5) year warranty.
2. The combustion chamber shall be sealed and completely enclosed with "Loch-Heat™" ceramic fiberboard insulation. A burner/flame observation port shall be provided. The burners shall be constructed of a high temperature stainless steel and fire on a horizontal plane. The water heater shall have multiple combustion air blower to precisely control the fuel/air mixture for maximum efficiency.
3. The water heater shall be constructed with a heavy gauge galvanized steel jacket assembly. All steel jacket components must be galvanized on both sides. The exterior of the jacket assembly shall be finished in a 3-coat acrylic enamel finish. The jacket design shall allow single unit venting connection without the use of external draft hood devices.
4. The water heater shall be certified and listed by The American Gas Association under the latest edition of the applicable ANSI test standard. It shall comply with the energy efficiency requirements of the latest edition of the ASHRAE Standard and shall operate at a minimum of 85% thermal efficiency.
5. Standard operating controls shall include a 4 stage digital temperature controller with an LCD display to control water temperatures and a safety high limit control. The digital temperature control shall display water inlet temperature and heater outlet temperature as well as individual stage set points and differentials. The digital controller shall have a +/-1°F accuracy. The control panel shall have a

master switch with an indicating light and sequential and diagnostic indicator lights.

6. The water heater shall provide 4 individual stages of control. Each stage shall provide for on/off control of individual valves and combustion air fans to maintain maximum efficiency at all stages of operation.
7. The standard control system shall include redundant Proven Pilot Ignition systems with full flame monitoring capability. Each Ignition system shall be able to function independently in the event of a failure in one system. Multiple main gas valves with redundant valve seats and built in low gas pressure regulators shall be supplied as standard. Additional standard controls shall include a flow switch, blocked flue pressure switch, low air pressure switch for each fan, low voltage transformer for the control circuit, 7 amp circuit breaker and an ASME temperature and pressure relief valve. The manufacturer shall verify proper operation of the burners, all controls and the heat exchanger by connection to water and venting for a factory fire test prior to shipping. A quality test report shall be shipped with each unit.
8. A 24 VAC control circuit and components shall be used. All components shall be easily accessed and serviceable. All components shall have multi-pin plug in type connectors to ease service, troubleshooting and lower removal and replacement cost. The water heater must be able to maintain a minimum of 50% operating capacity in the event of a failure of any one (1) gas control component, ie: gas valve, combustion air fan, igniter or pressure switch.
9. The units control panel shall contain the controllers LCD display and Diagnostic Information Center containing 14 individual indicators of current unit status.
10. The water heater shall be approved for indoor or outdoor installation. It shall be approved for side-wall, DirectAire Vertical, DirectAire Horizontal and conventional venting (see mechanical detail). Venting shall be classified Category I, negative draft, non-condensing, to use type "B" double wall venting materials.
11. The water heater shall have an independent laboratory rating for Oxides of Nitrogen (NO_x) of less than 9.9 ppm corrected to 3% O₂.
12. The Firing Control System shall be F14. Prefix "F" denotes Standard On-Off Firing. The F14 firing control system provides acceptable safety controls and gas train components to meet the requirements of Industrial Risk Insurers (IRI). All additional components added to the standard M-9 C.G.A./ANSI certified control system. Water heaters with inputs greater than 400,000 Btu/hr are provided with all additional components listed for M-13 controls plus an IRI acceptable safety shutoff gas valve, a normally open vent valve piped between the main gas valves and high and low gas pressure switches. All components factory mounted and wired.
13. Temperature gauge shall be mounted on the front of the cabinet with tank mounted remote sensor to register water temperature in the tank.

14. Pressure gauge shall be mounted on the front of the cabinet with tank mounted remote sensor to register the water pressure within the tank.
 15. Water heater shall be furnished with:
 - a. Alarm bell
 - b. Solid state intermittent pump controller. Stops tank/heater water circulation during periods of no hot water demand.
 - c. Manual reset high limit.
 - d. Pump delay.
 - e. Low water cutoff
 - f. Contacts for any failure.
 - g. Vertical DirectAire venting kit including adaptor flange and inlet air weather cap.
 - h. Outdoor vent cap.
- C. Storage Tank - shall be a Lochinvar Lock-Temp "Energy Saver" tank. The tank shall be constructed with an inner chamber designed to receive all circulation to and from the water heater to eliminate turbulence in the tank. The baffled tank shall supply 80% of tank capacity without a drop in outlet temperature, regardless of rate draw.
1. The storage tank shall be constructed in accordance with ASME requirements stamped and registered with the National Board of Boiler and Pressure Vessel Inspectors. It shall have a working pressure of 150 psi. and shall be cement lined and carry a five (5) year limited warranty.
 2. The storage tank shall have 316SS top outlet flange, 12"x16" manhole, lifting lugs, magnesium anodes, base ring, and tapings as indicated on drawings. The temperature gauge shall be mounted on the front of the cabinet with tank mounted remote sensor to register water temperature in the tank. Pressure gauge shall be mounted on the front of the cabinet with tank mounted remote sensor to register the water pressure within the tank. Solid state intermittent pump controller. Stops tank/heater water circulation during periods of no hot water demand.

2.10 ELECTRIC DOMESTIC HOT WATER HEATER

- A. Tank shall be 300 psi test pressure, 150 psi W.P. approved.
- B. Tank shall be lined glass lined and have 1.315" diameter "Dow" magnesium tank saver.
- C. Heating element shall be copper sheath, tin coated immersion type, maximum 75 watts per square inch.
- D. Water heater shall have an energy cut-off shut down power if tank water temperature reached 205°F.
- E. Water heater shall have all elements and controls fused in accordance with UL requirements.

- F. Water heater shall be approved for 180° outlet temperature. See drawings for operating temperature.
- G. Water heater shall have a factory installed ASME temperature and pressure relief valve.
- H. Furnish hand hole cleanout.
- I. Tank shall have factory installed 3" thick insulation to meet ASHRAE 90.1B energy efficiency standards with heavy gauge steel jacket with baked-on enamel finish.
- J. Water heater shall have a hinged access door to electric controls.
- K. Water heater shall have surface mounted thermostat.
- L. Internal wiring shall be composed of solid copper wire having insulation material rated at 600 volt, 200°C.
- M. Water heater shall have Underwriter's Laboratories, Inc. approval.
- N. Furnish 3 year limited warranty.
- O. Domestic hot water heaters shall be Lochinvar hi-power commercial electric water heater or approved equal. See drawings schedules for capacities.

2.11 DOMESTIC HOT WATER STORAGE TANK

- A. Tank shall be constructed with an inner chamber from which all circulation to and from the water heater shall be done.
- B. Tank manufacturer shall guarantee the tank to deliver 80% of tank capacity without a drop in outlet temperature, regardless of rate of draw.
- C. The tank shall be constructed in accordance to ASME requirements and so labeled with a working pressure of 150 psig.
- D. The tank lining shall be glass-lined with a 5 year guarantee.
- E. Tanks larger than 42" diameter shall have a 11"x15" manhole.
- F. Furnish V-line insulating couplings at all tank inlets and outlets.
- G. See drawings for sizes and capacities and furnish inlet and outlet tappings to meet pipe sizes and all code required connections. Furnish base ring for tank support when vertical tanks are scheduled on drawings.
- H. Domestic hot water storage tanks shall be Lochinvar lock-temp glass lined or approved equal.

2.12 NATURAL GAS DOMESTIC WATER HEATER

- A. Water heater shall have the following features:
1. Factory installed nipples with dielectric connectors.
 2. Magnesium tank saver anodes.
 3. Glass lined tank.
 4. 300 psi tested tank for 150 psi working pressure.
 5. Heavy steel jacket with acrylic paint finish.
 6. Robert Shaw adjustable thermostat with automatic overheat safety device.
 7. Energy saving pilot.
 8. Vent cap.
 9. Relief valve tapping.
 10. Dip tube.
 11. Heat hoarder flue baffle.
 12. Polyurethane closed cell foam insulation.
 13. Access door.
 14. Radial port burner.
 15. Water heater leg supports.
 16. 5 year warrantee.
 17. AGA design certified.
- B. Water heater shall meet or exceed ASHRAE and other energy efficiency requirements.

2.13 DOMESTIC WATER HEATER

- A. Water heater shall utilize power venting with PVC pipe. Use 2" PVC up to 20 foot lengths, 3" PVC pipe 20 feet to 40 feet.
- B. Water heater shall have intermittent pilot ignition, factory installed dielectric nipples, glass lined tank, non-CFC foam insulation, temperature and pressure relief valve opening on side of tank and flue baffle.
- C. Design of water heater shall be certified by A.G.A.
- D. Include five year warrantee.
- E. Domestic water heaters shall be Lochinvar Direct Vent Residential Water Heater or equal. See drawing schedules for capacities.

2.14 DOMESTIC WATER HEATER

- A. Three year limited warranty against tank leakage, on commercial applications.
- B. Steel Jacket - Almond color acrylic finish with accenting trim color.
- C. 98% Efficient Immersion Type Heating Element - copper sheathed, tin coated.
- D. Thermostat - Adjustable, set at 110°F. Controls provide automatic overheat safety control with manual reset.
- E. 300 psi Tested Tank - Permits 150 psi working pressure.

- F. Glasslined Tank - glass lining bonded to tank interior, protects against rust and corrosion.
- G. Self draining cold water inlet.
- H. Separate relief valve topping.
- I. All models U.L. Listed.
- J. All models feature two factory installed heat traps.
- K. Domestic water heaters shall be Lochinvar Junior models or equal. See drawing schedules for capacities.

2.15 DOMESTIC WATER HEATER

- A. Three year limited warranty against tank leakage, on commercial applications.
- B. Compact Size - 12½" x 9" x 10¼".
- C. Mounts easily under sinks, inside cabinets, etc.
- D. Glass lined storage tank, fully encapsulated in polyurethane foam.
- E. Deep draw steel tank.
- F. Operates on standard household current - 110-120V-1500W.
- G. Temperature range - 110°F - 170°F.
- H. Rustproof PVC jacket.
- I. ¾" pipe thread nipple for easy installation.
- J. ¾" relief valve fitting.
- K. Standard power cord connection.
- L. 300 psi tested tank - working pressure 150 psi.
- M. High efficiency and low operating cost.
- N. Light weight - less than 12 pounds.
- O. Domestic water heaters shall be Lochinvar Mighty - 2 Model or equal. See drawing schedules for capacities.

2.16 DOMESTIC WATER HEATER

- A. Manufacturer: Teledyne Laars Mighty Therm.

- B. Heater shall be atmospheric draft, copper finned water tube factory packaged water heater complete with natural gas burning equipment, safety controls and appurtenances as hereinafter specified.
- C. The water tube heat exchanger shall be a straight tube design with no blind pockets, with 7/8" I.D. integral finned copper tube of .33" minimum fin height. The tubes shall be rolled directly into ASME headers rated for 160 psi working pressure. The heat exchanger shall be of low water volume explosion proof design. All gaskets shall be nonmetallic, outside the jacket and separated from the combustion chamber by at least 3½" to eliminate deterioration from heat. Headers shall have covers permitting visual inspection and cleaning of internal surfaces.
- D. The piping side header shall have removable flanges to facilitate maintenance and permit vertical removal of complete heat exchanger for service or replacement.
- E. A flow sensing device shall be factory mounted as an integral part of the heat exchanger assembly to stop the flow of gas to the burners whenever water flow is inadequate or interrupted.
- F. All gas manifolds shall be outside the combustion chamber and all primary combustion air shall be drawn directly from outside the heater, to prevent derating due to excessive heating of gas and air entering the burners.
- G. Burners shall be of the atmospheric type and constructed of stainless steel.
- H. The combustion chamber shall be lined with a cast refractory of at least two inches in thickness to retain heat and approved for service temperatures of not less than 2000°F. The outer jacket shall be a unitized shell, finished with acrylic thermoset paint baked at not less than 325°F. The frame shall be constructed of galvanized steel for strength and protection.
- I. Heater shall have an integral draft diverter for gas-tight connection. Installer to provide draw band connection.
- J. Firing mode shall be standard 2-stage.
- K. Ignition safeguard system shall be intermittent electronic supervision with electronic flame supervision to respond to flame failure in less than 0.8 seconds.
- L. Controls shall meet requirements of ANSI Standard 721.13 and ASME CSD-1b standards and include ignition safeguard, high water temperature limit, operating temperature control, gas pressure regulator, redundant electric gas valve water flow sensing and manual shut off gas valve. Standard control system operates on 24 VAC power from class 2 transformer.

2.17 DOMESTIC WATER HEATER

- A. Storage heater shall be Cemline Series SWH; factory assembled and packaged. Water heater shall be constructed in accordance with ASME code for a working pressure of 125 psig. The packaged water heater shall be with a vertical steel tank, cement lined with

an 11"x 15" manhole, with stainless threaded opening, Cu (in) + Cu (out) tubing, ¾" O.D. tubes, copper lined tube sheet, and steel or cast iron coil head.

- B. Heater shall be mounted on a steel support skid and shall have concealed lifting lugs. Heater shall be insulated with 3" fiberglass protected by an enameled metal jacket, 20 gauge minimum thickness, with access panel to the manhole. Heater shall be factory assembled and piped including incoming steam strainer, pilot operated temperature regulator, main and auxiliary float and thermostatic steam traps, and condensate strainer. Coil shall have copper wrapper, shall be baffled and shall have an integral valved circulator to circulate the water across the coil into the bottom of the tank.
- C. Heater shall be provided with a field programmable digital electronic limit control with LCD readout and digital thermometer.
- D. Heater shall be furnished with a water pressure gauge and ASME pressure temperature relief valve of sufficient size to relieve total BTU input of the coil.
- E. Furnish water heater with additional safety system designed to relieve excessively heated water from the vessel. The safety system shall be field programmable for set point and differential and shall be of the electronic type.
- F. Heater shall be provided with a vacuum breaker.
- G. Manufacturer shall assume responsibility for correct sizing of components to assure performance designated in design criteria.
- H. See drawings for capacities and schedule.

2.18 SUMP AND SEWAGE PUMPS

- A. Refer to drawings and furnish all.

2.19 SUMP PUMP

- A. Furnish and install a duplex sump pump system as shown and scheduled on drawings. The pumps shall be stainless steel fitted and furnished for a pit depth as scheduled on drawings and furnished with an above cover discharger terminating connections. Unless otherwise noted on drawings.
- B. The pumps casing shall have an integrally cast discharge flange. The suction strainer shall be fabricated 304 stainless steel with iron bottom plate. The impeller shall be semi-open, and capable of passing solids. The impeller shall contain a balancing ring and be cast 316 stainless steel and be secured to shaft by tape fit, with Woodruff key, castellated nut, washer and cotter pin. All shafting shall be 316 stainless steel and shall be a minimum of 1¼" diameter between the coupling and impeller. Column pipe shall be steel with welded flanges machined for registered fit. The pump bearing shall be of bronze. Bearing housing shall be of 316 stainless steel.
- C. An intermediate bearing of the same materials as the pump bearing must be provided on pumps in excess of 6'-0" in length. One intermediate bearing for each additional 5'-

0" of pump length shall be furnished. Pump and intermediate bearing(s) shall be water lubricated through separate lubrication lines terminating at the cover plate. The motor support shall be of cast iron, machined to assure positive alignment of motor and pump shaft, fitted with a high thrust angular contact bearing with moisture-proof enclosure and grease seals. External impeller and shaft axial adjustment shall be provided. Pump operation shall be controlled by a mechanical alternator and float switch combination.

- D. Float rod shall be 304 stainless steel. Float shall be 304 stainless steel. Float stops shall be 304 stainless steel. The flexible coupling between the motor and pump shafts shall be Woods Sure-Flex spacer type coupling.
- E. Pumps shall be driven by a standard "C" face vertical electric motor.
- F. Pump basin and control panels shall be as scheduled on drawings.
- G. Pumps shall be Series 1540 as manufactured by ITT Bell and Gossett.

2.20 SEWAGE EJECTOR

- A. Furnish and install a duplex sewage ejector system as shown and scheduled on drawings. The pumps shall be capable of handling solids, constructed of iron construction, and designed for a pit depth as scheduled on drawings. Furnish with an above cover discharge terminating connection unless otherwise noted on drawings.
- B. The pump casing shall have an integrally cast discharge flange. The impeller shall be enclosed, non-clog and capable of passing solids. The impeller shall be cast in iron and be secured to shaft by taper fit, with Woodruff key, castellated nut, washer and cotter pin. All 1¼" diameter between the coupling and the impeller. Column pipe shall be Schedule 40 steel with welded flanges
- C. An intermediate bearing of the same materials as the pump bearing must be provided on pumps in excess of 6'-0" in length. One intermediate bearing for each additional 5'-0" of pump length shall be furnished. Pump and intermediate bearing(s) shall be water lubricated through separate lubrication lines terminating at the cover plate. The motor support shall be of cast iron, machined to assure positive alignment of motor and pump shaft, fitted with a high thrust angular contact bearing with moisture-proof enclosure and grease seals. External impeller and shaft axial adjustment shall be provided. Pump operation shall be controlled by mechanical alternator and float switch with combination enclosure.
- D. Float rod shall be 304 stainless steel. Float shall be 304 stainless steel. Float stops shall be 304 stainless steel. The flexible coupling between the motor and pump shafts shall be Woods Sure-Flex spacer type coupling, protected by a coupling guard. Pumps shall be driven by a standard "C" face, vertical electric motor.
- E. Pump basin and control panel shall be as scheduled on drawings.
- F. Pumps shall be Series 1545 as manufactured by ITT Bell and Gossett.

2.21 ACID WASTE DILUTION TANK

- A. Manufacturers: Orion, Zurn, Schier.

2.22 EMERGENCY SHOWERS AND EYEWASH STATIONS

- A. Emergency showers and eyewash stations shall conform to ISEA Z358.1.
- B. Flushing fluids must be of tepid temperatures (between 60°F and 100°F).
- C. Wash connections shall not be required for emergency showers and eyewash stations.
- D. Fixtures shall be installed with emergency rated thermostatic mixing valves to achieve tepid water temperature supply.

PART 3 EXECUTION

3.1 PREPARATION

- A. Coordinate cutting and forming of roof and floor construction to receive drains to required invert and rim elevations.
- B. Coordinate all rough-in and/or final connections to equipment and plumbing fixtures. Plumbing fixtures shall be located as required to meet all barrier free and American Disabilities Act codes and regulations.
- C. Coordinate all piping invert elevations, location, routing, etc. to allow proper drainage from all plumbing fixtures to sewer mains. Verify all services existing and new for elevations, locations, etc. before commencing installation.

3.2 FIXTURE CONNECTIONS

- A. In general, unless otherwise noted on the drawings, the sizes of all the branch connections to fixtures shall be no smaller than those listed in the following schedule and as required by local and state plumbing codes, latest edition:

Fixture	Waste	Vent	C.W.	H.W.
Lavatory	1¼"	1¼"	½"	½"
Sinks (General)	1½"	1½"	½"	½"
Janitor's Service Sink	3"	2"	½"	½"
Water Closet-Flush Valve	4"	2"	1¼"	---
Urinal-Flush Valve	2"	2"	1"	---
Wall Hydrants (Hose Bibb)	---	---	¾"	---
Drinking Fountain	1½"	1½"	½"	---
Showers	2"	2"	¾"	¾"

3.3 INSTALLATION

- A. Plumbing fixtures and trim shall be protected against damage during construction. Fixtures damaged during this period shall be replaced.

- B. All valves, waste and water supply piping servicing fixtures exposed beyond face of finished walls shall be brass, nickel, and chromium plated. Where fixtures are mounted in countertops and cabinet work concealing valves and piping, chrome plated brass finishes are not required.
- C. All fixtures shall be independently valved with either integral stops or brass stops.
- D. Waste connections to floor or wall outlet fixtures shall be gas and water-tight; fastened with an approved setting compound, gasket or washer. Rubber gaskets or putty are not acceptable. The fixture shall be set the proper distance from the wall or floor.
- E. Where flush valves are specified with fixtures, supply to valve in each room shall be set at same height for that type of fixture, and valve shall be set in place so that center line of valve discharge is directly above center line of fixture spud. Bending of nipple between valve and spud to achieve connection will not be permitted.
- F. All brackets, cleats, plates, anchors, etc. required to support fixtures or piping rigidly in place shall be provided as work of this section and shall be installed behind finished walls.
- G. Provide and install basic fixtures from one major fixture manufacturer. Also, accessories such as faucets, strainers, stops, traps, etc. shall be manufactured by one major company where possible.
- H. All fixtures shall be set rigid, tight, plumb, level and true to assure rigidity and permanence. Provide chair carriers as manufactured by Wade, Josam, Zurn, or J.R. Smith for wall mounted fixtures. Carriers for wall mounted lavatories, drinking fountains, water coolers, and urinals shall have dual foot supports, tubular uprights, adjustable headers, alignment trusses, and all necessary accessories. Lavatory carriers shall be with concealed arms. Urinal carriers shall be with bearing plate. Water cooler and drinking fountain carriers shall be as required for proper support.
- I. All wall mounted fixtures shall be tested by bearing the weight of 500 pounds without sagging or pulling away from the wall. Damage resulting from this test shall be made good by this contractor. All other piping and fixtures shall be secured to walls with wall plates, wall hangers and approved expansion shields and bolts.
- J. Connections between earthenware fixtures and soil pipe flanges shall be made gas and water tight with closet setting compound or approved Neoprene gaskets, without use of putty. Hold down bolts shall be brass, not less than ¼" in diameter, and shall be equipped with nuts and washers.
- K. Provide each fixture with an approved compression service stop. Exposed stops shall be either loose key or screwdriver type.
- L. Caulk joint between wall and fixture at wall mounted lavatories, water closets, urinals, drinking fountains and service sinks with Silicone Sealant, white.
- M. Conductors:

1. All inside conductors, except as otherwise specified, shall be caulked water tight and supported so as to provide for contraction, expansion and settlement of the building.
2. All connections between outlet at roof drains and conductors shall be made and caulked watertight. Install all inside conductors and cooperate with the roofing contractor to properly install connections to the roof drains.

N. Cleanouts:

1. All soil, waste and drain pipes shall have cleanout at foot of stacks, outside near wall where line leaves building, at every change in the direction of run, at upper end of all horizontal runs, at intervals of not more than 100'-0" in straight runs of sanitary sewers and as required by code. All outlets shall be accessible so that drain line may be readily cleaned with a snake or other rodding tool. Extend cleanouts to finished floor or finished wall.

O. Floor Drains

1. Floor drain pans shall be furnished and installed for all floor drains (except when floor drain is located in floors on fill) and be made of lead sheets weighting 4 lbs. per square foot or of an approved material, extending a minimum of 12" beyond lip of the flashing ring with outer edges turned up. All floor drains, floor sinks, etc. shall have deep traps installed.
2. All fixtures shall be trapped if required by local or state plumbing codes.
3. All trap seals that are subject to loss by evaporation shall have a trap seal primer valve installed as required by Local or State Plumbing Codes. A trap seal primer valve shall conform to ASSE 1018 or ASSE 1044.

P. Flashings: Vent pipe flashings shall be by roofing contractor. Provide lead sleeves for vents.

Q. Roof Drains: Furnish roof drains as scheduled on drawings, and all other accessories as required for installation and as recommended by the drain manufacturer. The General Contractor will be responsible for roof openings, roof opening supports and flashings.

R. Roof drain pans shall be furnished and installed for each roof drain and overflow roof drain. Pans shall be pre-cut 30"x30" and shall be recessed 1½" deep. Deliver pan to general contractor for installation by roof deck trades.

S. Pipe relief from backflow preventer to nearest drain.

T. Install water hammer arrestors as required by Code, complete with means for access if so required by the Plumbing Inspector.

U. Cold water supply branch to each toilet room shall be provided with shock absorbers designed and sized as recommended by the manufacturer to eliminate water hammer.

- V. All exposed supplies and valves in finished areas shall be brass chrome plated. Supply lines to all hanging fixtures shall be from the wall, unless otherwise noted on drawings.
- W. Install shutoff valves on all branches. All water supplies to fixtures shall have valve on supply line to the fixture.
- X. All plumbing fixtures shall be installed, vented, piped, trapped, etc. in accordance with all codes and regulations pertaining to this projects location.
- Y. Provide access to all thermostatic mixing valves and trap primer valves. If necessary, provide flush mounted stainless steel valve box with hinged cover and key lock.
- Z. All fixtures supplied for bathing shall be supplied with a temperature control valve that conforms to ASSE 1016. All fixtures for hand washing shall be supplied with a temperature control valve that conforms to ASSE 1070.

END OF SECTION

MAI: 2024-9508

SECTION 22 07 00 - PLUMBING PIPE INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES PIPE INSULATION FOR:

- A. Domestic water piping system including cold water, hot water and hot water return.
- B. Valves and fittings.
- C. Miscellaneous.

1.2 REFERENCES

- A. Thermal insulation materials shall meet the property requirements of the following specifications as applicable to the specific product or end use:
- B. American Society for Testing of Materials Specifications:
 - 1. ASTM C547, "Standard Specification for Mineral Fiber Preformed Pipe Insulation"
 - 2. ASTM C533, "Standard Specification for Calcium Silicate Pipe & Block Insulation"
 - 3. ASTM C585, "Recommended Practice for Inner and Outer Diameters of Rigid Pipe Insulation for Nominal Sizes of Pipe and Tubing (NPS System)"
 - 4. ASTM C1136, "Standard Specification for Barrier Material, Vapor," Type 1 or 2 (jacket only)
- C. Insulation materials, including all water and vapor barrier materials, closures, hangers, supports, fitting covers, and other accessories, shall be furnished and installed in strict accordance with project drawings, plans, and specifications.

1.3 SCOPE

- A. The work covered by this specification consists of furnishing all labor, equipment, materials and accessories, and performing all operations required, for the correct fabrication and installation of thermal insulation applied to the following commercial piping systems, in accordance with the applicable project specifications and drawings, subject to the terms and conditions of the contract:
 - 1. Hot Piping – Piping system with fluids 105°F and higher.
 - 2. Cold Piping – Piping systems with fluids below 105°F. (Includes storm water systems)
- B. Insulation, vapor barriers, jacketing, hangers, supports, accessory materials, etc. shall be installed according to manufacturers recommendations.

1.4 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.

1.5 SYSTEM PERFORMANCE

- A. Insulation material furnished and installed hereunder shall meet the minimum thickness requirements of Standard 90.1 (12007), "Energy Efficient Design of new Buildings" of the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) except minimum thickness shall be 1". 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 each of the following specifications:
 - 1. American Society for Testing of Materials ASTM E84
 - 2. Underwriters' Laboratories, Inc. UL 723
 - 3. National Fire Protection Associations NFPA 255
- C. Calcium silicate products shall include a visual identification system to permit positive field determination of their asbestos-free characteristic.

1.6 QUALITY ASSURANCE

- A. The contractor shall use whatever means are necessary to protect the insulation materials and accessories before, during and after installation. No insulation material 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.
- B. If any insulation material has become wet because of transit or job site exposure to moisture or water, 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 PIPE INSULATION ON INDOOR SYSTEMS

- A. Molded pipe insulation shall be manufactured to meet ASTM C585 for sizes required in the particular system.
- B. Molded fibrous glass pipe insulation shall comply with the requirements of ASTM C547. Heavy density Fiberglas pipe insulation with factory applied all-service jacket (ASJ) and Doublesure* two-component adhesive closure system, or Fiberglas Pipe and Tank Insulation, heavy density fiberglass insulation with end grain adhered to ASJ all service jacket. Joints shall be sealed by butt strips having a two-component sealing system or by applying staples and pressure sensitive tape. When self-sealing lap systems are used, sufficient thickness of insulation shall be used to maintain the outer surface temperature of the operating system below +150°F. Manufacturer's data regarding thickness constraints in relation to operating temperature shall be followed. When multiple layers are required, all inner layer(s) shall be unjacketed.

- C. Fittings and valves shall be insulated with preformed fiberglass fittings, fabricated sections of fiberglass pipe insulation, fiberglass pipe and tank insulation, fiberglass blanket insulation, or insulating cement. Thickness shall be equal to adjacent pipe insulation. Finish shall match that used on straight sections.
- D. Flanges, couplings, chilled water pump impeller housings, valve bonnets etc, shall be covered with an oversized pipe insulation section sized to provide the same insulation thickness as on the main pipe section. An oversized insulation section shall be used to form a collar between the two insulation sections with sections of insulation being used to fill gaps. Jacketing shall match that used on straight pipe sections. Rough cut ends shall be coated with a suitable vapor resistant mastic.
- E. On cold systems, vapor barrier performance is extremely important. Particular care must be given to vapor sealing the fitting cover or finish to the pipe insulation vapor barrier. Valve stems shall be sealed with caulking to allow free movement of the stem but provide a seal against moisture incursion. All penetrations of the ASJ and exposed ends of insulation shall be sealed with vapor barrier mastic.
- F. On hot systems where fittings are to be left exposed, insulation ends should be beveled away from bolts for easy access.
- G. All insulated, exposed piping inside the building within 8'-0" above the floor shall be additionally 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.

2.2 SUPPORT FOR PIPE WITH INSULATION

- A. All piping shall be supported in such a manner that neither the insulation nor the vapor/weather barrier is compromised by the hanger or the effects of the hanger. In all cases, hanger spacing shall be such that butt joints may be made outside the hanger.
 - 1. On all size piping of cold systems, the pipe hanger saddles shall be separated away from the pipe by utilizing inserts. The vapor barrier shall be continuous, including material covered by the hanger saddle.
 - 2. On warm water piping systems 3" in diameter or less, insulated with Fiberglas insulation, may be supported by placing saddles of the proper length and spacing, as designated in Owens-Corning Pub. 1-IN-12534, under the insulation.
 - 3. For hot or cold piping systems larger than 3" in diameter, Owens-Corning Calcium Silicate pipe insulation shall be used for high density inserts. Piping saddles for piping larger than 3" shall not be in contact with the piping.
 - 4. Owens-Corning Calcium Silicate pipe insulation may be used to support the entire weight of the piping system provided the hanger saddle is designed so the maximum compressive load does not exceed 100 psi.
 - 5. Where pipe shoes and roller supports are required, insulation shall be inserted in the pipe shoe to minimize pipe heat loss. Where possible, the pipe shoe shall be sized to be flush with the outer pipe insulation diameter.

6. Thermal expansion and contraction of the piping and insulation system can generally be taken care of by utilizing double layers of insulation and staggering both longitudinal and circumferential joints. Where long runs are encountered, expansion joints may be required where single layers of the insulation are being used.
7. On vertical runs, insulation support rings shall be used.

2.3 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.
- 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".

2.4 INSULATION THICKNESSES

- A. Fittings, including valves, flanges, unions, etc. shall be insulated with the same thickness as the required pipe insulation and covered with PVC fitting cover as specified.
- B. Pipe insulation thickness shall be as follows unless noted otherwise on drawings:

<u>Piping System</u>	<u>Pipe Size</u>	<u>Insulation Thickness</u>	<u>Insulation Conductivity BTU-in H-FT²-F</u>
Domestic cold water	All sizes	1"	0.28
Domestic hot water and hot water return (140°F and under)	Up thru 1¼" and larger	1" 1½"	0.28
Domestic hot water and Hot water return (140°F to 200°F)	Up to 1¼" and larger	1 ½" 2"	0.28

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 may comply with applicable specifications and standards and meet specified thermal and physical properties.

3.2 PREPARATION

- A. Ensure that all pipe and fitting surfaces over which insulation is to be installed are clean and dry.
- B. 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. All damaged insulation installed will be removed and replaced by the Contractor at no extra cost to the Owner.
- C. Ensure that pressure testing of piping and fittings has been completed prior to installing insulation.

3.3 INSTALLATION

A. General

- 1. Install all insulation materials and accessories in accordance with manufacturer's published instructions and recognized industry practices to ensure that it will serve its intended purpose.
- 2. Install insulation on piping subsequent to installation of heat tracing, painting, testing, and acceptance tests.
- 3. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other. Butt insulation joints firmly to ensure complete, tight fit overall piping surfaces.
- 4. Maintain the integrity of factory-applied vapor barrier jacketing on all pipe insulation, protecting it against puncture, tears or other damage. All staples used on cold pipe insulation shall be coated with suitable sealant to maintain vapor barrier integrity.

B. Fittings

- 1. Cover valves, fittings, and similar items in each piping system using one of the following:

- a. Mitered sections of insulation equivalent in thickness and composition to that installed on straight pipe runs.
 - b. Insulation cement equal in thickness to the adjoining insulation.
 - c. PVC fitting covers insulated with material equal in thickness and composition to adjoining insulation.
- C. Penetrations
- 1. Extend piping insulation without interruption through walls, floors, and similar piping penetrations, except where otherwise specified.
- D. Joints
- 1. Butt pipe insulation against hanger inserts. For hot pipes, apply 3" wide vapor barrier tape or band over butt joints. For cold piping apply wet coat of vapor barrier lap cement on butt joints, and seal joints with 3" wide vapor barrier tape or band.
 - 2. All pipe insulation ends shall be tapered and sealed, regardless of service.

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. The insulation contractor shall advise the general and/or the mechanical contractor as to requirements for protection of 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 piping, valves, equipment, etc. where tie-ins are required, shall be removed by the Owner at 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: 2024-9508

SECTION 22 10 00 - PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sanitary and storm piping system.
- B. Domestic water piping system
- C. Natural gas piping system.
- D. Valves.
- E. Acid waste and vent piping (plastic)
- F. Above ground acid waste drain and vent piping system (glass)
- G. Underground acid waste drain and vent piping system (glass)

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. ANSI B31.1 - Power Piping.
- B. ANSI B31.2 - Fuel Gas Piping.
- C. ANSI B31.4 - Liquid Petroleum Transportation Piping Systems.
- D. ANSI B31.9 - Building Service Piping.
- E. ASME - Boiler and Pressure Vessel Code.
- F. ASME Sec. 9 - Welding and Brazing Qualifications.
- G. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800.
- H. ASME B16.3 - Malleable Iron Threaded Fittings.
- I. ASME B16.4 - Cast Iron Threaded Fittings Class 125 and 250.
- J. ASME B16.18 - Cast Bronze Solder-Joint Pressure Fittings.
- K. ASME B16.22 - Wrought Copper and Bronze Solder-Joint Pressure Fittings
- L. ASME B16.23 - Cast Copper Alloy Solder-Joint Drainage Fittings - DWV.
- M. ASME B16.26 - Cast Bronze Fittings for Flared Copper Tubes.

- N. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
- O. ASTM A47 - Ferritic Malleable Iron Castings.
- P. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded.
- Q. ASTM A74 - Cast Iron Soil Pipe and Fittings.
- R. ASTM A106 - Carbon Steel Seamless Pipe.
- S. ASTM A234 - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
- T. ASTM A536 – Ductile Iron Castings.
- U. ASTM B32 - Solder Metal.
- V. ASTM B42 - Seamless Copper Pipe.
- W. ASTM B43 - Seamless Red Brass Pipe.
- X. ASTM B75 - Seamless Copper Tube.
- Y. ASTM B88 - Seamless Copper Water Tube.
- Z. ASTM B251 - Wrought Seamless Copper and Copper-Alloy Tube.
- AA. ASTM B302 - Threadless Copper Pipe (TP).
- AB. ASTM B306 - Copper Drainage Tube (DWV).
- AC. ASTM C14 - Concrete Sewer, Storm Drain, and Culvert Pipe.
- AD. ASTM C425 - Compression Joints for Vitrified Clay Pipe and Fittings.
- AE. ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- AF. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- AG. ASTM C700 - Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
- AH. ASTM D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- AI. ASTM D2235 - Solvent Cement for Acrylonitrile - Butadiene - Styrene (ABS) Plastic Pipe and Fittings.

- AJ. ASTM D2241 - Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).
- AK. ASTM D2466 - Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- AL. ASTM D2513 - Thermoplastic Gas Pressure Pipe, Tubing and Fittings.
- AM. ASTM D2564 - Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
- AN. ASTM D2680 - Acrylonitrile-Butadiene-Styrene (ABS) Composite-Sewer Piping.
- AO. ASTM D2683 - Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe.
- AP. ASTM D2729 - Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- AQ. ASTM D2751 - Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
- AR. ASTM D2846 - Chlorinated Polyvinyl Chloride (CPVC) Pipe, Fittings, Solvent Cements and Adhesives for Potable Hot Water Systems.
- AS. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
- AT. ASTM D3033 - Type PSP Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- AU. ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- AV. ASTM D3309 - Polybutylene (PB) Plastic Hot Water Distribution System.
- AW. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- AX. ASTM F493 - Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- AY. ASTM F891, Schedule 40 Cellular Core PVC-DWV Pipe.
- AZ. AWS A5.8 - Brazing Filler Metal.
- BA. AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
- BB. AWWA C110 - Ductile - Iron and Gray - Iron Fittings 3 in. through 48 in., for Water and Other Liquids.
- BC. AWWA C111- Rubber-Gasket Joints for Ductile Iron and Gray-Iron Pressure Pipe and Fittings.

- BD. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
- BE. AWWA C606 – Grooved and Shouldered Joints.
- BF. AWWA C651 - Disinfecting Water Mains.
- BG. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems.
- BH. CISPI 310 - Joints for Hubless Cast Iron Sanitary Systems.
- BI. CAN-3 B281 - Aluminum Drain, Waste, and Vent Pipe and Components.
- BJ. NCPWB - Procedure Specifications for Pipe Welding.
- BK. NFPA 54 - National Fuel Gas Code.
- BL. NFPA 58 - Storage and Handling of Liquefied Petroleum Gases.

1.3 QUALITY ASSURANCE

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- C. Welders Certification: In accordance with ASME Sec 9.
- D. All grooved joint couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
- E. All castings used for coupling housings, fittings, valve bodies, etc. shall be date stamped for quality assurance and traceability.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site.
- B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary protective coating on cast iron and steel valves.
- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 UNDERGROUND ACID WASTE PIPING (GLASS)

- A. Excavation – shall conform to National Plumbing Code A40.8 Section 2.7.
 - 1. Bottom of trench shall be properly compacted, graded, and the pipe supported throughout its entire length.
 - 2. A minimum of 4” properly compacted rock-free sand or soil shall be used directly under the pipe.
- B. Buried Pipe
 - 1. Pipe shall be 6502 series – 5 ft. lengths covered with expanded polystyrene.
 - 2. All underground fittings shall be protected prior to back-filling by wrapping in polyvinyl film (5 mil), Scotch Wrap or J.M. Trans-Tex or approved equal.
- C. Backfill
 - 1. Pipe trench shall be back-filled and tamped with rock-free sand or soil to 12” above top of pipe. Where space does not permit, a minimum 12” cover, additional protection must be provided to protect pipe against crushing loads, except when buried under protective concrete slab.

2.2 ACID WASTE AND VENT PIPING, ABOVE GRADE (Must be approved by governing authorities) (Plastic)

- A. Orion Blue Line or Zurn Corrosive Waste Schedule 40 fire retardant pipe grade polypropylene pipe, supplied in 10 foot lengths, conforming to ASTM D4101.
- B. Fittings shall be Orion Blue Line or Zurn Corrosive Waste Schedule 40 pipe grade polypropylene, conforming to ASTM D4101.
- C. Joints shall be mechanically fastened by the use of Riontite or Zurn mechanical joint having a corrosion resistance equal to pipe and fittings. Each Riontite coupling assembly shall be of 300 series stainless steel with outer band, with 5/16” bolts, nuts and washers.

2.3 SANITARY AND STORM SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING (Must be approved by governing authorities)

- A. Piping up thru 8": Cast iron ASTM A74 service weight with cast iron fittings ASTM C564 neoprene gasket system joints.
- B. Piping 10" and above: Reinforced concrete pipe with ASTM C-76 Class III specification when piping is located below a paved surface. All other pipe shall be reinforced concrete pipe with ASTM C-76 Class II specification. Joints shall be bell and spigot pattern with "Tylex" gasket material on sanitary piping or cemented joints with "Dewitt" No. 10 caulking around compound on storm piping. Joints shall conform to ASTM V-443.
- C. Schedule 40 PVC Pipe: ASTM D2729 and ASTM F891 DWV non-pressure cellular core.
 - 1. Fittings: PVC

2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

D. Dual wall corrugated polyethylene pipe may be used for storm when approved in writing by the Engineer, pipe sizes thru 10" shall meet AASHTO M252S, pipe sizes 12" thru 36" shall meet AASHTO M294S. Corrugated pipe shall have smooth inner liner. Acceptable manufacturers shall be Hancor or ADS.

2.4 SANITARY, STORM AND VENT SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING (Must be approved by governing authorities)

A. Gravity Cast Iron Pipe: ASTM A74 service weight.

1. Fittings: Cast iron.
2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets.

B. Gravity Cast Iron Pipe: CISPI 301, hubless, service weight

1. Fittings: Cast iron.
2. Joints: ASTM C564, neoprene gasket system.

C. Gravity Schedule 40 PVC Pipe: ASTM D2729 and ASTM F891 DWV non-pressure cellular core.

1. Fittings: PVC.
2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

D. Gravity 10" and larger. Schedule 40 PVC gravity sewer pipe with integral bell and spigot joints.

1. Fittings: PVC
2. Joints: ASTM D3212 flexible elastomeric seals.

E. Forced PVC Pipe:

1. 4" and Larger - ASTM D2241, DR18-Class 150 AWWA C900.
2. Fittings: ASTM D2466 PVC
3. Joints: ASTM D3139, integral bell and gasket seal installed with concrete thrust block or ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.5 SANITARY, STORM AND VENT PIPING, ABOVE GRADE (Must be approved by governing authorities)

A. Gravity Cast Iron Pipe: ASTM A74, service weight.

1. Fittings: Cast iron.
2. Joints: ASTM C564, hub and spigot, neoprene gasket system.

B. Gravity Cast Iron Pipe: CISPI 301, hubless, service weight.

1. Fittings: Cast iron.
2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

C. Gravity Steel Pipe: ASTM A53 Schedule 40, galvanized.

1. Cast Iron Fittings: ASME B16.1, flanges and fittings; ASME B16.4, screwed fittings.
2. Malleable Iron Fittings: ASME B16.3, screwed type. ASTM A47.

3. Ductile Iron Fittings: Grooved end, ASTM A536.
 4. Mechanical Grooved Couplings: Ductile iron, galvanized. (as specified for Forced Drains)
- D. PVC Pipe: ASTM D2729 (when approved by the Architect/Engineer).
1. Fittings: PVC.
 2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.
- E. CPVC Pipe: ASTM D2846 (When approved by the Architect/Engineer).
1. Fittings: ASTM D2846, CPVC
 2. Joints: ASTM D2846, solvent weld with ASTM F493 solvent cement.
- F. Forced larger than 3": Steel Pipe: ASTM A53, Schedule 40 , galvanized.
1. Fittings: Galvanized steel.
 2. Joints: Grooved mechanical couplings.
 3. IPS Grooved Piping System.
 - a. Victaulic mechanical pipe couplings, fitting, valves and other grooved components may be used as an option to welding, threading or flanged methods. All grooved components shall be of one manufacturer and shall conform to local code approval and/or as listed by ANSI B31.1, B31.9, ASME UL/FM IAPMO or BOC. Grooved end product manufacturer to be ISO-9001 certified.
 - b. Roll or cut grooved ends as appropriate to pipe material, wall thickness, pressures, size and method of joining. Pipe ends shall be grooved in accordance with manufacturer's current listed standards conforming to ANSI/AWWA C-606.
 - c. Mechanical couplings shall be Victaulic style 107H "Installation-Ready" or approved manufacturer, rigid coupling. Victaulic style 177 "Installation-Ready", and style 77 or 75 or equal coupling shall be used where system flexibility is desired at pumps and other mechanical equipment to reduce noise and vibration. Noise and vibration reduction is achieved by installing (3) style 77 or 75 or equal flexible couplings near the vibration source. Couplings shall be of cast ductile iron conforming to ASTM A536, grade 65-45-12.

2.6 DOMESTIC WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING (Must be approved by governing authorities)

- A. Ductile Iron Pipe: ANSI/AWWA C151/A21.51 rated 350 psi with Class 350 fittings.
1. ANSI thickness Class 50 minimum, nominal pipe wall thickness .27" minimum, rated 350 psi at laying condition Type 1.
 2. Cement lined as per AWWA C104 (ANSI A21.4)
 3. Pipe Joints: Push on, ANSI/AWWA C1533/A21.53, with Tyton gaskets.
 4. Fitting Joints: Mechanical, compact, ANSI/AWWA C153/A21.53, with stainless steel or Corten anti-rotation bolts and sacrificial zinc anode cap on each bolt.
 5. Coating: Exterior of pipe and fittings, asphaltic coating as per ANSI/AWWA.
 6. Polyethylene encasement as per ANSI/AWWA C105/A21.5.

7. Concrete thrust blocks, installation, etc. as per published engineering and construction standards of Michigan Department of Transportation and local codes.
 8. All material and installation shall be in accordance with manufacturer's recommendations.
- B. Copper Tubing: 2" and smaller - ASTM B88, Type K soft temper.
1. Fittings: ASME B16.18 cast bronze or ASME B16.22 wrought copper and bronze.
 2. Joints: AWS A5.8, BCuP silver braze if allowed by code, otherwise ASTM B32 solder, lead free Grade 95-5 tin-antimony or tin-silver, with melting range of 430 to 535 degrees F.
- C. Polyethylene Pipe 1½" or smaller
1. Pipe - Polyethylene (PE) flexible plastic, ASTM D2239 rated 160 psi minimum.
 2. Fittings - PE barbed insert fittings.
 3. Joints - Stainless steel clamps over barbed insert fittings.
- D. PVC Pipe:
1. 2½" and 3" - ASTM D2241, SDR 21 - Class 200 AWWA C900.
 2. 4" and Larger - ASTM D2241, DR18-Class 150 AWWA C900.
 3. Fittings: ASTM D2466, PVC
 4. Joints: ASTM D3139, integral bell and gasket seal installed with concrete thrust block or ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.7 SANITARY FORCE MAIN PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Ductile Iron Pipe: AWWA C151. Bituminous outside coating AWWA C151. Cement Mortar Lining AWWA C104.
1. Pipe Thickness Class: 50
 2. Pipe Pressure Rating: 350 psi minimum for 8" through 12", 250 psi minimum for 14" and larger.
 3. Fittings: Ductile iron, standard size, AWWA C110; compact size, AWWA C153.
 - a. Coating: Bituminous Coating, AWWA C110.
 - b. Lining: Cement Mortar Lining, AWWA C104.
 4. Joints: Tied restrained joints.
 5. Concrete thrust blocks, installation, etc. as per published Engineering and Construction Standards of Michigan Department of Transportation, and local codes.

2.8 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING (Must be approved by governing authorities)

- A. Ductile Iron Pipe: ANSI/AWWA C151/A21.51 rated 350 psi. with Class 350 fittings.
1. ANSI thickness Class 50 minimum, nominal pipe wall thickness .27" minimum, rated 350 psi at laying condition Type 1.
 2. Cement lined as per AWWA C104 (ANSI A21.4)

3. Pipe Joints: Push on, ANSI/AWWA C1533/A21.53, with Tyton gaskets.
4. Fitting Joints: Mechanical, compact, ANSI/AWWA C153/A21.53, with stainless steel or Corten anti-rotation bolts and sacrificial zinc anode cap on each bolt.
5. Coating: Exterior of pipe and fittings, asphaltic coating as per ANSI/AWWA.
6. Polyethylene encasement as per ANSI/AWWA C105/A21.5.
7. Concrete thrust blocks, installation, etc. as per published engineering and construction standards of Michigan Department of Transportation and local codes.
8. All material and installation shall be in accordance with manufacturers recommendations.

B. Copper Tubing: 2" and smaller - ASTM B88, Type K, soft temper.

1. Fittings: ASME B16.18 cast bronze or ASME B16.22 wrought copper and bronze.
2. Joints: AWS A5.8, BCuP silver braze.
3. No joints shall be located under floor unless standard pipe lengths are not long enough for the entire length of bury, then joints shall be kept to a minimum.

C. PVC Pipe

1. 3" - ASTM D2241, SDR 21- Class 200 AWWA C900.
2. 4" thru 12" - ASTM D2241, DR18 - Class 150, DR18 - AWWA C900.
3. Fittings ASTM D2466, PVC.
4. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.9 DOMESTIC WATER PIPING, ABOVE GRADE INSIDE BUILDING (Must be approved by governing authorities)

A. Domestic water piping 6" and smaller shall be: Copper tubing: ASTM B88, Type L, hard drawn, seamless.

1. Fittings: ASME B16.18 cast bronze tee tap or ASME B16.22 wrought copper and bronze.
2. Fittings 1-1/2" and smaller: ASME B16.18 cast bronze or ASME B16.22 wrought copper, with 301 stainless steel internal components, EPDM seals, and push-to-connect ends. Victaulic Permalynx.
3. Joints: ASTM B32, solder, Lead free Grade 95-A tin - antimony or tin and silver with melting range 430 to 535 degrees F or AWS A5BcuP silver braze.
4. Fittings 2" and smaller: At the Contractor's option, Schedule 10S stainless steel pipe with Vic-Press 304 fittings and couplings may be used in lieu of soldered copper. The seal material shall be UL classified in accordance with ANSI/NSF61 for Potable Water service.
5. Joints 2" thru 8" may be mechanical pipe couplings of a bolted type with a central cavity design pressure-responsive gasket along with grooved end copper or bronze fittings as available, as manufactured by Victaulic.
 - a. Copper Tube, ASTM B-88 (Type K or L) - Roll grooved only, at copper-tube dimensions. (Flaring to accommodate alternate sized couplings is not permitted).
 - b. Mechanical Couplings - Shall be Victaulic Style 607H "Installation-Ready" rigid couplings for copper consisting of a ductile iron cast housing, with offsetting angle-pattern bolt pads, a synthetic rubber gasket of a central

cavity pressure-responsive design, with ASTM A449 plated nuts and bolts to secure unit together.

- c. Coupling Housings - Shall be cast of ductile iron conforming to ASTM A-536 (Grade 65-45-12), with a copper colored enamel paint coating.
 - d. Gaskets - Shall be molded of synthetic rubber in a Flush-Seal configuration conforming to the copper tube size (CTS) outside diameter and coupling housing, of elastomers having properties as designated in ASTM D-2000. Reference shall always be made to the latest published Selection Guide for Gaskets for proper gasket selection for the intended service.
 - e. Water Service - Gasket supplied for water services from -30°F to +230°F Grade "E" EPDM compound molded of materials conforming to ASTM D-2000, designation 2CA615A25B24F17Z, recommended for hot water service within the specified temperature range, plus a variety of dilute acids, oil-free air, and many chemical services. Not recommended for petroleum services.
 - 1) Gaskets supplied with Style 607H couplings shall be grade EHP for water services from -30°F to +250°F.
 - 2) Gaskets shall be UL classified in accordance with ANSI/NSF61 for Potable Water service.
 - 3) Meets the low lead requirements of NSF-372.
 - f. Flange Adapters - Shall be Victaulic Style 641 Vic-Flange or equal adapters 2"-6", ductile iron ASTM A-536, engaging directly into roll grooved copper tube and fittings and bolting directly to ANSI Class 125 cast iron and Class 150 steel flanged components; installer to supply standard flange bolts. Flange casting shall have a corresponding gasket.
 - g. Fittings - Fittings shall be full flow (smooth turn elbows) copper fittings conforming with ASME B16.22 or cast bronze to ASME B16.18; with grooves designed to accept grooved end couplings at copper-tube dimensions. (Flaring to accommodate alternate sized couplings is not permitted). Victaulic Copper-Connection.
- B. Domestic water piping larger than 6" shall be: Steel pipe: ASTM A53, Schedule 40, galvanized.
- 1. Fittings: Galvanized steel.
 - 2. Joints: Grooved mechanical couplings.
 - 3. IPS Grooved Piping System
 - a. Victaulic mechanical pipe couplings, fitting, valves and other grooved components may be used as an option to welding, threading or flanged methods. All grooved components shall be of one manufacturer and shall conform to local code approval and/or as listed by ANSI B31.1, B 31.9, ASME, UL/FM IAPMO or BOC. Grooved end product manufacturer to be ISO-9001 certified.

- b. Roll or cut grooved ends as appropriate to pipe material, wall thickness, pressures, size and method of joining. Pipe ends shall be grooved in accordance with manufacturer's current listed standards conforming to ANSI/AWWA C-606.
- c. Mechanical couplings shall be Victaulic style 107H "Installation Ready" or 07 (zero-flex) or equal, rigid coupling or style HP-70 or equal rigid coupling for high pressure service. Victaulic style 177 "Installation Ready" and style 77 or 75 or equal coupling shall be used where system flexibility is desired at pumps and other mechanical equipment to reduce noise and vibration. Noise and vibration reduction is achieved by installing (3) style 77 or 75 or equal flexible couplings near the vibration source. Couplings shall be of cast ductile iron conforming to ASTM A536, grade 65-45-12.
- d. Mechanical reducing couplings shall be Victaulic style 750 or equal for pipe runs for reduction on pipe sizes 4" thru 8".
- e. Meets the low lead requirements of NSF-372.

2.10 NATURAL GAS PIPING BURIED (Must be approved by governing authorities and local gas utility company)

- A. Approval must be given in writing by the local gas company for type of material to be used and the proposed installation method
- B. Polyethylene Pipe: ASTM D2513, SDR 11.5.
 - 1. Joints and Fittings: Plastic pipe and fittings shall be joined in accordance with manufacturer's instructions. Piping shall be allowed to be joined by methods of heat fusion, or mechanical fittings designed for pipe made to ASTM D 2513 Standards.
 - a. Heat fusion joints shall be made in accordance with manufacturer's recommendations and shall be made by certified personnel in accordance with qualified procedures proven to make gas tight joints as strong as the pipe or tubing being joined.
 - b. Mechanical joints shall be compatible with the plastic piping and gas in the system. A stiffener should be inserted when using OD compression type fittings. The stiffener should be sized specifically for the pipe being installed and should equal the insertion depth of the pipe. Split tubular stiffeners shall not be used.
 - 2. Continuous insulated No. 14 copper tracer wire shall be installed with and attached to underground non-metallic gas piping and shall terminate above grade at each end.
 - 3. Install polyethylene pipe a minimum of 24" below grade, backfill with clean yellow sand to 6" below grade, and install yellow plastic warning tape 6" below grade above the pipe.
 - 4. Polyethylene pipe entering or emerging from the ground at locations exterior from the building shall be additionally protected by encasing with ASTM A53, Schedule 40 black steel pipe to a height of, if practical, 18" below to 6" above the ground.

5. Piping penetrating below grade through a foundation or basement wall shall be encased with steel, wrought iron, PVC or ABS Schedule 40 piping. The circular space behind the piping and the sleeve shall be sealed.

2.11 NATURAL GAS PIPING, ABOVE GRADE INSIDE OF BUILDING OR OUTDOORS EXPOSED

- A. Steel Pipe: ASTM A53, Schedule 40 black.
 1. Fittings: ASME B16.3, malleable iron or ASTM A234, forged steel welding type.
 2. Joints: NFPA 54, threaded or welded to ANSI B31.1, ANSI B31.2, ANSI B31.9, ASME Sec. 9.
 3. If both ends of the pipe sleeve within the same building terminate indoors, the pipe sleeve shall not be sealed or vented.
 4. If one end of the pipe sleeve terminates outdoors and the other terminates indoors, the pipe sleeve shall be sealed and vented.
 5. Exterior piping shall be painted with paint for steel pipe and outdoor rated.

2.12 NATURAL GAS PIPING INSIDE BUILDING, BELOW GROUND, INSIDE SOLID WALLS OR SOLID FLOORS

- A. Steel pipe, ASTM A53, Schedule 80, black iron with welded joints, encased in a Schedule 40 steel, wrought iron, PVC or ABS pipe sleeve. The sleeve shall be sealed and capable of containing full gas pressure in the event of a leak in the gas pipe. The sleeve shall be vented to a vent located 12" min. above the roof with a cap to prevent the entrance of water and insects. All gas piping shall be in conformance with the National Fuel Gas Code NFPA 54, the requirements of the State Building Code, the local Fire Marshal and the Office of Fire Safety (OFS).
 1. The gas shutoff valves serving the Science Rooms shall be made accessible from the Corridor. Each shutoff valve shall be located in a recessed box furnished and installed by the General Contractor. Each shutoff valve shall serve to shut off all gas outlets in the one adjacent room only.
 2. All gas piping located below the floor shall be located under the concrete, not in the concrete, and shall be located a minimum of 12" below the top of the floor.

2.13 NATURAL GAS PIPING IN CONCEALED LOCATIONS

- A. Steel pipe, ASTM A53, Schedule 80, black iron with welded joints.
 1. A concealed location is a location that cannot be accessed without damaging permanent parts of the building structure or finish surface. Spaces above, below or behind removable panels or doors shall not be considered concealed.

2.14 GENERATOR EXHAUST PIPING

- A. Steel Pipe ASTM A 312 seamless welded austenitic intended for high temperature and generally corrosive service.
- B. Fittings: Long radius, welded.

2.15 PIPE HANGERS AND SUPPORTS

- A. Refer to Section 22 05 00.

2.16 FLANGES, UNIONS, AND COUPLINGS

- A. Pipe Size 2 Inches and Under:
 - 1. Ferrous pipe: 150 psig malleable iron threaded unions.
 - 2. Copper tube and pipe: 150 psig bronze unions with soldered joints. (Solder shall be lead free.)
- B. Pipe Size Over 2 Inches:
 - 1. Ferrous pipe: 150 psig forged steel slip-on flanges; 1/16 inch thick preformed neoprene gaskets.
 - 2. Copper tube and pipe: 150 psig slip-on bronze flanges; 1/16 inch thick preformed neoprene gaskets.
- C. Grooved and Shouldered Pipe End Couplings:
 - 1. Unions and flanges for servicing and disconnect are not required in installations using grooved joint couplings. (The couplings shall serve as disconnect points.)
 - 2. Housing: Two ductile iron clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion where required; electroplated steel bolts, nuts, and washers conforming with ASTM A449; galvanized for galvanized pipe.
 - 3. Sealing gasket: "C" shape or FlushSeal composition sealing gasket.
 - 4. Gaskets shall be UL classified in accordance with ANSI/NSF-61 for Potable water service.
 - 5. Basis of Design: Victaulic Company, Style 607H (Installation-Ready for Copper Tubing) and Style 107H or 177 (Installation-Ready for Steel Piping).
- D. Dielectric Connections: Dielectric nipples shall be non-conducting for connection of dissimilar materials. Dielectric nipples shall be similar to Victaulic Style 647 or Style 47. A brass adapter dielectric union is not acceptable.

2.17 GATE VALVES

- A. Up to and including 3 Inches: Bronze body, bronze trim, non-rising stem, handwheel, inside screw, single wedge or disc, solder or threaded ends.
- B. Over 3 Inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, single wedge, flanged or grooved ends. Basis of Design: Victaulic Series 771V.

2.18 GLOBE VALVES

- A. Up to and including 3 Inches: Bronze body, bronze trim, rising stem, handwheel, inside screw, renewable composition disc, solder or screwed ends, with back seating capacity (repackable under pressure).
- B. Over 3 Inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, plug-type disc, flanged ends, renewable seat and disc.

2.19 BALL VALVES

- A. Up to and including 3 Inches:
 - 1. Bronze one piece body, stainless steel ball, Teflon seats and stuffing box ring, lever handle and balancing stops, solder or threaded ends with union.
 - 2. Brass two piece body, chrome plated brass ball and stem, PTFE seats and seals, lever handle, and Vic-Press ends. Victaulic Series P589.
- B. Over 1-1/2 Inches: Cast ductile iron steel body, chrome plated steel ball, teflon seat and stuffing box seals, lever handle, or gear drive handwheel for sizes 10 inches and over, flanged or grooved ends. Basis of Design: Victaulic Series 726.

2.20 PLUG VALVES

- A. Up to and including 3 Inches:
 - 1. Elastomer coated ductile iron disc with integrally cast stem, copper-tube dimensioned grooved ends, lever handle or gear operator. Basis of Design: Victaulic Series 608.
 - 2. Bronze body, bronze tapered lubricated plug, teflon packing, threaded ends.
- B. Over 3 Inches:
 - 1. Cast iron body and lubricated plug, flanged ends.
 - 2. Elastomer coated ductile iron plug with integrally cast stem, ductile iron body and bonnet, welded-in nickel seat, lever handle or gear operator. Basis of Design: Victaulic Series 377.
 - a. For installation on IPS / Steel pipe sizes with Victaulic Style 307 transition coupling.

2.21 BUTTERFLY VALVES

- A. Bronze body
 - 1. Elastomer coated ductile iron disc with integrally cast stem, copper-tube dimensioned grooved ends, lever handle or gear operator. Basis of design: Victaulic Series 608.
 - 2. Stainless steel disc, resilient replaceable seat, threaded ends, extended neck, 10 position lever handle.
- B. Cast or ductile iron body, chrome plated ductile iron disc, resilient replaceable pressure responsive EPDM seat, wafer or lug ends or grooved ends if Victaulic grooved fittings are used, with extended neck and 10 position lever handle. (Stem shall be offset from the disc centerline to provide full 360-degree circumferential seating). Sizes 6" and larger furnish gear drive handwheel. Basis of Design: Victaulic MasterSeal™.

2.22 FLOW CONTROL VALVES

- A. Construction: DZR brass (Ametal) or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet with blowdown/backflush drain.
 - 1. Body material shall be ISO 6509 compliant.
- B. Calibration: Control flow within 3.5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control.
- C. Manual (Multiple Turn Balancing Valves): Victaulic Series 786/787/78K circuit balancing valve.
- D. If called for on drawings, furnish Victaulic or Griswold flow control valve. Flow control valve shall automatically control flow rates with $\pm 5\%$ accuracy. Valve control mechanism shall consist of a stainless steel cartridge with a ported cup and coil/helical spring to avoid corrosion. Four operating ranges shall be available with minimum range requiring less than 2 psig to actuate the mechanism. Manufacturer shall provide independent laboratory tests verifying accuracy and performance. Griswold flow control valve shall have a 5 year warrantee to guarantee all materials and workmanship. See drawings for flow rate of valve.

2.23 SWING CHECK VALVES

- A. Up to and including 3 Inches: Bronze swing disc, solder or screwed ends.
- B. Over 3 Inches: Iron body, stainless steel or bronze trim, swing disc, renewable disc and seat, grooved or flanged ends. Basis of Design: Victaulic Series 712.

2.24 SPRING LOADED CHECK VALVES

- A. Iron body, bronze trim, stainless steel spring, renewable composition disc, screwed, wafer, or flanged ends.
- B. Ductile iron body, stainless steel spring and shaft aluminum-bronze disc with elastomer seal or elastomer coated ductile iron disc with welded-in nickel seat, grooved ends. Basis of Design: Victaulic Series 716.

2.25 WATER PRESSURE REDUCING VALVES

- A. Up thru 3 Inches: Bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, double union ends.
- B. Over 3 Inches: Cast iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.
- C. Valve shall be as manufactured by Bell and Gossett.

2.26 RELIEF VALVES

- A. Furnish and install as shown on plans a diaphragm-assist operated bronze body ASME rated and nameplated safety relief valve with fail-safe disc to assure normal operation under emergency conditions. The valve shall have a low blowdown differential and shall be designed to relief system pressure in excess of the operating pressure specified for the system, within the maximum operating limitations of the valve. The ASME safety relief valve shall be engineered to prevent the system fluid from entering the spring chamber under normal operating conditions. The permanent valve nameplate shall display the BTUH and relief pressure ratings certified by the National Board of Boiler and Pressure Vessel Inspectors. Valve shall be as manufactured by Bell and Gossett.

2.27 STRAINERS

- A. Size 3 inch and Under: Screwed brass body for 175 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen.
- B. Size 4 inch: Flanged iron body for 175 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen.
- C. Size 5 inch and Larger: Flanged iron body for 175 psig working pressure, basket pattern with 1/8 inch stainless steel perforated screen.
- D. Grooved-End Strainers: Size 2 inch through 12 inch, 300 psig working pressure, Y-pattern with 1/16 or 1/8 inch stainless steel perforated screen. Victaulic Series 732.

2.28 INSERTS

- A. Inserts: Malleable iron case of steel shell and expansion plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.29 CONCRETE FOR THRUST RESTRAINT AND COLLARS

- A. Concrete: Class A Concrete conforming to Divisions 500 and 700 of the SCDOT Standard Specifications.
 - 1. Compressive strength of 3,000 psi at 28 days.
 - 2. Air entrained.
 - 3. Water cement ratio of 0.488 with rounded aggregate and 0.532 with angular aggregate.
 - 4. Maximum slump of 3.5 inch for vibrated concrete and 4 inch for non-vibrated concrete.
 - 5. Minimum cement content of 564 pounds per cubic yard for vibrated concrete and 602 pounds per cubic yard for non-vibrated concrete.

2.30 ACID WASTE AND VENT PIPING, BURIED WITHIN 5 FEET OF BUILDING (Must be approved by governing authorities) (Plastic)

- A. Orion Blue Line or Zurn Corrosive Waste Schedule 40 fire retardant pipe grade polypropylene pipe, supplied in 10 foot lengths, conforming to ASTM D4101.

- B. Fittings shall be Orion Blue Line or Zurn Corrosive Waste Schedule 40 pipe grade polypropylene, conforming to ASTM D4101.
- C. Joints shall be fusion type made by Orion Heat Tool or Zurn Fusion-Lock joining machine, conforming to ASTM D2657.

2.31 ABOVE GROUND ACID WASTE DRAIN AND VENT PIPING SYSTEM (Glass)

A. General

1. Contractor shall furnish and install a complete acid waste drain and vent system as indicated. This system shall be made of U.L. Classified borosilicate glass conforming to ASTM Specification C 1053-90, Federal Specification DD-G-541 B as manufactured under the trade name "KIMAX" by SCHOTT.
2. This system shall include all glass straight lengths, fittings, and traps, compression type tetra-fluoroethylene lined couplings, and padded hanger supports. IT shall also include protected pipe for underground burial and recommended adapter couplings to connect other piping material, where applicable.
3. All pipe shall be installed free of strain, in a manner to permit limited movement. Padded pipe hangers shall be used on horizontal runs 8' to 10' on centers. Vertical risers shall be supported by padded riser clamps designed to restrict lateral and downward movement. Vertical risers up to 3" I.D. may be supported at every other floor level. Three-inch I.D. and greater shall be supported at every floor level.

B. Connections

1. Glass-to-glass connections shall be made with KIMAX compression type bead-to-bead and bead-to-plain end couplings – article numbers 6650 and 6661 respectively. Coupling's outer shell, bolt and nut to be made from 3009 series stainless steel. Bead-to-plain end coupling outer shell must encapsulate compression liner to prevent cold flow and ensure leak-free joint. Coupling compression liner to be made from Buna-N-Rubber. Seal ring gasket to be made of tetra-fluoro ethylene. When installed according to the manufacturer's recommendations, they shall provide a leak-free joint when deflected up to 4".
2. Joints between glass and other types of piping material shall be made with KIMAX adapters, and/or according to manufacturer's recommendations.

C. Floor and wall penetrations

1. Glass pipe passing through non-fire rated walls or floor slabs shall be fitted with pipe sleeves a minimum of 2" greater diameter than the pipe O.D. Space between pipe and sleeve shall be packed with fiberglass, glass wool and/or a non-hardening approved caulking material.
2. Glass pipe passing through fire-rated walls or floor slabs shall be installed in accordance with Underwriters Laboratory fire penetration systems for KIMAX Glass Pipe. System numbers listed in the U.L. Fire Resistance Directory include: C-AJ-2006, 2014, 2019, 2039, 2079, 2094, 2118, 2144, 8005, 8035; W-J-2032; W-L-2006, 2112, 2114.
3. Glass pipe shall not be installed in direct contact with concrete. Fiberglass insulation or other type padding as approved by the pipe manufacturer shall be used to insulate between the two materials.

4. Glass pipe shall be protected against all weld spatter.
- D. Laboratory sink connection
 1. Sink outlets, tailpieces, trap sand cup sinks shall be KIMAX Borosilicate Glass.
- E. Installation and testing
 1. Install and test in accordance with manufacturer's recommendations and national and/or local code requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel or groove plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- D. Unions and flanges for servicing and disconnect are not required in installations using grooved joint couplings. (The couplings shall serve as disconnect points.)

3.3 PLUMBING PIPING INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Dielectric nipples for connection of dissimilar materials. A brass adaptor dielectric union is not acceptable.
- C. Route piping in orderly manner and maintain gradient.
- D. Install piping to conserve building space and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
 1. For water systems, use adequate numbers of Victaulic Style 77 flexible couplings in header piping to accommodate thermal growth and contraction, and for the elimination of expansion loops. (In accordance with Victaulic instructions and as approved by the engineer). Where expansion loops are required, use Victaulic Style 77 couplings on the loops.
- G. Provide clearance for installation of insulation and access to valves and fittings.

- H. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors.
- I. Establish elevations of buried piping outside the building to ensure not less than 4'-0" of cover for sewers and not less than 5'-6" of cover for domestic water piping.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to weld.
- K. Provide support for utility meters in accordance with requirements of utility companies.
- L. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting.
- M. Underground sewers shall be a minimum of 3" in diameter. Sewers located within building shall have a minimum slope of $\frac{1}{4}$ " per foot for piping 3" and smaller and a minimum slope of $\frac{1}{8}$ " per foot for piping 4" and larger.
- N. All junctions of drainage piping shall be made with combination "Y" and $\frac{1}{8}$ bend fittings.
- O. Install bell and spigot pipe with bell end upstream.
- P. Terminate plumbing vents 12" minimum above roof. Furnish and install weather cap on top of all vent pipes.
- Q. Install valves with stems upright or horizontal, not inverted.
- R. Solder or "sweat" joints shall be used for all copper and brass fittings, valves and tubing, using the soldering flux and methods recommended by the manufacturer of the tubing and fittings. Solder shall be silver solder for buried piping. No lead solder shall be used on any potable water piping.
- S. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.
- T. Equipment using gas and related piping shall be installed in compliance with NFPA 54 and 58, as applicable.
- U. Install ductile iron pipe and fittings in accordance with AWWA C600 and manufacturer's instructions.
- V. Steel Rods, Bolt, Lugs, and Brackets: Coat buried steel with one coat of coal tar coating before backfilling.
- W. Maintain minimum 10-foot horizontal separation and 18 inch vertical separation of water main from sewer piping or as required by local code.

3.4 PLUMBING PIPING APPLICATION

- A. Use grooved mechanical couplings and fasteners in accessible locations, risers and pipe chases with Architect/Engineer's approval.
 - 1. Grooved joints shall be installed in accordance with the manufacturer's latest published installation instructions. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gaskets shall be of an elastomer grade suitable for the intended service, and shall be molded and produced by the coupling manufacturer. The grooved coupling manufacturer's factory trained representative shall provide on-site training for contractor's field personnel in the use of grooving tools and installation of grooved joint products. The representative shall periodically visit the jobsite and review contractor is following best recommended practices in grooved product installation. (A distributor's representative is not considered qualified to conduct the training or jobsite visit(s).)
- B. Install unions downstream of valves and at equipment or apparatus connections. Unions are not required in installations using grooved mechanical joint couplings. (The couplings shall serve as unions and disconnect points).
- C. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- D. Install gate, ball, or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers. All branch piping take-offs from mains, risers, or branch piping shall have valves installed to allow isolation of branch piping.
- E. Install globe, ball, or butterfly valves for throttling, bypass, or manual flow control services.
- F. Provide spring loaded check valves on discharge of water pumps.
- G. Provide plug valves in gas systems for shut-off service. Provide removable or fixed handle for each plug valve.
- H. Provide flow controls in water recirculating systems where indicated.

3.5 INSTALLATION OF INSERTS

- A. Install in accordance with manufacturer's instructions.
- B. Provide inserts for placement in concrete formwork.
- C. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- D. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- E. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

- F. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut flush with top of slab.

3.6 PIPE HANGERS AND SUPPORTS

- A. Support horizontal piping as scheduled.
- B. Install hangers to provide minimum ½ inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Use hangers with 1½ inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. Provide copper plated hangers and supports for copper piping.
- J. Design hangers for pipe movement without disengagement of supported pipe.
- K. Prime coat and finish paint exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed. Hangers and supports located in mechanical spaces are considered exposed.

3.7 ERECTION TOLERANCES

- A. Establish invert elevations, slopes for drainage to minimum 1/8 inch per foot for piping 4" and larger, ¼" per foot for piping 3" and smaller. Maintain gradients.
- B. Slope water piping and arrange to drain at low points.

3.8 SERVICE CONNECTIONS

- A. Provide new sanitary and storm sewer services. Before commencing work, check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing. Contractor shall pay all fees, cost, etc. to local authorities for tap-ins, inspections, etc. as required.
- B. Provide new water service complete with reduced pressure backflow preventer, double check valve assembly or water meter with by-pass valves as required by the local authorities.

- C. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Caulk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.
- D. Contractor shall pay all fees, costs, etc. to local authorities for tap-ins, inspections, etc. as required.
- E. Provide new gas service complete with gas meter and regulators. Provide regulators on each line serving gravity type appliances, sized in accordance with equipment. Gas company is responsible for installation of gas service and meter. Contractor shall be responsible for all coordination, etc. Contractor shall inform the gas company of gas load for service for the building and meter size by the gas company. Owner shall pay all gas company charges for gas service directly to the gas company.

3.9 NATURAL GAS PIPING

- A. Natural gas piping located outdoors shall be prime painted and finish painted with rust prohibitor paint that includes zinc. Color shall be selected by the Architect.
- B. Natural gas piping supports shall occur on 8'-0" centers and at changes in direction.
- C. Natural gas piping installed outdoors on the roof shall be supported at a minimum of 3½" above roof level.
- D. Roof supports shall be a manufactured support similar to PHP-SS8 or equal by Miro.

3.10 POLYETHYLENE ENCASEMENT

- A. Encase Ductile Iron piping in polyethylene where indicated on drawings to prevent contact with surrounding backfill material.
- B. Install in accordance with AWWA C105, Method A.
- C. Terminate encasement 3 to 6 inches above ground where pipe is exposed.

3.11 CONCRETE THRUST RESTRAINT

- A. Provide valves, tees, bends, caps, plugs and dead ends with concrete thrust blocks as indicated on drawings.
- B. Pour concrete thrust blocks against undisturbed earth. Locate thrust blocks at each elbow or change of pipe direction to resist resultant force and so pipe and fitting joints will be accessible for repair.
- C. Do not encase fitting joints and flanges.

END OF SECTION

MAI: 2024-9508

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 contractors 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 warranty 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 $\frac{1}{2}$ Hp. or larger shall be three phase; motors under $\frac{1}{2}$ 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 EXCAVATION AND BACKFILLING

- A. Furnish all excavation, backfilling and removal of excess dirt to accomplish installation of Division 23 mechanical work unless otherwise noted on drawings.
- B. All excavation shall be by open cut from the surface. Contractor shall determine whether excavation shall be by machine or by hand except where existing utilities may be located where excavation shall be by hand. Contractor shall be responsible for all damage to existing facilities and services. Excavation shall be to a depth of at least 6" to allow granular bedding below pipe or duct.
- C. If for any reason the work is suspended, the contractor shall properly protect the excavation and leave the areas unobstructed.
- D. Trench width shall allow sufficient width at centerline of pipe to allow at all times a first class construction/installation method but in no case should be less than 12" larger than the nominal pipe or duct size. This shall especially be true in areas that joints must be connected. Joint holes may have to be made with overhanging sides to make installation safe for workmen.

- E. The excavation shall be at all times finished and backfilled to the required grade after completion and approval of work. Not more than 100 feet of trench shall be excavated and open unless written approval is given by the Architect/Engineer.
- F. The subgrade shall be 4" to 6" below the pipe of granular bedding graded and tamped by hand or mechanical means to the exact elevation required at the bottom of the pipe. Granular materials shall be approved fine aggregate meeting MDOT #2NS specifications. This material shall pass a ½" sieve but will be retained on a #4 sieve. If poor soil conditions exist which will not give proper support to the pipe, duct or structure, furnish granular fill as required to remedy this situation and give proper support.
- G. Furnish and install properly sloped sheet piling, shored and braced in areas that the soil requires this to maintain a proper excavation and prevent any movement of earth which could in any way damage the work under construction. When removing the sheeting and bracing, special care should be taken to prevent any caving of the sides of the excavation and injury to the completed work or adjacent property.
- H. Take all necessary action to keep trenches and other excavation areas free from water at all times. Use such methods as pumping, ditching, well pointing, etc. to prevent water in trench or excavation. Dewatering of trench shall have constant supervision.
- I. Backfill excavation and trenches with approved granular material around sides of pipe and at least 12 inches above the top of the pipe laid not more than in 6 inch layers that are thoroughly tamped to 95% of its maximum density. There shall be no backfilling by any mechanical means until the granular material has been firmly tamped around the entire pipe to 12 inches above the pipe. All material used for backfilling shall be approved by the Architect/Engineer. Wherever trenching crosses walks or roadways or isolated inside of building, backfill top 6'-0" of trench with sand or bank run gravel in layers not to exceed 6 inches in depth and carefully compact by hand or machine. Do not backfill with frozen materials.
- J. No piping shall be covered until it has been tested, inspected and approved. Upon completion of backfilling, grade shall be restored in indicated elevation and left in reasonable condition for finish grade by others unless otherwise noted on drawings.
- K. Before final acceptance of work, all disturbed streets, drives, curbs, walks, parking areas, etc. shall be paved, graveled or other to as near their original condition as possible. All unused excavated material shall be removed from site if directed by the Architect/Engineer.

1.33 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.

1.34 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.

1.35 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.

1.36 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.

1.37 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.

1.38 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, BA91, 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.

1.39 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.

1.40 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.

1.41 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.

1.42 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.

1.43 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.

1.44 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.

1.45 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.

1.46 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: 2024-9508

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 1/2" in height, reading fire damper, smoke damper or fire/smoke damper respectively.

END OF SECTION

MAI: 2024-9508

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

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 WATER SYSTEM PROCEDURE

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gages to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- D. Effect system balance with automatic control valves fully open to heat transfer elements.
- E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balanced point.

- F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.
- G. Advise Mechanical Contractor about additional balancing devices required to attain design conditions.
- H. If pump impellor trimming or size change is recommended to improve reliability or reduce operating cost, 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.

3.7 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. Cooling Tower:
 - a. Tower identification/number
 - b. Manufacturer
 - c. Model number
 - d. Serial number
 - e. Rated capacity
 - f. Entering air WB temperature, specified and actual
 - g. Leaving air WB temperature, specified and actual
 - h. Ambient air DB temperature
 - i. Condenser water entering temperature
 - j. Condenser water leaving temperature
 - k. Condenser water flow rate
 - l. Fan RPM
- 11. 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
- 12. Electric Duct Heater:
 - a. Manufacturer
 - b. Identification/number
 - c. Location
 - d. Model number
 - e. Design kW
 - f. Number of stages
 - g. Phase, voltage, amperage
 - h. Test voltage (each phase)
 - i. Test amperage (each phase)

- j. Air flow, specified and actual
- k. Temperature rise, specified and actual
- 13. Air Moving Equipment:
 - a. Location
 - b. Manufacturer
 - c. Model number
 - d. Serial number
 - e. Arrangement/Class/Discharge
 - f. Air flow, specified and actual per pitot 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
- 14. 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
- 15. 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
- 16. 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
17. 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
18. Air Monitoring Station Data:
- a. Identification/location
 - b. System
 - c. Size
 - d. Area
 - e. Design velocity
 - f. Design air flow
 - g. Test velocity
 - h. Test air flow
19. Flow Measuring Station:
- a. Identification/number
 - b. Location
 - c. Size
 - d. Manufacturer
 - e. Model number
 - f. Serial number
 - g. Design Flow rate
 - h. Design pressure drop
 - i. Actual/final pressure drop
 - j. Actual/final flow rate
 - k. Station calibrated setting
20. Terminal Unit Data:
- a. Manufacturer
 - b. Type, constant, variable, single, dual duct
 - c. Identification/number
 - d. Location
 - e. Model number
 - f. Size
 - g. Minimum static pressure
 - h. Minimum design air flow
 - i. Maximum design air flow
 - j. Maximum actual air flow
 - k. Inlet static pressure
21. 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
22. Sound Level Report:
- a. Location
 - b. Octave bands-equipment off
 - c. Octave bands-equipment on
23. Vibration Test:
- a. Location of points:
 - 1) Fan bearing, drive end
 - 2) Fan bearing, opposite end
 - 3) Motor bearing, center (if applicable)
 - 4) Motor bearing, drive end
 - 5) Motor bearing, opposite end
 - 6) Casing (bottom or top)
 - 7) Casing (side)
 - 8) Duct after flexible connection (discharge)
 - 9) Duct after flexible connection (suction)
 - b. Test readings:
 - 1) Horizontal, velocity and displacement
 - 2) Vertical, velocity and displacement
 - 3) Axial, velocity and displacement
 - c. Normally acceptable readings, velocity and acceleration
 - d. Unusual conditions at time of test
 - e. Vibration source (if non-complying)

END OF SECTION

MAI: 2024-9508

SECTION 23 07 13 - EXTERNAL DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES EXTERNAL INSULATION FOR:

- A. Supply air ducts. Note: See drawings for notes on whether the supply air ductwork downstream of VAV boxes is to be insulated. If drawings internal duct insulation, delete external duct insulation downstream of the VAV box, except for spiral ductwork.

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. 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.
 - 3. 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.

4. 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".

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 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: 2024-9508

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. Downstream of volume box (when noted on drawings).
 - 2. Within 20 feet of the rooftop unit.
- B. Return Air Duct
 - 1. Within 20 feet of the rooftop unit.
- C. Exhaust Air Duct
 - 1. Within 10' of the fan.

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: 2024-9508

SECTION 23 09 00 - TEMPERATURE CONTROL SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temperature control System (TCS), utilizing direct digital controls.

The Temperature Control Contractor shall be herein referred to the TCC.

1.2 RELATED WORK

- A. Products Supplied but Not Installed Under This Section:

1. Control valves.
2. Control Actuators.

- B. Products Installed but Not Supplied Under This Section:

1. See System Description below.
2. The existing front-end controllers, equipment controllers, their present state of programming, current API & SKDs status, graphics, etc., must be field verified.

- C. Products existing or new with the Work of This Section:

NOTE: All new equipment as noted on plans must be fully integrated per this specification and Sequence of Operations.

1. Variable air volume boxes.
2. Water coil control valves (VAV boxes, AHU coils).
3. Cabinet unit heaters.
4. Exhaust fans.
5. Other HVAC systems as noted on plans.

- D. Work Required Under Other Divisions Related to This Section:

1. Power wiring to line side of equipment.
2. Provision and wiring devices relating to fire alarm system.

1.3 RELATED SECTIONS

- A. Section 23 05 00 – HVAC, 23 05 53 Identification for HVAC Piping and Equipment.

1.4 SYSTEM DESCRIPTION

- A. Scope: Furnish all labor, materials and equipment necessary for a complete and operating system matching the Owner's current system., utilizing Direct Digital Bacnet Protocol Controls as noted on the drawings and as described herein. Drawings are diagrammatic only. All controllers furnished in this section shall communicate on a peer-to-peer bus over an open protocol bus (Examples: BACnet, Modbus).

1. The intent of this specification is to provide a fully, non-proprietary, TCS comprised of non-proprietary equipment controller and front-end controller.
2. System architecture shall fully support a multi-vendor environment and be able to integrate third party systems via existing vendor protocols including, as a minimum, BACnet and MODBUS and LonTalk. All new controllers shall be

Bacnet protocol.

3. System architecture shall provide secure Web access using any of the current versions of Microsoft Internet Explorer, Mozilla Firefox, or Google Chrome browsers from any computer on the owner's LAN.
4. All control devices furnished with this Section shall be programmable directly from the existing system embedded toolset upon completion of this project. The use of configurable or programmable controllers that require additional software tools for post-installation maintenance shall not be acceptable.
5. Any control vendor that shall provide additional TCS server software shall be unacceptable.
6. The TCS server shall host all graphic files for the control system. All graphics and navigation schemes for this project shall match Owner's existing system.
7. The TCC shall coordinate the installation of the new software onto a virtual server provided by Owner.
 - a. The TCC shall provide written request through the Construction Manager all necessary server requests, server requirements, IP addresses, etc., as part of the approved shop drawing process.
8. Owner shall receive all Administrator level login and passwords for engineering toolset at first training session. The Owner shall have full licensing and full access rights for all network management, operating system server, engineering and programming software required for the ongoing maintenance and operation of the TCS.
9. All hardware licenses and certificates shall be stored on a local external hard drive employing encrypted "safe boot" technology. TCC shall provide external drive device.
11. To ensure quality, all products shall be provided through Honeywell Building Automation. Contact Skyler Nelson: 517-281-6029.

B. NiCS REQUIREMENTS:

1. Brand ID = Open
2. Station Compatibility In = All "*"
3. Tool Compatibility In = Open or Open "All"
4. Tool Compatibility Out = "All"

All Passwords shall be given to the Owner and shall be verified by the Engineer. THE OWNER AND CONTRACTOR MUST CREATE PASSWORD TOGETHER. NO RESETTING OR MANUFACTURER RESETTING OF PASSWORD IS AVAILABLE.

Note: It is the requirement of this specification that the hardware and software system installed by the Contractor shall be 100% accessible by any other Contractor the Owner wishes to employ for the lifespan of the system (no less than 20 years). The NiCS shall be set-up so that there is no limitation to the access, copying, and modification of programming, sequencing, coding, graphics, passwords, etc.

- C. All products of the TCS shall be provided with the following agency approvals. Verification that the approvals exist for all submitted products shall be provided on request, with the submittal package. Systems or products not currently offering the following approvals are not acceptable.

1. Federal Communications Commission (FCC), Rules and Regulations,

- Volume II -July 1986 Part 15 Class A Radio Frequency Devices.
2. FCC, Part 15, Subpart B, Class B
 3. FCC, Part 15, Subpart C
 4. FCC, Part 15, Subpart J, Class A Computing Devices.
 5. UL 504 - Industrial Control Equipment.
 6. UL 506 - Specialty Transformers.
 7. UL 910 - Test Method for Fire and Smoke Characteristics of Electrical and Optical-Fiber Cables Used in Air-Handling Spaces.
 8. UL 916 - Energy Management Systems All.
 9. UL 1449 - Transient Voltage Suppression.
 10. Standard Test for Flame Propagation Height of Electrical and Optical - Fiber Cables Installed Vertically in Shafts.
 11. EIA/ANSI 232-E - Interface Between Data Technical Equipment and Data Circuit Terminal Equipment Employing Serial Binary Data Interchange.
 12. EIA 455 - Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices.
 13. IEEE C62.41- Surge Voltages in Low-Voltage AC Power Circuits.
 14. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - a. NEMA 250 - Enclosures for Electrical Equipment.
 - b. NEMA ICS 1 - Industrial Controls and Systems.
 - c. NEMA ST 1 - Specialty Transformers.
 - d. NCSBC Compliance, Energy: Performance of control system shall meet or surpass the requirements of ASHRAE/IESNA 90.1-1999.
 - e. CE 61326.
 - f. C-Tick.
 - g. cUL.

1.5 SPECIFICATION NOMENCLATURE

- A. The term Control Contractor, Temperature Control Contractor (TCC) shall all serve as Contractor in this specification and project.
- B. Acronyms used in this specification are as follows:
 1. Actuator: Control device that opens or closes valve or damper in response to control signal.
 2. AI: Analog Input.
 3. AO: Analog Output.
 4. Analog: Continuously variable state over stated range of values.
 5. TCS: Temperature control System.
 6. DDC: Direct Digital Control.
 7. Discrete: Binary or digital state.
 8. DI: Discrete Input.
 9. DO: Discrete Output.
 10. FC: Fail Closed position of control device or actuator. Device moves to closed position on loss of control signal or energy source.
 11. FO: Fail open (position of control device or actuator). Device moves to open position on loss of control signal or energy source.
 12. GUI: Graphical User Interface.
 13. HVAC: Heating, Ventilating and Air Conditioning.

14. IDC: Interoperable Digital Controller.
15. ILC: Interoperable Lon Controller.
16. LAN: Local Area Network.
17. Modulating: Movement of a control device through an entire range of values, proportional to an infinitely variable input value.
18. Motorized: Control device with actuator.
19. NAC: Network Area Controller.
20. NC: Normally closed position of switch after control signal is removed or normally closed position of manually operated valves or dampers.
21. NO: Normally open position of switch after control signal is removed; or the open position of a controlled valve or damper after the control signal is removed; or the usual position of a manually operated valve.
22. OSS: Operating System Server, host for system graphics, alarms, trends, etc.
23. Operator: Same as actuator.
24. PC: Personal Computer.
25. Peer-to-Peer: Mode of communication between controllers in which each device connected to network has equal status and each shares its dataTCS values with all other devices connected to network.
26. P: Proportional control; control mode with continuous linear relationship between observed input signal and final controlled output element.
27. PI: Proportional-Integral control, control mode with continuous proportional output plus additional change in output TCSed on both amount and duration of change in controller variable (reset control).
28. PICS: BACnet Product Interoperability Compliance Statement.
29. PID: Proportional-Integral-Derivative control, control mode with continuous correction of final controller output element versus input signal TCSed on proportional error, its time history (reset) and rate at which it's changing (derivative).
30. Point: Analog or discrete instrument with addressable dataTCS value.
31. WAN: Wide Area Network.

1.6 SUBMITTALS

A. Shop Drawings:

1. See General Requirements and HVAC General Requirements.
2. Submit electronic, Portable Document Format (PDF), submittals to Construction Manager and Engineer for review.
3. Submit complete manufacturers shop drawings of all equipment, accessories and controls, including capacities, weights, dimensions, construction details, installation, controls, wiring diagrams, and motor data.
4. Approval of shop drawings is for general application only and is a service only and not considered as a guarantee of total compliance with or as relieving Contractor of basic responsibilities under all Contract Documents, and does not approve changes in time or cost.
5. After approval, each Contractor and Subcontractor is responsible to provide information to all other trades involved in or affected by installation of his equipment.

B. Operating and Maintenance Instruction and Manuals:

1. Each Contractor shall provide for all equipment (3) bound and indexed sets of

operating and maintenance instructions to Engineer for approval. Manual shall include a complete set of shop drawings.

2. Submit manuals prior to Substantial Completion. Final payment and release of Retainage shall follow submission of manuals.

1.7 QUALITY ASSURANCE

- A. The Contractor shall have a full service DDC office within 100 miles of the job site. This office shall be staffed with applications engineers, software engineers and field technicians. This office shall maintain parts inventory and shall have all testing and diagnostic equipment necessary to support this work, as well as staff trained in the use of this equipment.
- B. The project manager or lead installer and programmer of the project employed by the Contractor shall be available on-site, the same day within 4 hours of a requested service call.
- C. Single Source Responsibility of Supplier: The Control System Contractor shall be responsible for the complete installation and proper operation of the control system. The Control System Contractor shall exclusively be in the regular and customary business of design, installation and service of computerized temperature control systems similar in size and complexity to the system specified. The Control System Contractor shall be the manufacturer of the primary DDC system components or shall have been the authorized representative for the primary DDC components manufacturer for at least 5 years. All control panels shall be assembled by the Control System Contractor in a UL-Certified 508A panel shop.
- D. Equipment and Materials: Equipment and materials shall be cataloged products of manufacturers regularly engaged in the production and installation of HVAC control systems. Products shall be manufacturer's latest standard design and have been tested and proven in actual use.
- E. Acceptable Temperatures Controls Contractors Honeywell Building Automation. Contact Skyler Nelson: 517-281-6029.

1.8 PRE-INSTALLATION MEETINGS

- A. Coordinate with Construction Manager and/or Engineer.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Maintain integrity of shipping cartons for each piece of equipment and control device through shipping, storage and handling as required to prevent equipment damage. Store equipment and materials inside and protected from weather.

1.10 JOB CONDITIONS

- A. Cooperation with Other Trades: Coordinate the Work of this section with that of other sections to insure that the Work will be carried out in an orderly fashion. It shall be this Contractor's responsibility to check the Contract Documents for possible conflicts between his Work and that of other crafts in equipment location, pipe, duct and conduit runs, electrical outlets and fixtures, air diffusers and structural and architectural features.

- B. Special Coordination: The TCC shall provide all necessary labor, materials, integration, and programming to integrate the Fire Alarm Panel (FAP) smoke purge operation.
- C. Smoke Purge System Commissioning. The TCC shall include all necessary labor, materials, integration, modification, etc., to commission the operation of the smoke purge system with the Mechanical Contractor, Test and Balance Contractor, FAP Contractor (FAPC) and State and local inspectors.

1.11 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Approved equipment controller manufacturers and front-end controller with supervisor:
 - 1. Honeywell Building Automation
 - 2. No others shall be approved.
- B. Substitutions: Not permitted.
- C. Temperature control system manufacturers must provide a single price to the Mechanical Contractor for temperature control system equipment complete for installation, that shall not include packaging of other HVAC equipment (air handlers, roof top units, boilers, pumps, etc.).
- D. Requests for substitutions must receive written pre-approval during the bidding period by the Engineer. The equipment supplier

2.2 GENERAL

- A. The Temperature Control System (TCS) shall be comprised of a network of interoperable, stand-alone digital controllers, a network area controller, graphics and programming and other control devices for a complete system as specified herein.
- B. The installed system shall provide secure password access to all features, functions and data contained in the overall TCS.
- C. Temperature Control System Project Summary:
 - 1. A new stand-alone server (or virtual server if provided by Owner) shall be provided and configured by the Temperature Control Contractor. All new equipment, integration, and programming required for a fully operational platform must be provided by the Temperature Control Contractor.
 - 2. The temperature control contractor shall integrate the operation of the Fire Alarm Panel (FAP) into the TCS. The integration and operation of the smoke purge sequence and operation shall be approved by the Authority Having Jurisdiction.
 - 3. Commissioning of TCS operation in conjunction with the FAP and is required by Code.

2.3 OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURE

- A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system utilizing Open protocols in one open, interoperable system.
- B. The supplied computer software shall employ object-oriented technology (OOT) for representation of all data and control devices within the system. Physical connection of any BACnet control equipment, such as chillers, shall be via Ethernet or IP.
- C. All components and controllers supplied under this contract shall be true "peer-to-peer" communicating devices. Components or controllers requiring "polling" by a host to pass data shall not be acceptable.
- D. The supplied system shall incorporate the ability to access all data using HTML5 enabled browsers without requiring proprietary operator interface and configuration programs or browser plug-ins. An Open DataTCS connectivity (ODBC) or Structured Query Language (SQL) compliant server dataTCS is required for all system dataTCS parameter storage. This data shall reside on the Operating System Server located in the Facilities Office on the LAN. Systems requiring proprietary dataTCS and user interface programs shall not be acceptable.
- E. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data without unduly burdening the customer's internal Intranet network. Systems employing a "flat" single tiered architecture shall not be acceptable.
 - 1. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 5 seconds for network connected user interfaces.
 - 2. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 60 seconds for remote or dial-up connected user interfaces.

2.4 TCS SERVER HARDWARE

- A. The Temperature Control Contractor shall include all necessary memory, hard drive, display and network cards, as requested by Owner based on the following:
 - 1. Memory: 16 GB or more recommended for the Windows 64-bit version.
 - 2. Hard Drive: 256 GB minimum, more recommended depending on archiving requirements.
 - 3. Display: Video card and monitor capable of displaying 1024 x 768 pixel resolution or greater.
 - 4. Network Support: Ethernet adapter (10/100 Mb with RJ-45 connector).
 - 5. The TCC shall verify the hardware requirements and ensure enhanced TCS hardware performance capabilities are included for robust operation.
- B. The Temperature Control Contractor must include all necessary materials and labor to provide a complete installation of the TCS software onto the Owner Virtual Server.

2.5 SYSTEM NETWORK CONTROLLER (SNC)

- A. These controllers are designed to manage communications between the programmable equipment controllers (PEC), application specific controllers (ASC) and advanced unitary

controllers (AUC) which are connected to its communications trunks, manage communications between itself and other system network controllers (SNC) and with any operator workstations (OWS) that are part of the TCS, and perform control and operating strategies for the system TCSed on information from any controller connected to the TCS.

- B. The controllers shall be fully programmable to meet the unique requirements of the facility it shall control.
- C. The controllers shall be capable of peer-to-peer communications with other SNC's and with any OWS connected to the TCS, whether the OWS is directly connected, connected via cellular modem or connected via the Internet.
- D. The communication protocols utilized for peer-to-peer communications between SNC's will be BACnet TCP/IP and SNMP. Use of a proprietary communication protocol for peer-to-peer communications between SNC's is not allowed.
- E. The SNC shall employ a device count capacity license model that supports expansion capabilities.
- F. The SNC shall be enabled to support and shall be licensed with the following Open protocol drivers (client and server) by default:
 - 1. BACnet
 - 2. Lon
 - 3. MODBUS
 - 4. SNMP
 - 5. KNX
- G. The SNC shall be capable of executing application control programs to provide:
 - 1. Calendar functions.
 - 2. Scheduling.
 - 3. Trending.
 - 4. Alarm monitoring and routing.
 - 5. Time synchronization.
 - 6. Integration of LonWorks, BACnet, and MODBUS controller data.
 - 7. Network management functions for all SNC, PEC and ASC TCSed devices.
- H. The SNC shall provide the following hardware features as a minimum:
 - 1. Two 10/100 Mbps Ethernet ports.
 - 2. Two Isolated RS-485 ports with biasing switches.
 - 3. 1 GB RAM
 - 4. 4 GB Flash Total Storage / 2 GB User Storage
 - 5. Wi-Fi (Client or WAP)
 - 6. USB Flash Drive
 - 7. High Speed Field Bus Expansion
 - 8. -20-60°C Ambient Operating Temperature
 - 9. Integrated 24 VAC/DC Global Power Supply
 - 10. MicroSD Memory Card Employing Encrypted Safe Boot Technology
- I. The SNC shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 16 simultaneous users.

- J. The SNC shall provide alarm recognition, storage, routing, management and analysis to supplement distributed capabilities of equipment or application specific controllers.
- K. The SNC shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via cellular modem, or wide-area network.
 - 1. Alarm generation shall be selectable for annunciation type and acknowledgement requirements including but not limited to:
 - a. Alarm.
 - b. Return to normal.
 - c. To default.
 - 2. Alarms shall be annunciated in any of the following manners as defined by the user:
 - a. Screen message text.
 - b. Email of complete alarm message to multiple recipients.
 - c. Graphics with flashing alarm object(s).
 - 3. The following shall be recorded by the SNC for each alarm (at a minimum):
 - a. Time and date.
 - b. Equipment (air handler #, access way, etc.).
 - c. Acknowledge time, date, and user who issued acknowledgement.
- L. Programming software and all controller "Setup Wizards" shall be embedded into the SNC.
- M. The SNC shall support the following security functions.
 - 1. Module code signing to verify the author of programming tool and confirm that the code has not been altered or corrupted.
 - 2. Role-TCSed Access Control (RBAC) for managing user roles and permissions.
 - 3. Require users to use strong credentials.
 - 4. Data in Motion and Sensitive Data at Rest be encrypted.
 - 5. LDAP and Kerberos integration of access management.
- N. The SNC shall support the following data modeling structures to utilize Search; Hierarchy; Template; and Permission functionality:
 - 1. Metadata: Descriptive tags to define the structure of properties.
 - 2. Tagging: Process to apply metadata to components
 - 3. Tag Dictionary
- O. The SNC shall employ template functionality. Templates are a containerized set of configured data tags, graphics, histories, alarms... that are set to be deployed as a unit TCSed upon manufacturer's controller and relationships. All lower level communicating controllers (PEC, AUC, AVAV, VFD...) shall have an associated template file for reuse on future project additions.
- P. The SNC shall be provided with a 5 Year Software Maintenance license. Labor to implement not included.

2.6 PROGRAMMABLE EQUIPMENT CONTROLLER (PEC)

- A. All new HVAC control equipment controllers shall be accomplished using Native BACnet TCSed devices. Where the existing application has a LonMark profile or BTL Listed PICS defined, LonMark may be used. Where LonMark devices are not available for a particular

application, devices TCSeD on LonWorks shall be acceptable. For each LonWorks device that does not have LonMark certification, the device supplier shall provide an XIF file for the device. The controller platform shall provide options and advanced system functions, programmable and configurable, that allow standard and customizable control solutions required in executing the "Sequence of Operation".

- B. All PECs shall be application programmable and shall at all times maintain their certification. All control sequences within or programmed into the PEC shall be stored in non-volatile memory, which is not dependent upon the presence of a battery to be retained.
- C. The PEC shall provide LED indication of communication and controller performance to the technician, without cover removal.
- D. The PEC shall not require any external configuration tool or programming tool. All configuration and programming tasks shall be accomplished and accessible from within the environment.
- E. The following integral and remote Inputs/Outputs shall be supported per each PEC:
 - 1. Eight integral dry contact digital inputs.
 - 2. Any two digital inputs may be configured as pulse counters with a maximum pulse read rate of 15 Hz.
 - 3. Eight integral analog inputs (configurable as 0-10V, 0-10,000 ohm or, 20K NTC).
 - 4. Six integral 4-20 ma analog outputs.
 - 5. Eight integral 24 Vac Triac digital outputs, configurable as maintained or floating motor control outputs.
 - 6. One integral 20 Vdc, 65-mA power supply for auxiliary devices.
 - 7. If a 20 Vdc 65-mA power supply terminal is not integral to the PEC, provide at each PEC a separate, fully isolated, enclosed, current limited and regulated UL listed auxiliary power supply for power to auxiliary devices.
- F. Each PEC shall have expansion ability to support additional I/O requirements through the use of remote input/output modules.
- G. PEC Controllers shall support at minimum the following control techniques:
 - 1. General-purpose control loops that can incorporate Demand Limit Control strategies, Set point reset, adaptive intelligent recovery, and time of day bypass.
 - 2. General-purpose, non-linear control loops.
 - 3. Start/stop Loops.
 - 4. If/Then/Else logic loops.
 - 5. Math Function loops (MIN, MAX, AVG, SUM, SUB, SQRT, MUL, DIV, ENTHALPY).

2.7 ADVANCED UNITARY CONTROLLER (AUC)

- A. The advanced unitary controller (AUC) platform shall be designed specifically to control HVAC - ventilation, filtration, heating, cooling, humidification, and distribution. Equipment includes: constant volume air handlers, VAV air handlers, packaged RTU, boilers, PTACs, pumps, fin-tube radiation. The control shall use LonMark or BACnet TCSeD devices where the application has a LonMark profile or BTL Listed PICS defined. Where LonMark devices are not available for a particular application, devices TCSeD on

LonWorks shall be acceptable. For each LonWorks device that does not have LonMark certification, the device supplier shall provide an XIF file for the device. The controller platform shall provide options and advanced system functions, programmable and configurable that allow standard and customizable control solutions required in executing the "Sequence of Operation".

B. Minimum Requirements:

1. The controller shall be fully programmable with full functionality on any brand platform.
 - a. Support downloads to the controller from any brand of platform.
 - b. Support uploads from the controller to any brand of platform.
 - c. Support simulation/debug mode of the controller.
 - d. Maintain native GUI.
 - e. Native function-block programming software and all controller "Setup Wizards" shall be embedded within the environment.
2. The controller shall be capable of either integrating with other devices or stand-alone operation.
3. The controller shall have two microprocessors. The Host processor contains on-chip FLASH program memory, FLASH information memory, and RAM to run the main HVAC application. The second processor for network communications. Controller memory minimum requirements include:
 - a. FLASH Memory Capacity: 60 Kilobytes with 8 Kilobytes for application program.
 - b. FLASH Memory settings retained for ten years.
 - c. RAM: 2 Kilobytes.
4. The controller shall have an internal time clock with the ability to automatically revert from a master time clock on failure.
 - a. Operating Range: 24 hour, 365 day, multi-year calendar including day of week and configuration for automatic day-light savings time adjustment to occur on configured start and stop dates.
 - b. Accuracy: ± 1 minute per month at 77 degrees F (25 degrees C).
 - c. Power Failure Backup: 24 hours at 32 degrees to 122 degrees F (0 degrees to 50 degrees C).
5. The controller shall have Significant Event Notification, Periodic Update capability, and Failure Detect when network inputs fail to be detected within their configurable time frame.
6. The controller shall have an internal DC power supply to power external sensors.
 - a. Power Output: 20 VDC $\pm 10\%$ at 75 mA.
7. The controller shall have a visual indication (LED) of the status of the device:
 - a. Controller operating normally.
 - b. Controller in process of download.
 - c. Controller in manual mode under control of software tool.
 - d. Controller lost its configuration.
 - e. No power to controller, low voltage, or controller damage.
 - f. Processor and/or controller are not operating.
8. The minimum controller Environmental ratings.
 - a. Operating Temperature Ambient Rating: -40 degrees to 150 degrees F (-40 degrees to 65.5 degrees C).
 - b. Storage Temperature Ambient Rating: -40 degrees to 150 degrees F (-40 degrees to 65.5 degrees C).

- c. Relative Humidity: 5% to 95% non-condensing.
9. The controller shall have the additional approval requirements, listings, and approvals:
 - a. UL/cUL (E87741) listed under UL916 (Standard for Open Energy Management Equipment) with plenum rating.
 - b. CSA (LR95329-3) Listed.
 - c. Meets FCC Part 15, Subpart B, Class B (radiated emissions) requirements.
 - d. Meets Canadian standard C108.8 (radiated emissions).
 - e. Conforms requirements European Consortium standard EN 61000-6-1; 2001 (EU Immunity).
 - f. Conforms requirements European Consortium standard EN 61000-6-3; 2001 (EU Emission).
10. The controller housing shall be UL plenum rated mounting to either a panel or DIN rail (standard EN50022; 7.5mm x 35mm).
11. The controller shall have a mix of digital inputs (DI), digital Triac outputs (DO), analog outputs (AO), and universal inputs (UI).
 - a. Analog outputs (AO) shall be capable of being configured as digital outputs (DO).
 - b. Input and Output wiring terminal strips shall be removable from the controller without disconnecting wiring.
 - c. Input and Output wiring terminals shall be designated with color coded labels.
 - d. Universal inputs shall be capable of being configured as binary inputs, resistive inputs, voltage inputs (0-10 VDC), or current inputs (4-20 mA).
12. The controller shall provide "continuous" automated loop tuning with an Adaptive Integral Algorithm Control Loop.
13. The controller platform shall have standard HVAC application programs that are modifiable to support both the traditional and specialized "sequence of operations" as outlined in Section 4.
 - a. Discharge air control and low limit.
 - b. Pressure-dependent dual duct without flow mixing.
 - c. Variable air volume with return flow tracking.
 - d. Economizer with differential enthalpy.
 - e. Minimum airflow coordinated with CO2.
 - f. Unit ventilator cycle (1, 2, 3) 2-pipe.
 - g. Unit ventilator cycle (1, 2, 3) 2-pipe with face/bypass.
 - h. Unit ventilator cycle (1, 2, 3) 4-pipe.
 - i. Unit ventilator cycle (1, 2, 3) 4-pipe with EOC valve.

2.8 OTHER CONTROL SYSTEM HARDWARE

- A. Motorized control dampers that will not be integral to the equipment shall be furnished by the Control System Contractor. Control damper frames shall be constructed of galvanized steel, formed into channels and welded or riveted. Dampers shall be galvanized, with nylon bearings. Blade edge seals shall be vinyl or neoprene. Blade edge and tip seals shall be included for all dampers. Blades shall be 16-gauge minimum and 6 inches wide maximum and frame shall be of welded channel iron. Damper leakage shall not exceed 10 CFM per square foot, at 1.5 inches water gauge static pressure.

- B. Control damper actuators shall be furnished by the Control System Contractor. Two-position or proportional electric actuators shall be direct-mount type sized to provide a minimum of 5 in-lb torque per square foot of damper area. Damper actuators shall be spring return type. Operators shall be heavy-duty electronic type for positioning automatic dampers in response to a control signal. Motor shall be of sufficient size to operate damper positively and smoothly to obtain correct sequence as indicated. All applications requiring proportional operation shall utilize truly proportional electric actuators. Honeywell is TCSis of design.
- C. Control Valves: Control valves shall be 2-way or 3-way pattern as shown and constructed for tight shutoff at the pump shut-off head or steam relief valve pressure. Control valves shall operate satisfactorily against system pressures and differentials. Two-position valves shall be 'line' size. Proportional control valves shall be sized for a maximum pressure drop of 5.0 psi at rated flow (unless otherwise noted or scheduled on the drawings). Valves with sizes up to and including 2 inches (51 mm) shall be "screwed" configuration and 2-1/2 inches (63.5 mm) and larger valves shall be "flanged" configuration. All control valves, including terminal unit valves, less than 2 inches (51 mm) shall be globe valves. Electrically-actuated control valves shall include spring return type actuators sized for tight shut-off against system pressures (as specified above) and, when specified, shall be furnished with integral switches for indication of valve position (open-closed). Pneumatic actuators for valves, when utilized, shall be sized for tight shut-off against system pressures (as specified above). Honeywell is TCSis of design.
- D. Control Valve Actuators: Actuators for VAV terminal unit heating coils shall be "drive-open; drive-closed" type. All actuators shall have inherent current limiting motor protection. Valve actuators shall be 24-volt, electronic type, modulating or two-position as required for the correct operating sequence. Actuators on valves needing 'fail-safe' operation shall have spring return to Normal position. Modulating valves shall be positive positioning in response to the signal. All valve actuators shall be UL listed. Honeywell is TCSis of design.
- E. All control valves 2-1/2 inches (63.5 mm) or larger shall have position indication. All hot water control valves shall be Normally-Open arrangement; all chilled water control valves shall be Normally-Closed arrangement. Honeywell is TCSis of design.
- F. Wall Mount Room Temperature sensors: Each room temperature sensor shall provide temperature indication to the digital controller, provide the capability for a software-limited occupant set point adjustment (warmer-cooler slider bar or switch) and limited operation override capability. Room Temperature Sensors shall be 20,000-ohm thermistor type with a temperature range of -40 to 140 degrees F (-38 to 60 degrees C). The sensor shall be complete with a decorative cover and suitable for mounting over a standard electrical utility box. These devices shall have an accuracy of 0.5 degrees F (.024 degrees C) over the entire range. Honeywell is TCSis of design.
- G. Duct-mounted and Outside Air Temperature Sensors: 20,000-ohm thermistor temperature sensors with an accuracy of \pm 0.2 degrees C. Outside air sensors shall include an integral sun shield. Duct-mounted sensors shall have an insertion measuring probe of a length appropriate for the duct size, with a temperature range of -40 to 160 degrees F (-38 to 71 degrees C) The sensor shall include a utility box and a gasket to prevent air leakage and vibration noise. For all mixed air and preheat air applications, install bendable averaging duct sensors with a minimum 8 feet (2438 mm) long sensor

element. These devices shall have accuracy of 0.5 degrees F (.024 degrees C) over the entire range. Honeywell is TCSis of design.

- H. Humidity sensors shall be thin-film capacitive type sensor with on-board nonvolatile memory, accuracy to plus or minus two percent (2%) at 0 to 90% RH, 12 - 30 VDC input voltage, analog output (0 - 10 VDC or 4 - 20mA output). Operating range shall be 0 to 100% RH and 32 to 140 degrees F (0 to 60 degrees C). Sensors shall be selected for wall, duct or outdoor type installation as appropriate. Honeywell is TCSis of design.
- I. Carbon Dioxide Sensors (CO₂): Sensors shall utilize Non-dispersive infrared technology (N.D.I.R.), repeatable to plus or minus 20 PPM. Sensor range shall be 0 - 2000 PPM. Accuracy shall be plus or minus five percent (5%) or 75 PPM, whichever is greater. Response shall be less than one minute. Input voltage shall be 20 to 30 VAC or DC. Output shall be 0 - 10 VDC. Sensor shall be wall or duct mounted type, as appropriate for the application, housed in a high impact plastic enclosure. Honeywell is TCSis of design.
- J. Current Sensitive Switches: Solid state, split core current switch that operates when the current level (sensed by the internal current transformer) exceeds the adjustable trip point. Current switch to include an integral LED for indication of trip condition and a current level below trip set point. Honeywell is TCSis of design.
- K. Differential Analog (duct) Static Pressure Transmitters Provide a pressure transmitter with integral capacitance type sensing and solid-state circuitry. Accuracy shall be plus or minus 1% of full range; range shall be selected for the specific application. Provide zero and span adjustment capability. Device shall have integral static pickup tube. Honeywell is TCSis of design.
- L. Differential Air Pressure Switches: Provide SPDT type, UL-approved, and selected for the appropriate operating range where applied. Switches shall have adjustable set points and barbed pressure tips. Honeywell is TCSis of design.
- M. Water Flow Switches: Provide a SPST type contact switch with bronze paddle blade, sized for the actual pipe size at the location. If installed outdoors, provide a NEMA-4 enclosure. Flow switch shall be UL listed.
- N. Temperature Control Panels: Furnish temperature control panels of code gauge steel with locking doors for mounting all devices as shown. All electrical devices within a control panel shall be factory wired. Control panel shall be assembled by the TCS in a UL-Certified 508A panel shop. A complete set of 'as-built' control drawings (relating to the controls within that panel) shall be furnished within each control panel.
- O. Pipe and Duct Temperature sensing elements: 20,000-ohm thermistor temperature sensors with and accuracy of $\pm 1\%$ accuracy. Their range shall be -5 to 250 degrees F (-20 to 121 degrees C). Limited range sensors shall be acceptable provided they are capable of sensing the range expected for the point at the specified accuracy. Thermal wells with heat conductive gel shall be included. Honeywell is TCSis of design.
- P. Low Air Temperature Sensors: Provide SPST type switch, with 15 to 55 degrees F (-9 to 13 degrees C), range, vapor-charged temperature sensor. Honeywell model L482A, or approved equivalent.
- Q. Variable Frequency Drives: The variable frequency drive (VFD) shall be designed

specifically for use in Heating, Ventilation, and Air Conditioning (HVAC) applications in which speed control of the motor can be applied. The VFD, including all factory installed options, shall have UL & CSA approval. VFD's shall include communications capability with DDC TCS via built-in interface card (MODBUS or BACnet). Honeywell SmartVFD is TCSis of design.

- R. Relays: Start/stop relay model shall provide either momentary or maintained switching action as appropriate for the motor being started. All relays shall be plugged in, interchangeable, mounted on a sub TCSe and wired to numbered terminals strips. Relays installed in panels shall all be DPDT with indicating lamp. Relays installed outside of controlled devices shall be enclosed in a NEMA enclosure suitable for the location. Relays shall be labeled with UR symbol. RIB-style relays are acceptable for remote enable/disable.
- S. Emergency Stop Switches: Provide toggle-type switch with normally-closed contact. Switch shall be labeled "AIR HANDLER EMERGENCY SHUTOFF, NORMAL - OFF."
- T. Transducers: Differential pressure transducers shall be electronic with a 4-20 mA output signal compatible to the Direct Digital Controller. Wetted parts shall be stainless steel. Unit shall be designed to operate in the pressure ranges involved.
- U. Control Power Transformers: Provide step-down transformers for all DDC controllers and devices as required. Transformers shall be sized for the load, but shall be sized for 50 watts, minimum. Transformers shall be UL listed Class 2 type, for 120 VAC/24 VAC operation. Honeywell is TCSis of design.
- V. Line voltage protection: All DDC system control panels that are powered by 120 VAC circuits shall be provided with surge protection. This protection is in addition to any internal protection provided by the manufacturer. The protection shall meet UL, ULC 1449, IEEE C62.41B. A grounding conductor, (minimum 12 AWG), shall be brought to each control panel.

2.9 TCS SERVER & WEB BROWSER GUI - SYSTEM OVERVIEW

- A. The TCC Contractor shall provide system software TCS based on server/thin-client architecture, designed around the open standards of web technology. The TCS server shall communicate using Ethernet and TCP. Server shall be accessed using a web browser over Owner intranet and remotely over the Internet.
- B. The intent of the thin-client architecture is to provide the operator(s) complete access to the TCS system via a web browser. The thin-client web browser Graphical User Interface (GUI) shall be browser and operating system agnostic, meaning it will support HTML5 enabled browsers without requiring proprietary operator interface and configuration programs or browser plug-ins. Microsoft, Firefox, and Chrome browsers (current released versions), and Windows as well as non-Window operating systems.
- C. The TCS server software shall support at least the following server platforms (Windows 7, Windows 10). The TCS server software shall be developed and tested by the manufacturer of the system stand-alone controllers and network controllers/routers.
- D. The web browser GUI shall provide a completely interactive user interface and shall provide a HTML5 experience that supports the following features as a minimum:

1. Trending.
 2. Scheduling.
 3. Electrical demand limiting.
 4. Duty Cycling.
 5. Downloading Memory to field devices.
 6. Real time 'live' Graphic Programs.
 7. Tree Navigation.
 8. Parameter change of properties.
 9. Set point adjustments.
 10. Alarm / event information.
 11. Configuration of operators.
 12. Execution of global commands.
 13. Add, delete, and modify graphics and displayed data.
- E. Software Components: All software shall be the most current version. All software components of the TCS system software shall be provided and installed as part of this project. TCS software components shall include:
1. Server Software, DataTCSe and Web Browser Graphical User Interface.
 2. 5 Year Software Maintenance license. Labor to implement not included.
 3. Embedded System Configuration Utilities for future modifications to the system and controllers.
 4. Embedded Graphical Programming Tools.
 5. Embedded Direct Digital Control software.
 6. Embedded Application Software.
- F. TCS Server DataTCSe: The TCS server software shall utilize a Java DataTCSe Connectivity (JDBC) compatible dataTCSe such as: MS SQL 8.0, Oracle 8i or IBM DB2. TCS systems written to Non -Standard and/or Proprietary dataTCSeS are NOT acceptable.
- G. Thin Client - Web Browser TCSed: The GUI shall be thin client or browser TCSed and shall meet the following criteria:
1. Web Browser's for PC's: Only the current released browser (Explorer/Firefox/Chrome) will be required as the GUI and a valid connection to the server network. No installation of any custom software shall be required on the operator's GUI workstation/client. Connection shall be over an intranet or the Internet.
 2. Secure Socket Layers: Communication between the Web Browser GUI and TCS server shall offer encryption using 128-bit encryption technology within Secure Socket Layers (SSL). Communication protocol shall be Hyper-Text Transfer Protocol (HTTP).

2.10 WEB BROWSER GRAPHICAL USER INTERFACE

- A. Web Browser Navigation: The Thin Client web browser GUI shall provide a comprehensive user interface. Using a collection of web pages, it shall be constructed to "feel" like a single application, and provide a complete and intuitive mouse/menu driven operator interface. It shall be possible to navigate through the system using a web browser to accomplish requirements of this specification. The Web Browser GUI shall (as a minimum) provide for navigation, and for display of animated graphics, schedules, alarms/events, live graphic programs, active graphic set point controls, configuration

menus for operator access, reports and reporting actions for events.

- B. Login: On launching the web browser and selecting the appropriate domain name or IP address, the operator shall be presented with a login page that will require a login name and strong password. Navigation in the system shall be dependent on the operator's role-TCSed application control privileges.
- C. Navigation: Navigation through the GUI shall be accomplished by clicking on the appropriate level of a navigation tree (consisting of an expandable and collapsible tree control like Microsoft's Explorer program) and/or by selecting dynamic links to other system graphics. Both the navigation tree and action pane shall be displayed simultaneously, enabling the operator to select a specific system or equipment and view the corresponding graphic. The navigation tree shall as a minimum provide the following views: Geographic, Network, Groups and Configuration.
 - 1. Geographic View shall display a logical geographic hierarchy of the system including: cities, sites, buildings, building systems, floors, equipment and objects.
 - 2. Groups View shall display Scheduled Groups and custom reports.
 - 3. Configuration View shall display all the configuration categories (Operators, Schedule, Event, Reporting and Roles).
- D. Action Pane: The Action Pane shall provide several functional views for each subsystem specified. A functional view shall be accessed by clicking on the corresponding button:
 - 1. Graphics: Using graphical format suitable for display in a web browser, graphics shall include aerial building/campus views, color building floor-plans, equipment drawings, active graphic set point controls, web content and other valid HTML elements. The data on each graphic page shall automatically refresh.
 - 2. Dashboards: User customizable data using drag and drop HTML5 elements. Shall include Web Charts, Gauges, and other custom developed widgets for web browser. User shall have ability to save custom dashboards.
 - 3. Search: User shall have multiple options for searching data TCSed upon Tags. Associated equipment, real time data, Properties, and Trends shall be available in result.
 - 4. Properties: Shall include graphic controls and text for the following: Locking or overriding objects, demand strategies, and any other valid data required for setup. Changes made to the properties pages shall require the operator to depress an 'accept/cancel' button.
 - 5. Schedules: Shall be used to create, modify/edit and view schedules TCSed on the systems hierarchy (using the navigation tree).
 - 6. Alarms: Shall be used to view alarm information geographically (using the navigation tree), acknowledge alarms, sort alarms by category, actions and verify reporting actions.
 - 7. Charting: Shall be used to display associated trend and historical data, modify colors, date range, axis and scaling. User shall have ability to create HTML charts through web browser without utilizing chart builder. User shall be able to drag and drop single or multiple data points, including schedules, and apply status colors for analysis.
 - 8. Logic - Live Graphic Programs: Shall be used to display 'live' graphic

- programs of the control algorithm, (micro block programming) for the mechanical/electrical system selected in the navigation tree.
9. Other actions such as Print, Help, Command, and Logout shall be available via a drop-down window.
 10. Color Graphics: The Web Browser GUI shall make extensive use of color in the graphic pane to communicate information related to set points and comfort. Animated .gifs or .jpg, vector scalable, active set point graphic controls shall be used to enhance usability. Graphics tools used to create Web Browser graphics shall be non-proprietary and conform to the following TCSic criteria:
 11. Display Size: The GUI workstation software shall graphically display in a minimum of 1024 by 768 pixels 24 bit True Color.
 12. General Graphic: General area maps shall show locations of controlled buildings in relation to local landmarks.
 13. Color Floor Plans: Floor plan graphics shall show heating and cooling zones throughout the buildings in a range of colors, as selected by Owner. Provide a visual display of temperature relative to their respective set points. The colors shall be updated dynamically as a zone's actual comfort condition changes.
 14. Mechanical Components: Mechanical system graphics shall show the type of mechanical system components serving any zone through the use of a pictorial representation of components. Selected I/O points being controlled or monitored for each piece of equipment shall be displayed with the appropriate engineering units. Animation shall be used for rotation or moving mechanical components to enhance usability.
 15. Minimum System Color Graphics: Color graphics shall be selected and displayed via a web browser for the following:
 - a. Each piece of equipment monitored or controlled including each terminal unit.
 - b. Each building.
 - c. Each floor and zone controlled.
- E. Hierarchical Schedules: Utilizing the Navigation Tree displayed in the web browser GUI, an operator (with proper access credentials) shall be able to define a Normal, Holiday or Override schedule for an individual piece of equipment or room, or choose to apply a hierarchical schedule to the entire system, site or floor area. For example, Independence Day ' Holiday' for every level in the system would be created by clicking at the top of the geographic hierarchy defined in the Navigation Tree. No further operator intervention would be required and every control module in the system with would be automatically downloaded with the ' Independence Day' Holiday. All schedules that affect the system/area/equipment highlighted in the Navigation Tree shall be shown in a summary schedule table and graph.
1. Schedules: Schedules shall comply with the LonWorks and BACnet standards, (Schedule Object, Calendar Object, Weekly Schedule property and Exception Schedule property) and shall allow events to be scheduled TCSed on:
 - a. Types of schedule shall be Normal, Holiday or Override.
 - b. A specific date.
 - c. A range of dates.
 - d. Any combination of Month of Year (1-12, any), Week of Month (1-5, last, any), Day of Week (M-Sun, Any).

- e. Wildcard (example, allow combinations like second Tuesday of every month).
 2. Schedule Categories: The system shall allow operators to define and edit scheduling categories (different types of "things" to be scheduled; for example, lighting, HVAC occupancy, etc.). The categories shall include: name, description, icon (to display in the hierarchy tree when icon option is selected) and type of value to be scheduled.
 3. Schedule Groups: In addition to hierarchical scheduling, operators shall be able to define functional Schedule Groups, comprised of an arbitrary group of areas/rooms/equipment scattered throughout the facility and site. For example, the operator shall be able to define an ' individual tenant' group - who may occupy different areas within a building or buildings. Schedules applied to the ' tenant group' shall automatically be downloaded to control modules affecting spaces occupied by the ' tenant group'.
 4. Intelligent Scheduling: The control system shall be intelligent enough to automatically turn on any supporting equipment needed to control the environment in an occupied space. If the operator schedules an individual room in a VAV system for occupancy, for example, the control logic shall automatically turn on the VAV air handling unit, chiller, boiler and/or any other equipment required to maintain the specified comfort and environmental conditions within the room.
 5. Partial Day Exceptions: Schedule events shall be able to accommodate a time range specified by the operator (ex: board meeting from 6 pm to 9 pm overrides Normal schedule for conference room).
 6. Schedule Summary Graph: The schedule summary graph shall clearly show Normal versus Holiday versus Override Schedules and the net operating schedule that results from all contributing schedules. Note: In case of priority conflict between schedules at the different geographic hierarchy, the schedule for the more detailed geographic level shall apply.
- F. Alarms: Alarms associated with a specific system, area, or equipment selected in the Navigation Tree, shall be displayed in the Action Pane by selecting an ' Alarms' view. Alarms, and reporting actions shall have the following capabilities:
1. Alarms View: Each Alarm shall display an Alarms Category (using a different icon for each alarm category), date/time of occurrence, current status, alarm report and a bold URL link to the associated graphic for the selected system, area or equipment. The URL link shall indicate the system location, address and other pertinent information. An operator shall easily be able to sort events, edit event templates and categories, acknowledge or force a return to normal in the Events View as specified in this section.
 2. Alarm Categories: The operator shall be able to create, edit or delete alarm categories such as HVAC, Maintenance, Fire, or Generator. An icon shall be associated with each alarm category, enabling the operator to easily sort through multiple events displayed.
 3. Alarm Templates: Alarm template shall define different types of alarms and their associated properties. As a minimum, properties shall include a reference name, verbose description, severity of alarm, acknowledgement requirements, and high/low limit and out of range information.
 4. Alarm Areas: Alarm Areas enable an operator to assign specific Alarm Categories to specific Alarm Reporting Actions. For example, it shall be possible

for an operator to assign all HVAC Maintenance Alarm on the 1st floor of a building to email the technician responsible for maintenance. The Navigation Tree shall be used to setup Alarm Areas in the Graphic Pane.

5. Alarm Time/Date Stamp: All events shall be generated at the DDC control module level and comprise the Time/Date Stamp using the standalone control module time and date.
 6. Alarm Configuration: Operators shall be able to define the type of Alarm generated per object. A 'network' view of the Navigation Tree shall expose all objects and their respective Alarm Configuration. Configuration shall include assignment of Alarm, type of Acknowledgement and notification for return to normal or fault status.
 7. Alarm Summary Counter: The view of Alarm in the Graphic Pane shall provide a numeric counter, indicating how many Alarms are active (in alarm), require acknowledgement and total number of Alarms in the TCS Server dataTCSs.
 8. Alarm Auto-Deletion: Alarms that are acknowledged and closed shall be auto-deleted from the dataTCSs and archived to a text file after an operator defined period.
 9. Alarm Reporting Actions: Alarm Reporting Actions specified shall be automatically launched (under certain conditions) after an Alarm is received by the TCS server software. Operators shall be able to easily define these Reporting Actions using the Navigation Tree and Graphic Pane through the web browser GUI. Reporting Actions shall be as follows:
 - a. Print: Alarm information shall be printed to the TCS server's PC or a networked printer.
 - b. Email: Email shall be sent via any POP3-compatible e-mail server (most Internet Service Providers use POP3). Email messages may be copied to several email accounts. Note: Email reporting action shall also be used to support alphanumeric paging services, where email servers support pagers.
 - c. File Write: The ASCII File write reporting action shall enable the operator to append operator defined alarm information to any alarm through a text file. The alarm information that is written to the file shall be completely definable by the operator. The operator may enter text or attach other data point information (such as AHU discharge temperature and fan condition upon a high room temperature alarm).
 - d. Write Property: The write property reporting action updates a property value in a hardware module.
 - e. SNMP: The Simple Network Management Protocol (SNMP) reporting action sends an SNMP trap to a network in response to receiving an alarm.
 - f. Run External Program: The Run External Program reporting action launches specified program in response to an event.
- G. Trends: As system is engineered, all points shall be enabled to trend. Trends shall both be displayed and user configurable through the Web Browser GUI. Trends shall comprise analog, digital or calculated points simultaneously. A trend log's properties shall be editable using the Navigation Tree and Graphic Pane.
1. Viewing Trends: The operator shall have the ability to view trends by using the Navigation Tree and selecting a Trends button in the Graphic Pane. The system shall allow y- and x-axis maximum ranges to be specified and shall be able to simultaneously graphically display multiple trends per graph.

2. Local Trends: Trend data shall be collected locally by Multi-Equipment/Single Equipment general-purpose controllers, and periodically uploaded to the TCS server if historical trending is enabled for the object. Trend data, including run time hours and start time date shall be retained in non-volatile module memory. Systems that rely on a gateway/router to run trends are NOT acceptable.
 3. Resolution. Sample intervals shall be as small as one second. Each trended point will have the ability to be trended at a different trend interval. When multiple points are selected for displays that have different trend intervals, the system will automatically scale the axis.
 4. Dynamic Update. Trends shall be able to dynamically update at operator-defined intervals.
 5. Zoom/Pan. It shall be possible to zoom-in on a particular section of a trend for more detailed examination and 'pan through' historical data by simply scrolling the mouse.
 6. Numeric Value Display. It shall be possible to pick any sample on a trend and have the numerical value displayed.
 7. Copy/Paste. The operator shall have the ability to pan through a historical trend and copy the data viewed to the clipboard using standard keystrokes (i.e. CTRL+C, CTRL+V).
- H. Security Access: Systems that are accessed from the web browser GUI to TCS server shall require a Login Name and Strong Password. Access to different areas of the TCS system shall be defined in terms of Role-TCSed Access Control privileges as specified:
1. Roles: Roles shall reflect the actual roles of different types of operators. Each role shall comprise a set of 'easily understood English language' privileges. Roles shall be defined in terms of View, Edit and Function Privileges.
 - a. View Privileges shall comprise: Navigation, Network, and Configuration Trees, Operators, Roles and Privileges, Alarm/Event Template and Reporting Action.
 - b. Edit Privileges shall comprise: Set point, Tuning and Logic, Manual Override, and Point Assignment Parameters.
 - c. Function Privileges shall comprise: Alarm/Event Acknowledgement, Control Module Memory Download, Upload, Schedules, Schedule Groups, Manual Commands, Print and Alarm/Event Maintenance.
 2. Geographic Assignment of Roles: Roles shall be geographically assigned using a similar expandable/collapsible navigation tree. For example, it shall be possible to assign two HVAC Technicians with similar competencies (and the same operator defined HVAC Role) to different areas of the system.

2.11 GRAPHICAL PROGRAMMING

- A. The system software shall include a Graphic Programming Language (GPL) for all DDC control algorithms resident in all control modules. Any system that does not use a drag and drop method of graphical icon programming shall not be accepted. All systems shall use a GPL method used to create a sequence of operations by assembling graphic microblocks that represent each of the commands or functions necessary to complete a control sequence. Microblocks represent common logical control devices used in conventional control systems, such as relays, switches, high signal selectors etc., in addition to the more complex DDC and energy management strategies such as PID loops and optimum start. Each microblock shall be interactive and contain the programming

necessary to execute the function of the device it represents.

- B. Graphic programming shall be performed while on screen and using a mouse; each microblock shall be selected from a microblock library and assembled with other microblocks necessary to complete the specified sequence. Microblocks are then interconnected on screen using graphic "wires," each forming a logical connection. Once assembled, each logical grouping of microblocks and their interconnecting wires then forms a graphic function block which may be used to control any piece of equipment with a similar point configuration and sequence of operation.
- C. Graphic Sequence: The clarity of the graphic sequence shall be such that the operator has the ability to verify that system programming meets the specifications, without having to learn or interpret a manufacturer's unique programming language. The graphic programming shall be self-documenting and provide the operator with an understandable and exact representation of each sequence of operation.
- D. GPL Capabilities: The following is a minimum definition of the capabilities of the Graphic Programming software:
 - 1. Function Block (FB): Shall be a collection of points, microblocks and wires which have been connected together for the specific purpose of controlling a piece of HVAC equipment or a single mechanical system.
 - 2. Logical I/O: Input/Output points shall interface with the control modules in order to read various signals and/or values or to transmit signal or values to controlled devices.
 - 3. Microblocks: Shall be software devices that are represented graphically and may be connected together to perform a specified sequence. A library of microblocks shall be submitted with the control contractors bid.
 - 4. Wires: Shall be Graphical elements used to form logical connections between microblocks and between logical I/O.
 - 5. Reference Labels: Labels shall be similar to wires in that they are used to form logical connections between two points. Labels shall form a connection by reference instead of a visual connection, i.e. two points labeled 'A' on a drawing are logically connected even though there is no wire between them.
 - 6. Parameter: A parameter shall be a value that may be tied to the input of a microblock.
 - 7. Properties: Dialog boxes shall appear after a microblock has been inserted which has editable parameters associated with it. Default parameter dialog boxes shall contain various editable and non-editable fields, and shall contain 'push buttons' for the purpose of selecting default parameter settings.
 - 8. Icon: An icon shall be graphic representation of a software program. Each graphic microblock has an icon associated with it that graphically describes its function.
 - 9. Menu-bar Icon: Shall be an icon that is displayed on the menu bar on the GPL screen, which represents its associated graphic microblock.
 - 10. Live Graphical Programs: The Graphic Programming software shall support a 'live' mode, where all input/output data, calculated data and set points shall be displayed in a 'live' real-time mode.

2.12 LONWORKS NETWORK MANAGEMENT

- A. BACnet shall be the primary protocol used. Systems requiring the use of third-party LonWorks network management tools shall not be accepted.
- B. Network management shall include the following services: device identification, device

installation, device configuration, device diagnostics, device maintenance and network variable binding.

- C. The Network configuration tool shall also provide diagnostics to identify devices on the network, to reset devices and to view health and status counters within devices.
- D. These tools shall provide the ability to "learn" an existing LonWorks network, regardless of what network management tool(s) were used to install the existing network, so that existing LonWorks devices and newly added devices are part of a single network management dataTCSe.
- E. The network management dataTCSe shall be resident in the Network Area Controller (NAC), ensuring that anyone with proper authorization has access to the network management dataTCSe at all times. Systems employing network management dataTCSe that are not resident, at all times and within the control system shall not be accepted.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. The temperature control contractor shall coordinate all work with Owner,
- D. Technical Services (IT) Department. Coordinate requirement for virtual network, IP addresses, and VPN. TCC shall provide all requested hardware, firmware, software, and programming requested by the Owner.

3.3 GENERAL

- A. Install system and materials in accordance with manufacturer's instructions, and as detailed on the project drawing set.
- B. Line and low voltage electrical connections to control equipment shown specified or shown on the control diagrams shall be furnished and installed by the Control System Contractor in accordance with these specifications.
- C. Equipment furnished by the Mechanical Contractor that is normally wired before installation shall be furnished completely wired. Control wiring normally performed in the field will be furnished and installed by the Control System Contractor.
- D. All control devices mounted on the face of control panels shall be clearly identified as to

function and system served with permanently engraved phenolic labels.

3.4 WIRING

- A. All electrical control wiring to the control panels shall be the responsibility of the Control System Contractor.
- B. All wiring shall be in accordance with the Project Electrical Specifications (Division 16), the National Electrical Code and any applicable local codes. All control wiring shall be installed in raceways.
- C. Excess wire shall not be looped or coiled in the controller cabinet.
- D. Incorporate electrical noise suppression techniques in relay control circuits.
- E. There shall be no drilling on the controller cabinet after the controls are mounted inside.
- F. Careful stripping of wire while inside the cabinet is required to ensure that no wire strand fragments land on circuit boards.
- G. Use manufacturer-specified wire for all network connections.
- H. Use approved optical isolation and lightning protection when penetrating building envelope.
- I. Read installation instructions carefully. Any unavoidable deviations shall be approved by owner's rep prior to installation.

3.5 ACCEPTANCE TESTING

- A. Upon completion of the installation, the Control System Contractor shall load all system software and start-up the system. The Control System Contractor shall perform all necessary calibration, testing and de-bugging and perform all required operational checks to insure that the system is functioning in full accordance with these specifications.
- B. The Control System Contractor shall perform tests to verify proper performance of components, routines and points. Repeat tests until proper performance results. This testing shall include a point-by-point log to validate 100% of the input and output points of the DDC system operation.
- C. System Acceptance: Satisfactory completion is when the Control System Contractor has performed successfully all the required testing to show performance compliance with the requirements of the Contract Documents to the satisfaction of the Owner's Representative. System acceptance shall be contingent upon completion and review of all corrected deficiencies.
- D. The Third-party temperature control system commissioning agent will provide a written commissioning report.
- E. The TCC shall provide all necessary labor and materials required to meet the recommendations of the commissioning agent prior to system acceptance, project close-out, and release of retainage.

- F. Final written acceptance of the TCS shall be provided by the Owner.

3.6 OPERATOR TRAINING

- A. During system commissioning and at such time acceptable performance of the Control System hardware and software has been established, the Control System Contractor shall provide on-site operator instruction to the owner's operating personnel. Operator instruction shall be done during normal working hours and shall be performed by a competent representative familiar with the system hardware, software and accessories.
- B. The Control System Contractor shall provide 32 total hours of comprehensive training in multiple sessions for system orientation, product maintenance and troubleshooting, programming and engineering. These classes are to be spread out during the 1st year warranty period. The first class starting after final commissioning and the last class is to be in the last month of 1-year warranty period.

3.7 WARRANTY PERIOD SERVICES

- A. Equipment, materials and workmanship incorporated into the work shall be warranted for a period of one year from the time of system acceptance.
- B. Within this period, upon notice by the Owner, any defects in the TCS due to faulty materials, methods of installation or workmanship shall be promptly repaired or replaced by the Control System Contractor at no expense to the Owner.
- C. Maintenance of Computer Software Programs: The Control System Contractor shall maintain all software during the standard first year warranty period. In addition, all factory or sub-vendor upgrades to software during the first year warranty period shall be added to the systems, when they become available, at no additional cost. In addition to first year standard warranty, software provided by Control System Contractor shall come with a 5 Year Software Maintenance license. All SNC and TCS Servers are included in this coverage. Labor to implement upgrades in years two through five are not included in standard warranty.
- D. Maintenance of Control Hardware: The Control System Contractor shall inspect, repair, replace, adjust, and calibrate, as required, the controllers, control devices and associated peripheral units during the warranty period. The Control System Contractor shall then furnish a report describing the status of the equipment, problem areas (if any) noticed during service work, and description of the corrective actions taken. The report shall clearly certify that all hardware is functioning correctly.
- E. Service Period: Calls for service by the Owner shall be honored within 24 hours and are not to be considered as part of routine maintenance.
- F. Service Documentation: A copy of the service report associated with each owner-initiated service call shall be provided to the owner.

3.8 WARRANTY ACCESS

- A. The Owner shall grant to the Temperature Control System Contractor reasonable access to the TCS during the warranty period. Remote access to the TCS (for the purpose of diagnostics and troubleshooting, via the Internet, during the warranty period) may be

allowed.

3.9 OPERATION & MAINTENANCE MANUALS

- A. See General Requirements. O&M manuals shall include the following elements, as a minimum:
 - 1. As-built control drawings for all equipment.
 - 2. As-built Network Communications Diagram.
 - 3. General description and specifications for all components.
 - 4. Completed Performance Verification sheets.
 - 5. Completed Controller Checkout/Calibration Sheets.

3.10 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 23 25 00 - HVAC SYSTEMS TESTING, CLEANING, WATER TREATMENT & STARTUP

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Testing of piping systems.
- B. Cleaning of piping systems.
- C. Chemical feeder equipment.
- D. Chemical treatment.
- E. 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 Applicable)

PART 3 - EXECUTION

3.1 HEATING HOT WATER PIPING SYSTEMS

- A. Testing
 - 1. Before equipment is connected, hydrostatically test at 1.5 times the maximum system pressure, but not less than 100 psig in excess of the working pressure for four hours. This pressure to be on piping only, not equipment.
- B. Cleaning and Flushing
 - 1. Systems shall be operational, filled, started and vented prior to cleaning. Use water meter and record capacity in system.
 - 2. Place terminal control valves in open position during cleaning.
 - 3. Verify that electric power is available and of the correct characteristics.
 - 4. Install cleaning chemicals. Concentration shall be one pound per 100 gallons of water or as recommended by manufacturer of chemicals.
 - a. Utilize liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products.
 - b. Utilize biocide; chlorine release agents such as sodium hypochlorate or calcium hypochlorite, or micro biocides such as quarteratany ammonial compounds, tributyl tin oxide, emthlene bis (thiocyanate), or isothiazolones.
 - 5. Apply heat where circulating, slowly raising water temperature to 160°F and maintain for 12 hours minimum.
 - 6. Remove heat and circulate until water temperature is 100°F or less. Drain system as quickly as possible and refill with clean water.
 - 7. Circulate for 6 hours at design temperature, then drain. Flush with clean water for one hour. Refill with clean water and repeat until system cleaner and all material is removed. Water shall be clear upon last drain.
 - 8. Use neutralizer agents as recommended by the system cleaner supplier.
 - 9. Remove, clean and replace strainer screens.
 - 10. Inspect, remove sludge, and flush low points of piping system with clean water after cleaning process is completed. Include disassembly of components as required.
 - 11. Install sequestering agent to reduce deposits and adjust pH. Install corrosion inhibitors and conductivity enhancers. All chemical treatment shall be as

recommended by manufacturers and chemical treatment contractor. If system is to utilize a glycol water mixture, the glycol shall contain the sequestering agent and corrosion inhibitors.

- C. System Water Treatment
 - 1. Provide one bypass feeder on each system. Install isolating and drain valves and necessary piping. Install around balancing valve downstream of circulating pumps unless indicated otherwise.
 - 2. Introduce chemicals through bypass feeder when required or indicated by a test.
 - 3. Provide ¾" water coupon rack around circulating pumps with space for four test specimens.

3.6 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: 2024-9508

Freeland Schools – Elementary Cafeteria
Freeland Community School District

SYSTEMS COMPLETION CHECKLIST						
Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
Air Handling Units						
Coils	When Completed					Verify coils have been piped properly per drawings and thoroughly cleaned of all construction dust and debris.
Spring Isolators	When Completed					Verify all shipping blocking has been removed.
Duct Connectors	When Completed					Verify all duct connections to unit are complete and that flex duct connections were used.
Motorized Dampers	When Completed					Verify linkages are free to operate and temperature control operation is correct.
Control Valves	When Completed					Verify correct 2-way or 3-way valves have been installed per drawing details and temperature control operation is correct.
Duct Smoke Detector	When Completed					Verify duct smoke detectors have been installed and are operational.
Temperature Controls	When Completed					Verify all temperature control points have been installed and are operational.
Identification	When Completed					Verify AHU properly identified and labeled per specification.
Cooling Coil Condensate Drain	When Completed					Verify P-trap on drain is piped correctly with minimum depth of seal greater than total static pressure possible by AHU. Verify drain pipe extended to floor drain.
Gages and Thermometers	When Completed					Verify coil piping have gauges, thermometers and "petes plug" installed per piping details.

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

All items are to be signed off on and submitted to MacMillan Associates Inc. before a final project walk-thru by the Engineer is requested. If the Engineer discovers items incomplete and/or not in accordance with this checklist, the drawings, or the specifications, the Contractor will be backcharged for the Engineer's time and expenses.

Freeland Schools – Elementary Cafeteria
Freeland Community School District

Steam Traps	When Completed					Verify steam traps are piped with adequate “pipe drop” from coil connection to trap.
SYSTEMS COMPLETION CHECKLIST						
Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner’s Representative Signature	Remarks
		Name	Signature			
Air Handling Units, Continued						
Filters	When Completed					Verify prefilters and final filters are clean and ready for final air balance.
Supply Fans	When Completed					Verify proper rotation and operation.

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

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Freeland Schools – Elementary Cafeteria
 Freeland Community School District
**SYSTEMS COMPLETION
 CHECKLIST**

Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
Rooftop Units						
Gas Heat Exchanger	When Completed					Verify heat exchangers have been piped properly per drawings and thoroughly cleaned of all construction dust and debris.
Spring Isolator Roof Curb	When Completed					Verify all shipping blocking has been removed and curb has been flashed properly.
Duct Connectors	When Completed					Verify all duct connections to unit are complete and that flex duct connections were used.
Motorized Dampers	When Completed					Verify linkages are free to operate and temperature control operation is correct.
Duct Smoke Detectors	When Completed					Verify duct smoke detectors have been installed and are operational.
Temperature Controls	When Completed					Verify all temperature control points have been installed and are operational.
Identification	When Completed					Verify AHU properly identified and labeled per specification.
Cooling Coil Condensate Drain	When Completed					Verify P-trap on drain is piped correctly with minimum depth of seal greater than total static pressure possible by RTU. Verify drain pipe extended to roof drain.
Filters	When Completed					Verify prefilters and final filters are clean and ready for final air balance.
Supply Fans	When Completed					Verify proper rotation and operation.

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

All items are to be signed off on and submitted to MacMillan Associates Inc. before a final project walk-thru by the Engineer is requested. If the Engineer discovers items incomplete and/or not in accordance with this checklist, the drawings, or the specifications, the Contractor will be backcharged for the Engineer's time and expenses.

Freeland Schools – Elementary Cafeteria
 Freeland Community School District
**SYSTEMS COMPLETION
 CHECKLIST**

Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
HVAC Ductwork Systems						
Ductwork Inspection	When Completed					Verify all joints have been sealed, connectors made, etc.
Balance Dampers	When Completed					Verify balance dampers are installed at each duct branch and duct take-off.
Fire and Smoke Dampers	When Completed					Verify dampers are operational and open prior to air handling system operation.
Louvers, Hoods, Exhaust Fans	When Completed					Verify installation is complete, all caulking, roofing etc. has been completed.
Flexible Ductwork	When Completed					Verify flex duct installed without "kinks" and have maximum 5'-0" length.
Duct Insulation	When Completed					Verify all insulation has been installed and sealed on duct systems as specified.
Duct Cleaning	When Completed					Verify all dust, dirt and debris are removed from ducts.
Diffusers and Registers	When Completed					Verify installation is complete and properly supported.

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

All items are to be signed off on and submitted to MacMillan Associates Inc. before a final project walk-thru by the Engineer is requested. If the Engineer discovers items incomplete and/or not in accordance with this checklist, the drawings, or the specifications, the Contractor will be backcharged for the Engineer's time and expenses.

Freeland Schools – Elementary Cafeteria
Freeland Community School District

**COMPLETION
SYSTEMS CHECKLIST**

Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
HVAC Piping and Circulating Pump Systems						
Flushing and testing of heating hot water piping system	48 hours					Flushed and tested per specification.
Flushing and testing of chilled water piping system	48 hours					Flushed and tested per specification.
Flushing and testing of cooling tower water system	48 hours					Flushed and tested per specification.
Flushing and testing of refrigerant piping system	48 hours					Flushed and tested per specification.
Valving	When completed					Verify that all valves have been installed at all branch locations.
Pipe and Fitting Insulation	When Completed					Verify all piping and fittings are per specification.
Circulating pumps installation complete, check, tested and started	7 days					Verify circulating pump rotation, operation and control are correct. Verify check, test and start-up of circulating pumps by manufacturer's representative.
Circulating pump V.F.D. System	7 days					Verify installation complete for all control components, system check tested and started by manufacturer's representative.
Glycol feed unit	7 days					Verify installation complete, system check, test and startup by manufacturer's representative.

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Freeland Schools – Elementary Cafeteria
Freeland Community School District

**SYSTEMS COMPLETION
CHECKLIST**

Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
HVAC Piping and Circulating Pump Systems, Continued						
Air Vents	When completed					Verify air vents at all high points of hydronic piping systems and all air bled from system.
Labeling and valve tagging identification	When completed					Verify system identification is complete per specification.
Owner's training	When completed					Verify that Owner has been instructed on operation and maintenance of systems.

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

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Freeland Schools – Elementary Cafeteria
Freeland Community School District

**SYSTEMS COMPLETION
CHECKLIST**

Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		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 of installation					Per specification
Water Balance Report	At completion of installation					Per specification
One complete set of shop drawings for Owner	At completion of project					Per specification
Inspection, local authority approvals, etc.	At completion of project					

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

All items are to be signed off on and submitted to MacMillan Associates Inc. before a final project walk-thru by the Engineer is requested. If the Engineer discovers items incomplete and/or not in accordance with this checklist, the drawings, or the specifications, the Contractor will be backcharged for the Engineer's time and expenses.

SC-3

Freeland Schools – Elementary Cafeteria
Freeland Community School District

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

All items are to be signed off on and submitted to MacMillan Associates Inc. before a final project walk-thru by the Engineer is requested. If the Engineer discovers items incomplete and/or not in accordance with this checklist, the drawings, or the specifications, the Contractor will be backcharged for the Engineer's time and expenses.

SC-3

SECTION 23 30 00 - AIR DISTRIBUTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal ductwork.
- B. Nonmetal ductwork.
- C. Casing and plenums.
- D. Single wall spiral duct and fittings
- E. Kitchen hood exhaust ductwork.
- F. Dampers.
- G. Duct cleaning.
- H. Exhaust fans and grilles.
- I. Return air fan.

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.

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 SINGLE WALL SPIRAL DUCT AND FITTINGS

A. General

- 1. All round and/or flat oval spiral duct and fittings shall be manufactured by a company whose primary business is the manufacture of spiral duct and fittings and who has been in business for at least ten (10) years. All spiral duct and fittings shall be manufactured by the same firm and shall be as shown on the contract drawings.
- 2. All spiral duct and fittings shall be manufactured from G-60 galvanized steel meeting ASTM A924 and A653 requirements, with a prime coat finish.

B. Construction

- 1. Branch connections shall be made with 90° conical and 45° straight taps as shown on the drawings. All branch connections shall be made as a separate fitting. Factory or field installation of taps to spiral duct shall not be allowed without written approval of the engineer. Manufacturer's published individual fitting performances shall be on file with the design engineer ten (10) days prior to bid.
- 2. All elbows shall be fabricated with a centerline radius of 1.5 times the diameter. 90° and 45° elbows in diameters 3" round through 10" round shall be stamped or pleated elbows. All other elbows shall be of the gored type, fabricated in accordance with the following:

<u>DEGREE OF ELBOW</u>	<u>NUMBER OF GORES</u>
less than 36°	2
37° thru 71°	3
72° thru 90°	5

Where it is necessary to use two-piece mitered elbows, they shall have a minimum number of vanes in accordance with the following:

<u>DUCT DIAMETER</u>	<u>NUMBER OF VANES</u>
3" thru 9"	2
10" thru 20"	3
21" and up	5

3. Circumferential and longitudinal seams of all fittings shall be a continuous weld or spot welded and sealed with mastic. All welds shall be painted to prevent corrosion.
4. All field joints up to and including 60" shall be made with a 2" slip-fit or slip coupling. Diameters 62" round and larger shall be joined with 2"x2"x3/16" Vanstone flanges for fittings and solid welded flanges for spiral duct.
5. Proprietary connectors such as manufactured by Ductmate or AccuFlange may also be used in lieu of slip connections or angle flanges.
6. Access doors shall be supplied by the duct manufacturer at all fire and/or smoke dampers.
7. All flanges and access doors shall be factory installed. Shipments of loose flanges, access doors or taps for field installation into spiral duct will not be allowed.

C. Metal Gauges

1. Metal gauges for single wall round ducts shall be as follows:
 - a. Round ducts with maximum 2" W.G. positive static pressure:

<u>DUCT DIAMETER</u>	<u>SPIRAL DUCT</u>	<u>FITTINGS AND LONGITUDINAL SEAM DUCT</u>
3" thru 26"	26	24
28" thru 36"	24	22
38" thru 50"	22	20
52" thru 60"	20	18
62" thru 78"	18	16

- b. Round ducts with maximum 2" W.G. negative static pressure:

<u>DUCT DIAMETER</u>	<u>SPIRAL DUCT</u>	<u>FITTINGS AND LONGITUDINAL SEAM DUCT</u>
3" thru 17"	26	24
18" thru 20"	24	22
21" thru 22"	24	20
24" thru 26"	22	20
28" thru 30"	22	18
32" thru 34"	20	18
36" thru 42"	20	16
44" thru 48"	20	18(note 1 & 3)
50" thru 60"	18	18(note 2 & 3)

Notes:

1. Reinforce with 1"x1"x1/8" girth rings every 6 feet.
2. Reinforce with 1¼" x 1¼" x 3/16" girth rings every 4 ft.
3. When companion flange joints are used as reinforcement, 44" to 48" diameter shall be 2"x2"x3/16" and 50" to 60" diameter shall be 2½"x2½" x 3/16".

D. Manufacturers

1. All spiral duct fittings shall be as manufactured by SEMCO Incorporated or approved equal.

2.5 CASINGS

- A. Fabricate casings 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. Construct for not less than 6" w.c. unless otherwise noted on drawings.
- B. Mount floor mounted casings on concrete curbs. At floor, rivet panels on 8 inch centers to angles. Where floors are acoustically insulated, provide liner of 18 gage galvanized expanded metal mesh supported at 12 inch centers, turned up 12 inches at sides with sheet metal shields.
- C. Reinforce door frames with steel angles tied to horizontal and vertical plenum supporting angles. Install hinged access doors where indicated or required for access to equipment for cleaning and inspection.
- D. Fabricate acoustic casings with reinforcing turned inward. Provide 16 gage back facing and 22 gage perforated front facing with 3/32 inch diameter holes on 5/32 inch centers. Construct panels 3 inches thick packed with 4.5 lb/cu ft minimum glass fiber media, on inverted channels of 16 gage.

2.6 DUCT ACCESS DOORS

- 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. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one inch thick insulation with sheet metal cover.
 1. Less Than 12 Inches Square: Secure with sash locks.
 2. Up to 18 Inches Square: Provide two hinges and two sash locks.
 3. Up to 24 x 48 Inches: Three hinges and two compression latches with outside and inside handles.
 4. Larger Sizes: Provide an additional hinge.
- C. Access doors with sheet metal screw fasteners are not acceptable.

2.7 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.

2.8 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.

2.9 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.

2.10 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with blades aligned in short dimension, steel construction, with individually adjustable blades and mounting straps.

2.11 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.

2.12 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 its 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.

2.13 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.

2.14 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 30" 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.

2.15 EXHAUST FANS

- A. See schedules on drawings and furnish all.

2.16 DIFFUSERS AND GRILLES

- A. See schedules on drawings and furnish all.

2.17 KITCHEN HOOD EXHAUST DUCTWORK

- A. Fabricate in accordance with SMACNA HVAC Duct Construction, Standard Michigan Mechanical Code, and NFPA 96 as a minimum. Ducts shall pitch down

back toward hood a minimum of 2% slope (.25" per ft.) 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. Exhaust duct from a Class I kitchen hood shall be constructed of 16 gauge carbon steel or 18 gauge stainless steel, using continuous external welded joints. Cleanouts shall be provided on ductwork at all changes in direction. Duct shall be enclosed as follows:
 - 1. Kitchen hood exhaust duct enclosure shall consist of a 22 gauge sheet metal enclosure on 1" thick mineral wool batts or ceramic fiber blanket reinforced with blanket reinforced with wire mesh or equivalent, spaced out 1" from exhaust duct on non-combustible spacers, or shall be wrapped with two layers of "Fyre Wrap" by Unifrax or similar, installed as recommended by manufacturer and approved by the Fire Marshall. Refer to Section 15270 of these specifications. The enclosure system shall be furnished and installed in accordance with NFPA 96.
- C. Exhaust duct from a Class II kitchen hood, such as serving a dishwasher, shall be constructed of 18 aluminum or 20 gauge stainless steel, with all joints sealed with silicone.

2.18 KITCHEN HOOD

- A. Kitchen hoods shall be furnished and installed by Food Service Equipment contractor.
- B. Mechanical contractor shall coordinate all duct connections to hood.

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. 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.
- I. Coordinate duct locations with available space, route ducts around obstructions as required, and review duct changes with Engineer, all before starting construction.
- J. 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.
- K. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- L. Install manual balancing dampers in ductwork at all branch take-offs, all diffuser and grille take offs, etc.
- M. 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

SECTION 23 74 00 - ROOFTOP HVAC UNIT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rooftop HVAC unit and accessories.

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. ARI 210 - Unitary Air-Conditioning Equipment.
- B. ARI 270 - Sound Rating of Outdoor Unitary Equipment.
- C. NFPA 70 - National Electric Code
- D. NFPA 90A - Installation of Air Conditioning and Ventilation Systems.
- E. ANSI/ASHRAE 90A - Energy Conservation in New Building Design
- F. ARI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment.

1.3 QUALITY ASSURANCE

- A. Air Handling Units: Product of manufacturer regularly engaged in production of components who issues complete catalog data on product offering.
- B. ISO 9001 Certification. The air handling manufacturer shall be ISO 9001 Certified by a third party registrar, such as HSB Registration Services, that is accredited by an accreditation body such as ANSI-RAB and / or RvC Dutch Council for Accreditation.
- C.
- D. Variable Air Volume Air Handling Units with Variable Inlet Vanes: Certify air volume, static pressure, fan speed, brake horsepower and selection procedures in accordance with ARI 430. Certify units with inlet vanes in wide-open position. If air handling units are not certified in accordance with ARI 430, contractor shall be responsible for expenses associated with testing of units after installation to verify performance of fan(s). Any costs incurred to adjust fans to meet scheduled capacities shall be the sole responsibility of the contractor.
- E. Air Coils: Certify capacities, pressure drops and selection procedures in accordance with ARI 410-91.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

1.5 ACOUSTICS

- A. Manufacturer of packaged rooftop equipment shall provide Noise Criteria (NC) sound level data across all octave band center frequencies for cataloged operating range of unit at gross cooling capacity range. Data shall be obtained in conformance with ANSI S1.32-1980, American National Standard Methods for the Determination of Sound Power Levels of Discrete Frequency and Narrow Band Noise Sources in Reverberation Rooms and per AMCA Standard 300-85 test code "Sound Rating Air Moving Devices".

1.6 REGULATORY REQUIREMENTS

- A. Unit shall conform to ANSI/UL 465 for construction of packaged air conditioner and shall have U.L. label affixed to rooftop unit package. In the event the unit is not UL approved, the manufacturer shall, at his expense, provide for a field inspection by a UL representative to verify conformance to UL standards. If necessary, contractor shall perform required modifications to the unit to comply with UL, as directed by the UL representative, at no additional expense to the Owner.

1.7 EXTRA MATERIALS

- A. Install new clean filters at end of project. Provide one extra set of filters for future use by Owner at completion of project.
- B. Furnish one extra complete set of fan motor drive belts.

1.8 WARRANTY

- A. A parts warranty for one year from date of start-up or 18 months from date of shipment, whichever comes first, shall be provided at no additional cost.

PART 2 PRODUCTS

- A. Refer to schedule on drawings.

PART 3 EXECUTION

3.2 EXAMINATION

- A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Verify that proper power supply is available.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Mount units on factory built roof mounting frame providing watertight enclosure. Install roof mounting curb level.

3.4 MANUFACTURER'S FIELD SERVICES & WARRANTY

- A. Manufacturer shall furnish a factory trained service engineer without additional charge to start the unit.
- B. The manufacturer shall furnish complete submittal wiring diagrams of the package unit as applicable for field maintenance and service.
- C. Furnish complete service and maintenance of units for one year from date of substantial completion.
- D. Furnish initial start-up and shut-down during first year of operation, including routine servicing and check-out. Furnish Owner's personnel training on operation and maintenance of rooftop unit.
- E. Provide a full parts warranty for one year from start-up or 18 months from shipment, whichever occurs first.
- F. Submit copy of service call work order on report to the Owner, and include description of work performed.
- G. The Sheetmetal Trade shall be responsible for installation and wiring of all rooftop unit manufacturer furnished accessories such as the economizer, power exhaust fan, roof curb, etc. The Sheetmetal Trade shall verify all work required during bidding and include all costs in their bid.

END OF SECTION

MAI: 2024-9508

SECTION 26 00 00 - BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Basic electrical Requirements specifically applicable to Division 26, 27 & 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, 27 & 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, 27 & 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, 27 & 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. The Electrical Contractor shall be responsible for confirming final receptacle, data, and switch heights at countertop and casework locations with the architectural details. Architectural details shall govern final locations and mounting heights. Failure to coordinate will not relieve the contractor of making changes as required, at no cost to the owner.
- E. Any changes made, necessary through failure to make proper arrangement to avoid interference, shall not be considered as extra.
- F. 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.
- G. In the event the described work on the drawings doesn't match requirements described in the specification, the more stringent shall be provided.
- H. 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.
- I. 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 TRENCHING AND RELATED UNDERGROUND WORK

- A. The Electrical Contractor shall contact "811" 72 hours prior to any excavation to locate existing underground utilities. Pay all costs to obtain the services of a specialty utility service company to locate all private utilities as required.
- B. Prior to any actual trenching, Electrical Contractor shall review the utility maps; shall visually observe and review the intended routing for above and below ground obstruction; shall confer with the appointed field representative, and shall establish preliminary location for trenching.
- C. After this routing is established, Contractor shall hand dig in areas of obstructions where powered equipment is non-accessible.

1.5 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, 27 & 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, 27 & 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.

1.6 GUARANTEES

- A. All equipment and work performed under Division 26, 27 & 28 shall be guaranteed for one (1) year from time of substantial completion of project, unless directed otherwise in Division 1.

1.7 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.

1.8 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.

1.9 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.

1.10 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 22 13 - Dry Type Transformers
 - 4. Section 26 24 16 - Panelboards
 - 5. Section 26 27 26 - Wiring Devices
 - 6. Section 26 28 16 - Enclosed Switches and Circuit Breakers
 - 7. Section 26 51 00 - Interior Lighting
 - 8. 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.

1.11 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.

1.12 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.

1.13 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.

1.14 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.

1.15 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, 27 & 28.

END OF SECTION

MAI: 2024-9506

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 electrical distribution equipment, lighting, receptacles, switching, associated conduit, surface raceway, interior building cable TV distribution, voice and data from only each station side outlet back to the existing technology distribution frame. Remove the fire alarm system, 120 volt clocks, wiring, PA speakers and the PA front end unit as noted or shown or shown on the drawings. Remove surface mounted conduit, boxes, and non-metallic raceway, from the existing walls in offices, classrooms, etc. 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. Mechanical trades or BAS Contractor shall remove all associated temperature components, and associated conduit and wiring.
- C. As noted or shown on the demolition plans, remove all TV voice and data cables from each station side back to the distribution frames. Remove all cables, patch cords at the distribution frames. Remove all TV cables and outlets from each TV monitor back to the distribution frames.
- D. Electrical Trades shall transport all of the electrical salvaged materials to the Owner and include all transportation costs.
- E. Electrical Trades shall remove all of the existing electrical branch panelboards as noted, scheduled and shown on the drawings and specifications. Confirm all outages with the Owner to starting the replacement work.
- F. As noted or shown on the demolition plans, remove all of the existing non-metallic type surface raceway or surface metal conduits noted or specified to be removed. Contractor shall also be responsible to review the architectural, structural and mechanical demolition drawings for associated electrical demolition work. Do not rely solely on the electrical drawings for bid submitted.
- G. 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.
- H. The Owner shall be responsible to remove computers, printers, and monitors.
- I. All wall mounted and desk mounted phones shall be removed by the Owner.
- J. Electrical Contractors are responsible to confirm all demolition quantities. Make pre-bid site visit arrangements as deemed necessary.

END OF SECTION

MAI: 2024-9506

SECTION 26 05 19 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Building wire and cable.
- B. MC cable
- C. 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 acceptable 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 27 00 00 for Network/Communication wiring.
- P. Refer to Section 28 31 00 for Fire Alarm wiring.
- Q. 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.
- R. Shared neutrals for lighting and power circuits are not permitted.
- S. MC cable shall only be acceptable as the final connection to light fixtures installed in accessible ceilings. Maximum cable shall not exceed 6 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: 2024-9506

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 EXOTHERMIC CONNECTIONS

- A. As scheduled on the drawings.

2.4 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 EXAMINATION

- A. Verify site soil conditions before driving rod electrodes.

3.2 INSTALLATION

- A. Install Products in accordance with manufacturer's instructions.
- B. Provide bonding to meet Regulatory Requirements.
- C. Provide supplemental and service entrance grounding in accordance with 2023 NEC Section 250. Refer to Table 250-66
- D. Equipment Grounding Conductor: Provide a separate grounding conductor for lighting and power circuits as noted or specified on the drawings.
- E. As shown and noted on the drawings, provide ground conductor from the new addition's foundation rebar back to the building's main distribution panel service ground bar. Provide minimum #6 grounding conductor from the main electric distribution equipment to the data racks.
- F. Provide a grounding electrode and conductor for the pad mounted emergency generator as shown and noted on the drawings.
- G. Bond the cable tray or wire mesh tray as noted on the drawings.

3.3 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

3.4 EARTH GROUND RESISTANCE

- A. Use a meter that is suitable to tests 3 and 4 pole fall of potential with and without stakes. The meter shall measure ground loop resistances using only clamps, one stake, or one clamp and stakes. The stake-less test method shall measure earth ground loop resistances for multi-grounded system using only current clamps.
- B. The meter shall be capable of reading out which stakes or clamps to connect for each test. The resistance measurement shall calculate at 55 hz. Meter shall include automatic frequency control to identify existing interferences.
- C. Basic ground resistance measurements as applicable:
- 3 pole
 - 4 pole
 - Stake-less ground loop
 - 3 pole with current clamp
 - 4 pole with current clamp
- D. Measuring principle: current/voltage measurement methods for the resistance methods listed above.

END OF SECTION

MAI: 2024-9506

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.
- H. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- I. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- J. No drilling of laminated wood beams without structural engineer review.

END OF SECTION

MAI: 2024-9506

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. Nonmetal conduit.
- F. Electrical nonmetallic tubing.
- G. Flexible nonmetallic conduit.
- H. Fittings and conduit bodies.
- I. Surface raceway assembly.
- J. MC Cable.
- K. Flexible metal conduit.
- L. Conduit water sealant.
- M. Conduit seals (foundation walls).

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).
- H. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

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.
- D. Protect PVC conduit from sunlight.

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. Underground Installations:
 - 1. Use Schedule 40 PVC conduit for general underground installation.
 - 2. Use Schedule 80 PVC conduit for heavy traffic areas.
 - 3. Use direct burial seamless HDPE as noted and shown on the drawings for underground installation.
- C. Outdoor Locations, Above Grade: Use rigid steel conduit.
- D. Wet and Damp Locations: Use rigid conduit or liquid-tight non-metallic flexible conduit.
- E. Dry Locations:
 - 1. Concealed: Use electrical metallic tubing.
 - 2. Exposed: Use electrical metallic tubing.
 - 3. Use minimum $\frac{3}{4}$ " conduit for TV outlet and fire alarm drops.
 - 4. Use flexible metal conduit for final wiring connections to motors, VFD units, light fixtures in accessible ceiling and interior transformers.
 - 5. Use minimum 1" conduit for voice/data wiring.
 - 6. Use minimum $1\frac{1}{4}$ " conduit for ceiling projectors.

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 NONMETALLIC CONDUIT

- C. Description: NEMA TC 2; Schedule 40 PVC.
- D. Fittings and Conduit Bodies: NEMA TC 3.

2.7 SURFACE RACEWAY ASSEMBLY

- A. One steel raceway as scheduled or noted on the drawings.
- B. Divided non-metallic raceway basic components
 - 1. Base cover
 - 2. Flat elbow
 - 3. Divided entrance fitting
 - 4. Blank end fitting
 - 5. Dividers
 - 6. Fill-in covers
 - 7. 2 gang horizontal device bracket

2.8 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.

2.9 WATER SEALANT

- A. Use “Polywater FST” for a means and methods to seal leaking conduits. Follow the manufacturer’s instructions.

2.10 CONDUIT SEALS (FOUNDATION WALLS)

- A. Modular elastomer type. EDM seal element. Nylon reinforcement. Pressure plate zinc plated bolts and nuts. Follow manufacturer’s sizing chart and installation manual. Eaton Link Seal or equal.

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. Route conduit in and under slab from point-to-point.
- L. Do not cross conduits in slab.
- M. Maintain adequate clearance between conduit and piping.
- N. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- O. Cut conduit square using saw or pipecutter; de-burr cut ends.
- P. Bring conduit to shoulder of fittings; fasten securely.
- Q. 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.
- R. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

- S. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams.
- T. 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.
- U. Provide suitable pull wire in each empty conduit except sleeves and nipples.
- V. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- W. Ground and bond conduit under provisions of Section 26 05 26.
- X. Identify conduit under provisions of Section 26 05 53.
- Y. 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.
- Z. The control system contractor shall be responsible to adhere to the mechanical plans and/or temperature control system drawings to establish conduit routes.
- AA. 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.
- BB. All power, voice, clock, public address, data, fire alarm, occupancy sensor lighting wiring installed in exposed spaces shall be installed in conduit.
- CC. Electrical Contractor shall install the non-metallic divided surface raceway as noted or shown on the drawings. Refer to Electrical plans for a typical raceway detail.
- DD. Low-voltage voice and data device conduit drops shall only be required to be extended into the accessible ceiling space or to a cable tray as noted or specified on the drawings.
- EE. Provide conduit wall sleeves for low-voltage wiring installation as shown and noted on the drawings. Firestop the conduit openings. Use fire rated wireway as specified or noted on the drawings.

- FF. Multiple non-metallic conduit duct bank shall include top, intermediate and bottom PVC conduit spacers spaced on 60” centers.
- GG. Provide empty conduit for power assisted doors as noted and shown on the drawings.
- HH. Provide empty conduit for security system as noted and shown on the drawings.

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.
- C. No drilling of the existing gym laminated beams is permitted without a review with the project Structural Engineer.

END OF SECTION

MAI: 2024-9506

SECTION 26 05 33.16 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Floor boxes.
- C. Pull and junction boxes.
- D. Fire alarm device boxes.
- E. TV outlet.
- F. Voice/data boxes.
- G. Occupancy sensor boxes.
- H. Power assisted door 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 01 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.
- E. Use 4" octagon box for ceiling smoke detectors.
- F. Use in line non-metallic type box in non-metal surface raceway assembly as scheduled and detailed on the drawings.
- G. Elevator service pit box for the receptacle shall be NEMA 4 to meet State Elevator Code.

2.2 FLOOR BOXES

- A. As scheduled on the drawing.

2.3 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.

2.4 OCCUPANCY SENSORS

- A. Refer to the manufacturer for box requirements.

2.5 VOICE AND DATA BOXES

- A. Use 4 11/16" square stamped steel box with a single gang device.

2.6 POWER ASSISTED DOOR BOXES

- A. Provide 4" square box for palm button backbox for use by the installing vendor.

2.7 SECURITY BOXES

- A. Provide empty 4" square boxes as noted and shown on the drawings.

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. Coordinate mounting heights and locations of outlets for counters, backsplashes, benches in casework and workstations.
- J. Locate outlet boxes to allow luminaires positioned as shown.
- K. Align adjacent wall mounted outlet boxes for switches, etc.
- L. Use flush mounting outlet box in finished areas. Surface mounted boxes are acceptable for non-finished spaces.
- M. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- N. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.

- O. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- P. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- Q. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- R. Use adjustable steel channel fasteners for hung ceiling outlet box.
- S. Do not fasten boxes to ceiling support wires.
- T. Support boxes independently of conduit.
- U. Use gang box where more than one device is mounted together. Do not use sectional box.
- V. Use gang box with plaster ring for single device outlets.
- W. Install floor boxes flush with the finished floor.
- X. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations. Set floor boxes level.
- Y. Install in line boxes in the surface mounted raceway system as shown on the drawing.
- Z. Large Pull Boxes: Provide screwed cover or hinged enclosure in interior dry locations as noted or specified on the drawing.
- AA. 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 31 00 for fire alarm mounting height.
- C. Install public address speaker backbox at locations noted or shown on the drawings. Confirm final ceiling location to avoid the interferences with light fixtures, fire alarm and HVAC diffusers.

3.3 ADJUSTING

- A. Adjust floor box flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused box openings.

END OF SECTION

MAI: 2024-9506

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. Voice/data faceplates and data rack patch panel ports.
- I. 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.

- B. Locations:
 - 1. Each electrical distribution panelboard, switchboard and power panel.
 - 2. Each starter.
 - 3. Each disconnect.
 - 4. MDF/IDF patch panel ports.
 - 5. Voice/data outlets.
 - 6. Each VFD.

- 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, terminal cabinets 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. 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, VFDs, Boiler e-stop station	1/2" high minimum

Manual Motor Starters 1/4" high minimum

3. 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 2017 requirements. Provide PPE arc flash warning labels as specified with arc flash/short circuit coordination study.
- 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: 2024-9506

SECTION 26 05 83 - WIRING CONNECTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mechanical equipment.
- B. Food service.
- C. Occupancy sensor equipment.
- D. Owner furnish equipment.
- E. Electrical water cooler

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. Provide a 120 volt power supply in a junction box for use by the sprinkler contractor to connect to main sprinkler riser flow switch.
- G. Mechanical Trades shall be responsible to furnish and install all temperature control components, associated conduit, wiring and 120 volt power supplies. Electrical Trades shall reserve 120 volt circuit breaker as scheduled in the panels for this purpose.
- H. All food service control wiring shall be completed by the installing equipment contractor.
- I. All food service equipment is considered to include a factory installed cord/plug assembly. Electrical Contractor shall furnish cord/plug assemblies as required for all equipment not factory included, but requires a cord/plug connection. Complete all hard wired connections for all other food service equipment.
- J. All VFD programming shall be completed as part of the Mechanical Trades work.
- K. Provide a readily accessible GFI outlet for electrical water cooler.

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 CORDS AND CAPS

- A. Manufacturers:
 - 1. Hubbell, Pass & Seymour, Leviton or equal.
- B. Attachment Plug Construction: Conform to NEMA WD 1.
- C. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
- D. Cord Construction: ANSI/NFPA 70, Type SO multi-conductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- E. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit over current protection.

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. Provide the NEMA configuration that matches receptacle.
- E. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- F. Install disconnect switches, power relays, motor starters and as noted on the drawings.
- G. Provide and install fuses in mechanical trades furnished fused disconnects and combination starters per manufacturer's requirements.
- H. Final power connection to powerized furniture shall be completed by the installing vendor. Where the furniture system utilizes shared neutrals, the Electrical Trades shall furnish and install a circuit breaker tie.
- I. Electrical Contractor shall install mechanical furnished motor speed control and as required to control motor speed.
- J. Complete all lighting controls as scheduled, noted and shown on the drawings.
- K. Electrical Contractor shall complete all main power wiring to the mechanical equipment shown and noted.
- L. VFD control wiring and programming shall be completed as part of the Mechanical Trades bid. VFD shall be factory installed with the equipment unless noted or specified otherwise.

END OF SECTION

MAI: 2024-9506

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 6 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, 2017 National Electrical Code, 2017 State of Michigan Code Rules Part 8, 2009 ICC/ANSI 117.1 and local code requirements.
- C. 2015 Michigan Energy Code.

1.4 SUBMITTALS

- A. Provide submittal as listed in Section 26 01 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, 2017 National Electrical Code, 2017 State of Michigan Code Rules Part 8, 2009 ICC/ANSI 117.1 and local code requirements.
- C. Products: Furnish products listed or labeled to conform to requirements of 2017 National Electric Code, 2017 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 SYSTEM PERFORMANCE REQUIREMENTS

- A. System Architecture:
 - 1. System architecture based upon the following concepts:
 - a. Standalone lighting control zones using distributed intelligence.
 - 2. Intelligent lighting control devices with individually addressable network communication capability and having one or more basic lighting control components including: occupancy sensor, photosensor, relay, dimming output, contact closure input, analog 0-10 V(dc) input, and manual wall station capable of indicating switching, dimming, and/or scene control. Combining one or more of these components into a single device enclosure permissible to minimize overall system device count.

2.3 WIRED NETWORKED DEVICES

- A. Wired Networked Wall Switches, Dimmers, Scene Controllers:
1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; [nPODM] [nPODM xS] [nPODM xL] [nPODMA] [nPODMA xS] [nPODMA xL] or comparable product by one of the following:
 - a. [Cooper Industries, Inc.](#)
 - b. [Leviton Manufacturing Co., Inc.](#)
 2. Mounting: Suitable for installation in single-gang switch box.
 3. Communication and low-voltage power delivered via standard low-voltage network cabling with RJ-45 connectors.
 4. All switches detect valid communication and blink a unique LED pattern to visually indicate a potential wiring issue.
 5. Devices with mechanical push buttons provide tactile and LED user feedback.
 6. Devices with mechanical push buttons manufactured with custom button labeling.
 7. Wall switch and dimmer options:
 - a. Number of control zones: [1] [2] [4]. Refer to device schedule on drawings.
 - b. Control Types Supported:
 - 1) On/Off.
 - 2) On/Off/Dimming.
 - 3) On/Off/Dimming/Correlated Color Temperature Control for specific luminaire types.
 - c. Color: [Ivory] [White] [Light Almond] [Gray] [Black] [Red]. To be selected on a room by room basis during the submittal phase.
 - a. Color: [Ivory] [White] [Light Almond] [Gray] [Black] [Red]. To be selected on a room by room basis during the submittal phase.

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: 2024-9506

SECTION 26 22 00 - LOW VOLTAGE TRANSFORMERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Dry type two winding transformers.

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 ST 1 - Specialty Transformers
- B. NEMA ST 20 - Dry Type Transformers for General Applications.
- 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 SUBMITTALS

- A. Provide submittal as listed in Section 26 01 00.
- B. Product Data: Provide outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.
- C. Test Reports: Indicate loss data, efficiency at 25, 50, 75 and 100 percent rated load, and sound level.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
- E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

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 UL as suitable for purpose specified and shown.
- C. Department of Energy 2016 ruling 10 CFR Part 431 for transformer efficient levels.
- D. Transformer shall be UL listed or labeled to meet the requirements of 2023 National Electric Code, 2023 Michigan Electric Code Rules Part 8, and local authority having jurisdiction

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store, protect, and handle products to site.
- B. Deliver transformers individually wrapped for protection and mounted on shipping skids.
- C. Accept transformers on site. Inspect for damage.
- D. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- E. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

PART 2 PRODUCTS

2.1 TWO-WINDING TRANSFORMERS

- A. Manufacturers:
 - 1. As scheduled on the drawings.
- B. Description: NEMA ST 20, factory-assembled, air cooled dry type transformers, ratings as indicated.
- C. Insulation system and average winding temperature rise for rated kVA as follows:
 - 1. 1-15 kVA: Class 185 with 115 degrees C rise, and aluminum windings, DOE compliant.
 - 2. 16-500 kVA: Class 220 with 115 degrees C rise, and aluminum windings, DOE compliant.
- D. Case temperature: Do not exceed 40 degrees C rise above ambient at warmest point.
- E. Winding Taps:
 - 1. Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.
 - 2. Transformers 15 kVA and Larger: NEMA ST 20.
- F. Sound Levels: NEMA ST 20. Maximum sound levels are as follows:
 - 1. 1-5 kVA: 40 dB.

2. 6-25 kVA: 45 dB.
 3. 26-150 kVA: 50 dB.
 4. 151-225 kVA: 55 dB.
 5. 226-300 kVA: 55 dB.
 6. 301-500 kVA: 60 dB.
- G. Basic Impulse Level: 10 kV for transformers less than 300 kVA, 30 kV for transformers 300 kVA and larger.
- H. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.
- I. Mounting: Suitable for wall, floor, or trapeze mounting.
- J. Coil Conductors: Continuous windings with terminations brazed or welded.
- K. Isolate core and coil from enclosure using vibration-absorbing mounts.
- L. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are suitable for installing transformer supports.

3.2 INSTALLATION

- A. Install Products in accordance with manufacturer's instructions.
- B. Set transformer plumb and level.
- C. Use flexible conduit, under the provisions of Section 26 05 33.13, for the final wiring connection to the transformer. Make conduit connections to side panel of enclosure.
- D. Mount transformers on vibration isolating pads suitable for isolating the transformer noise from the building structure as noted or shown.
- E. Provide grounding and bonding in accordance with Section 26 05 26.
- F. Use a trapeze type transformer support or knee brace support unless noted otherwise.

3.3 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed to assure proper operation.
- B. Check for damage and tight connections prior to energizing transformer.
- C. Measure primary and secondary voltages and make appropriate tap adjustments.

END OF SECTION

MAI: 2024-9506

SECTION 26 24 16 - PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Distribution panelboards.
- B. Branch circuit panelboards.

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 ICS 2 - Industrial Control Devices, Controllers, and Assemblies.
- C. NEMA KS 1 - Enclosed Switches.
- D. NEMA PB 1 - Panelboards.
- E. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- F. 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 01 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. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.
- C. Fusible Switch Assemblies: NEMA KS 1, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate Class R fuses.
- D. 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.
- E. 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.
- F. 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.

- G. Provide circuit breaker accessory trip units and auxiliary switches as indicated.
- H. Cabinet Front: Surface type, fastened with concealed trim clamps, hinge and latch. Provide hinged door with flush lock. Finish in manufacturer's standard gray enamel.

2.3 BRANCH CIRCUIT PANELBOARDS

- A. As scheduled on the drawings.

2.4 FUSES

- A. Manufacturers:
 - 1. Bussman, or equal.
- B. Fuses 600 Amperes and Less: Dual element, current limiting, time delay, one-time fuse, 600 volt.
- C. Fuses 601 Amperes and Larger: Current limiting, time delay one time fuse, 600 volt, UL Class L.
- D. Interrupting Rating: 200,000 rms amperes.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1.
- B. Height: 6 ft to top of panelboard; install panelboards taller than 6 ft with bottom no more than 4 inches above floor.
- C. Provide filler plates for unused spaces in panelboards.
- D. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- E. Provide engraved plastic nameplates under the provisions of Section 26 05 53.
- F. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Minimum spare conduits: 5 empty 1 inch. Identify each as SPARE.
- G. Arc-fault protection is required on all 120 volt branch circuits supplying 15 amp and 20 amp receptacles installed in dwelling units.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed to assure proper operation.

- B. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.
- C. 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: 2024-9506

SECTION 26 27 16 - ELECTRICAL CABINETS AND ENCLOSURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hinged cover enclosures.
- B. Cabinets.
- C. Terminal blocks.
- D. Accessories.

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 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.
- 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 SUBMITTALS

- A. Provide submittal as listed in 26 01 00.
- B. Product Data: Provide manufacturer's standard data for enclosures and cabinets.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.5 EXTRA MATERIALS

- A. Provide two (2) of each cabinet key.

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 HINGED COVER ENCLOSURES

- A. As scheduled on the drawing.

2.2 CABINETS

- A. As scheduled on the drawing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive Work.

3.2 INSTALLATION

- A. Install Products in accordance with manufacturer's instructions.
- B. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner.
- C. Install cabinet fronts plumb.

END OF SECTION

MAI: 2024-9506

SECTION 26 27 26 - WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Device plates.
- D. Floor box service fittings.
- E. Poke-through service fittings.
- F. Tamper resistant receptacles.

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 WALL SWITCHES

- A. Manufacturers:
 - 1. Pass & Seymour, Hubbell, Leviton or equal.
- B. Description: NEMA WD 1, Heavy-Duty, AC only general-use snap switch.
- C. Body and Handle: Color to be determined from standard colors by the Architect.
- D. Ratings:
 - 1. Voltage: 120/277 volts, AC.
 - 2. Current: 20 amperes.
- E. Boiler Emergency Power Off
 - 1. Provide EPO station as scheduled on the drawings.

2.2 WALL DIMMERS

- A. Manufacturers:
 - 1. As scheduled on the drawings.

2.3 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. Emergency receptacles shall be red with matching cover plate and shall be provided with LED power indicating light.
- G. GFCI Receptacle: Convenience duplex receptacle with integral ground fault circuit interrupter to meet regulatory requirements.
- H. Damp and wet location receptacles shall be rated "WR".
- I. Tamper Resistant Receptacles
 - 1. All 15 amp and 20 amp receptacles shall be listed tamper resistant as follows:
 - Dwelling units.
 - Guest rooms.
 - Child care facilities.
 - Preschools and elementary education facilities.
 - Business offices, corridors, waiting rooms, and the like in clinics, medical and dental offices, and outpatient facilities.
 - Assembly occupancies, including gyms, skating rinks, and auditoriums.

2.4 WALL PLATES

- A. Cover Plate: Color to be determined from standard colors by the Architect.
- B. Use stainless steel cover for food service areas.
- C. Use “in use” weather proof metallic covers at exterior locations as indicated on the drawings to meet 2023 NEC Section 406.
- D. Provide blank metal cover plates on abandoned boxes.
- E. Provide stamped metal cover plate for unfinished spaces.

2.5 FLOOR MOUNTED SERVICE FITTINGS

- A. As scheduled on the drawings.

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 floor boxes are adjusted properly.
- D. 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 switches with OFF position down.
- C. Install receptacles with grounding pole on bottom.
- D. Connect wiring device grounding terminal to outlet box with bonding jumper or branch circuit equipment grounding conductor where specified.
- E. Install plates on switch, receptacle, and blank outlets in finished areas.
- F. Connect wiring devices by wrapping conductor around screw terminal.

- G. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- H. Install protective rings on active flush cover service fittings.
- I. Shared neutral are not permitted for lighting and power circuits.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Confirm with architectural drawings for counter casework, etc. details for wiring devices mounting heights.
- B. Install wall switch 48 inches to top of box above finished floor.
- C. Install convenience receptacle 16 inches to bottom of box above finished floor.
- D. Install convenience receptacle 6 inches above backsplash of counter.
- E. Install dimmer 48 inches to top of box above finished floor.
- F. 18" mounting height is lieu of the 16" minimum specified is acceptable pending masonry course lines.
- G. Electrical Trades shall review 2017 ICC/ANSI A117.1 for ADA requirements. Obtain a copy as required.
- H. Refer to all other sections of the specification, drawings, and Architectural drawing for specific mounting requirements for clocks, receptacles shown in counters, work stations. Do not rely solely on the electrical drawings for this information. Division 26, 27 & 28 Contractor shall be responsible to review all project documentation and obtain all required information from the district.
- I. Refer to section 28 31 00 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: 2024-9506

SECTION 26 28 13 - FUSES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fuses.

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.
- B. NEMA FU 1 - Low Voltage Cartridge Fuses.

1.4 PROJECT RECORD DOCUMENTS

- A. Record actual fuse sizes.

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 UL as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Bussman or equal.

2.2 FUSE REQUIREMENTS

- A. Dimensions and Performance: NEMA FU 1, Class as specified or indicated.
- B. Voltage: Provide fuses with voltage rating suitable for circuit phase-to-phase voltage.

C. Main Service Switches Larger than 600 amperes: Class L (time delay).

2.3 CLASS RK1 (TIME DELAY) CURRENT LIMITING FUSES

A. Manufacturers:

1. Bussman or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install fuses in accordance with manufacturer's instructions.

B. Install fuse with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

MAI: 2024-9506

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fusible switches.
- B. Nonfusible switches.
- C. Fuses.

1.2 REFERENCES

- A. NEMA KS 1 - Enclosed Switches.
- 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. UL 198C - High-Interrupting Capacity Fuses; Current Limiting Type.
- D. UL 198E - Class R Fuses.

1.3 SUBMITTALS

- A. Provide submittal as listed in Section 26 01 00.
- B. Product Data: Provide switch ratings and enclosure dimensions.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

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 UL as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. As scheduled on the drawings.

2.2 ENCLOSED SWITCHES

- A. Fusible Switch Assemblies: NEMA KS 1, Type Heavy Duty load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate Class R fuses.
- B. Nonfusible Switch Assemblies: NEMA KS 1, Type Heavy Duty load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.
- C. Enclosures: NEMA KS 1.
 - 1. Interior Dry Locations: Type 1.
 - 2. Exterior Locations: Type 3R.
- D. Disconnect switches serving the elevator main power must be a heavy duty type to meet the State of Michigan Elevator Code. Disconnect switch shall include auxiliary contacts for use by the elevator contractor to send a signal the main power disconnect is open.

2.3 FUSES

- A. Manufacturers:
 - 1. Bussman or equal.
- B. Description: Dual element, current limiting, time delay, one-time fuse, 600 volt.
- C. Interrupting Rating: 200,000 rms amperes.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install disconnect switches where indicated.
- B. Install fuses in fusible disconnect switches.
- C. Provide adhesive label on inside door of each switch indicating UL fuse class and size for replacement.
- D. Contractor shall confirm final elevator main power requirements to properly size the disconnect switch and fusing.
- E. Electrical Contractor shall be responsible to review the mechanical equipment schedules to determine if any factory installed switches are scheduled and noted as part of the equipment to minimize duplication by electrical trades.
- F. Furnish and install a separate lockable fusible disconnect switch for the elevator car fan and light.
- G. Furnish and install a lockable fusible disconnect switch for each boiler main incoming power disconnecting means to meet the State's Boiler Code Division requirements.

END OF SECTION

MAI: 2024-9506

SECTION 26 29 13 - ENCLOSED CONTROLLERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Manual motor starters.
- B. Combination magnetic motor starters.

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.
- B. UL 198C - High-Interrupting Capacity Fuses; Current Limiting Type.
- C. UL 198E - Class R Fuses.
- D. NEMA AB 1 - Molded Case Circuit Breakers.
- E. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.
- F. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- G. NEMA KS 1 - Enclosed Switches.

1.4 SUBMITTALS

- A. Provide submittal as listed in Section 26 01 00.
- B. Product Data: Provide catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.
- C. Test Reports: Indicate field test and inspection procedures and test results.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory

Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

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 MANUFACTURERS

- A. As scheduled on the drawings.

2.2 MANUAL CONTROLLERS

- A. As scheduled on the drawings.

2.3 POWER RELAYS

- A. As scheduled on the drawings.
- B. Furnish and install the power relay for the new mechanical equipment as shown on the drawings to allow for interface by the BAS contractor.

2.4 COMBINATION MOTOR STARTERS

- A. As scheduled on the drawings.

2.5 UNIT HEATERS

- A. Provide manual motor starter as noted and shown on the drawing.
- B. Electrical Trades shall install and wire all loose pump starter panels furnished as part of Mechanical Trades. Electrical Trades shall be responsible to determine what mechanical equipment will have loose equipment and include costs as part of the bid submitted. Contact the mechanical bidders to obtain all information. All control wiring shall be completed as part of the temperature control contractor bid.

2.6 BOILER IN-LINE CIRCULATING PUMPS

- A. Provide manual motor starter and power relays as noted and shown on the drawing.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install enclosed controllers where indicated, in accordance with manufacturer's instructions.
- B. Install enclosed controllers plumb. Provide supports in accordance with Section 26 05 29.
- C. Height: 5 ft to operating handle.
- D. Install fuses in fusible switches.
- E. Select and install overload heater elements in motor controllers to match installed motor characteristics.
- F. Provide engraved plastic nameplates under the provisions of Section 26 05 53.
- G. Provide neatly typed label inside each motor controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed for proper operation.
- B. Inspect and test each enclosed controller to NEMA ICS 2.

END OF SECTION

MAI: 2024-9506

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 01 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. Install suspended luminaires using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
- B. Support luminaires independent of ceiling framing.
- C. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- D. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- E. 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.
- F. Install recessed luminaires to permit removal from below.
- G. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- H. Install clips to secure recessed grid-supported luminaires in place at a minimum of (4) points of attachment to prevent movement.
- I. Install wall mounted luminaires at height as indicated on Drawings and/or architectural drawings.
- J. Install accessories furnished with each luminaire.
- K. Connect emergency luminaires and exit signs shall be equipped with batteries.

- L. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- M. Bond products and metal accessories to branch circuit equipment grounding conductor.
- N. Luminaires specified with factory installed battery drivers shall be wired as noted and shown on the drawings.

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.
- C. Position exit sign directional arrows as indicated.

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: 2024-9506

SECTION 27 05 28 - PATHWAYS FOR COMMUNICATION SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Voice/Data raceway.

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. EIA/TIA-568 - Commercial Building Wiring Standard.
- B. EIA/TIA-569 - Commercial Building Standard for Telecommunication Pathways and Spaces.
- 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 SYSTEM DESCRIPTION

- A. Telephone Service Entrance Pathway: Nonmetallic from point of telephone utility connection at property line to building service terminal backboard.
- B. Backbone Pathway: Conform to EIA/TIA 569 using combination of conduit and sleeves as indicated.
- C. Horizontal Pathway: Conform to EIA/TIA 569, using raceway, backboards as indicated.
- D. Voice/Data wiring: By Owner.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division 1.
- B. Record actual locations and sizes of pathways and outlets.

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

Section Not Used

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install raceways in accordance with EIA/TIA 568.
- B. Support raceways and cabinets under the provisions of Section 26 05 29.
- C. Install recessed cabinets flush with wall finishes, and stub 5 empty 1 inch conduits to accessible location above ceiling at each location.
- D. Install polyethylene pulling string in each empty voice conduit over ten feet in length or containing a bend.
- E. Install a #6 AWG green ground wire to backboard from service entrance ground bar in main panel.
- F. Voice/data outlet minimum mounting heights shall match duplex receptacles. Refer to Section 26 06 24.

END OF SECTION

MAI: 2024-9506

SECTION 27 15 00 - COMMUNICATIONS HORIZONTAL CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Data patch panel.
- B. Cable management.
- C. Voice/data/terminations.
- D. Wall station faceplate.
- E. Category 6 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. ANSI EIA/TIA-568-B.2, 568-B.2, 568-B.3 - Commercial Building Wiring Standard.
- 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.

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.

1.5 PROJECT RECORD DOCUMENTS

- A. A record shall be compiled and provided to the owner in compliance with the ANSI EIA/TIA 606-A standard.
- B. Each horizontal cable shall be tested in accordance with ANSI EIA/TIA 568-B.2 to verify C6 compliance. Passable test per cable segment shall be submitted to the Owner.

1.6 SUBMITTALS

- A. Provide submittals as listed in Section 26 01 00. The submittal shall be prepared by manufacturer's representative. Supply house or contractor's prepared submittals will be returned
- B. Submittals shall include the cable management, cable, jacks, faceplates and all component cut sheets. Mark or arrow cut sheets with catalog numbers. Failure to comply will be cause to return the submittals for corrections at no delays or extra costs to the District.

1.7 SCOPE OF WORK, BUT NOT LIMITED TO THE FOLLOWING

- A. Furnish and install Contractor furnished system components for a complete operating and tested system.
 - 1. General Requirements:
 - a. Contractor shall terminate on the existing patch panel. Include all terminations to serve the new voice, data outlets
 - 2. Specific Project Requirements:
 - a. Remove all existing voice and data cabling from the station side outlets, to the existing distribution frames. Removal shall include all wiring installed from the ceiling space.
 - b. Provide J hooks. Nylon ties for supports or bundling of new cables are not permitted.
 - c. Complete all new voice, data that exits from the MDF or IDF frames to serve the station side outlets.to the MDF or IDF frame and to the station side outlets.

1.8 SCOPE OF WORK

- A. Provide new cat6 cabling from existing patch panel to new jack and faceplate.

1.9 PERMITS

- A. Contractor shall obtain and pay all permit costs and inspection fees for voice and data device drops.

1.10 PRE-START CONFERENCE

- A. The Contractor shall be responsible to set up a pre-start meeting with the construction manager or the Owner's technology vendor to determine installation phasing and actual work installation methods prior to starting this phase of the work.

PART 2 PRODUCTS

2.1 PATCH PANEL

2.2 Existing

2.3 PATCH CORDS (Field confirm length). 3'-10" minimum, 10'-0" standard. However, a longer length shall be furnished for a complete operating system.

A. By owner

2.4 WALL STATION FACEPLATE

A. Flush mounted single gang, minimum 4 port. Include blue, C6, RJ45, modular jack insert for data. Contractor to review the drawing for each station to determine quantity and type. Faceplate covers shall be stainless steel.

2.5 CATEGORY 6 CABLE

A. 23 awg solid copper, FEP insulation, type MPP/CMP. 4 pair, plenum cable and rated for cable tray installation. Minimum performance 350 MHz.

Blue jacket

PART 3 EXECUTION

3.1 INSTALLATION

- A. Furnish and install all voice/data components in accordance with plans and specifications.
- B. Contractor shall complete all terminations, testing and certifications in accordance with ANSI EIA/TIA 568-B.2 standard. Testing includes all components: cable,
- C. Label data rack equipment, closet side, station side cables, faceplates.
- D. Firestop all wall sleeve openings conduits and cables installed through the sleeve.
- E. All terminations and test each cable in accordance with the ANSI EIA/TIA 568-B.2 standard. Passable test results per cable shall be provided to the Owner. Written final documentation shall be furnished at closeout of project and serve as part of the as-built records.
- F. Network/Communication cables shall not exceed bend radius or pulling tension. Obtain manufacturer's data prior to starting this phase of the work.
- G. Review the school's facility wide standards voice/data rack installation to gain a knowledgeable insight and technical installation methods for this project.
- H. Contractor shall install data C6 UTP cables from each work station to patch panel in accordance with plans and specification. Each cable shall be a "home run" back to telecommunications room and/or IDF. Splices are not acceptable.
- I. Provide modular jack RJ45 type or as specified.

- J. Furnish and install cable management devices 2” bridle ring with plastic saddle above accessible ceilings. Provide EMT conduit for physical protection of all low voltage system cables in exposed areas.
- K. Provide firestop caulk for all conduit sleeves and fire rated wireway as shown on the drawings.
- L. Arrange with the Owner during the bid phase to visit an existing facility to review rack configuration, equipment layouts, labeling, patch cords, faceplate modular jack color and labeling scheme.
- M. Provide cable maintenance loops at the racks for all voice and data cables.
- N. Minimally compliant cable and connectivity is not acceptable.

END OF SECTION

MAI: 2024-9506

SECTION 28 46 13 - FIRE ALARM SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. New [voice evacuation] [non-voice evacuation] [non-proprietary] point addressable main fire alarm panel, devices, and new NAC panels.
 - 1. Fire alarm system performance specification.
 - a. Contractor shall be responsible to obtain engineering and AutoCAD from the fire alarm manufacturer to design a new system. Devise an existing system and install a complete fire alarm system.
 - b. Contractor shall submit and pay all fees for plan review, 50% inspection, final inspection and complete and submit all associated documents.
 - c. Contractor shall be responsible for system check-out, start-up and on-site Owner training.
- 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. Unit Prices: Provide a unit price for complete device installation as listed: Manual pull stations, audio/visual devices, smoke detectors, duct smoke detectors, conduit, backboxes and wiring. Refer to the Bid Proposal Form for associated requirements.
- F. Combination smoke/fire dampers shall be furnished and installed as part of Mechanical Trades bid. It shall be the responsibility of the Electrical Trades to review the mechanical drawings for damper locations. Do not rely solely on the electrical drawings.
- G. Fire protection system. Electrical Trades shall complete all flow and tamper switch wiring to the fire alarm system. The flow and tamper switches shall be furnished and installed as part of the fire protection contractor's bid. Electrical Trades shall furnish and install a flush mounted backbox, an exterior horn/strobe and wiring to the fire alarm system. Electrical Trades shall be responsible to contact the fire protection contractor to confirm flow and tamper switch quantities and locations, and include all costs.
- H. The fire alarm vendor shall be responsible to review the Architectural door schedules and hardware specification section to include all magnetic door holder devices. Include all fire alarm panel points.

- I. Complete fire alarm wiring to the fire pump controller, flow and tamper switches. Fire pump controller minimum monitoring points shall include phase loss, phase reversal, power loss and frequency sensitivity.
- J. 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.
- K. 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, 2017 National Electrical Code, 2017 State of Michigan Code Rules Part 8, 2009 ICC/ANSI 117.1 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, 2017 National Electrical Code, 2017 State of Michigan Code Rules Part 8, 2009 ICC/ANSI 117.1 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 fire alarm panel, all devices and associated NAC panel, wiring and system certification ready for interconnection to one main fire alarm control panel, and a remote annunciator panel as specified.
- B. Provide fire alarm wiring and a 120 volt circuit to any combination smoke/fire dampers as shown on the Mechanical drawings. Electrical Trades shall be responsible to review the Mechanical drawings in addition to the Electrical plans. Mechanical plans shall govern damper location. Interwire to the associated duct smoke detector in accordance with the manufacturer's wiring instructions. Duct smoke detector shall be provided and wired by Electrical Trades, unless specifically listed on the damper schedules.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. JCI/Simplex, Siemens, National Time, Honeywell, Gamewell or Edwards.
- B. Non-proprietary manufacturers Kidde, Firelite, Silent-Nite or Honeywell.
- C. 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 device 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 FIRE ALARM CONTROL PANEL

- A. New point addressable suitable for [voice evacuation] [non-voice evacuation] [non-proprietary] sized properly with a minimum of 30% spare capacity.
- B. Provide a fire alarm control panel with the following:
 - 1. Digital display.
 - 2. Multiple pushbutton keypad.
 - 3. LED status indicating lights.
 - 4. Audible status signals.
 - 5. Output relays.
 - 6. Battery charger and batteries.
 - 7. RS-232 communications card.
- C. Evaluate and document the appropriate notification appliance circuit class designation.
 - 1. In general, provide Class B notification appliance circuits.
 - 2. Size the control panel power supplies, amplifiers, and batteries for 25 percent spare capacity calculated with, 1 watt speaker loads, and 150 ma strobe light loads.
 - 3. Provide sufficient spare capacity on each notification appliance circuit for an additional 25 percent of notification appliances.

- D. The system shall supervise the following circuits and components:
 - 1. Initiating device circuits.
 - 2. Signaling line circuits.
 - 3. Notification appliance circuits.
 - 4. Addressable initiating and control devices.
 - 5. Control output wiring.
 - 6. Auxiliary control switches.
 - 7. System, NAC panels, remote annunciator, and remote microphone.
 - 8. Primary power supply.
 - 9. Secondary power supply.
- E. The system shall be capable of being programmed by the Owner on site to accommodate expansion or sequence of operation changes.
- F. Provide 120 volts AC primary power to the system.
- G. Provide a control panel battery charger capable of fully charging a 200 amp-hour battery within 24 hours.
- H. Provide sufficient secondary power battery capacity to operate the entire system (except the door hold-open devices) upon the loss of primary power for a period of 24 hours in a normal supervisory mode followed by 5 minutes of evacuation alarm operation.
 - 1. When emergency voice/alarm communications is provided, provide sufficient battery capacity for 24 hours of operation in a normal supervisory mode followed by 15 minutes of voice/alarm operation.
 - 2. The system shall automatically transfer to and from the secondary power batteries upon an interruption of primary power without initiating a nuisance alarm.
 - 3. The system shall delay initiating a trouble condition for two seconds upon a transfer to or from primary power to avoid nuisance trouble conditions during emergency generator testing.
- I. Provide smoke and heat detectors as required by code and as shown, including the following.
 - 1. Provide a smoke detector in each mechanical, electrical, telecommunications, daycare rooms, and associated egress corridors.
 - 2. Provide duct smoke detectors where required by code. When not in plain view or when more than 10 feet above the floor, provide duct detector remote alarm indicators and test switches mounted in plain view at 48 inches above the floor.
- J. Provide sufficient audible notification appliances to achieve a sound level of 15 dBA above ambient sound level, but not less than 60 dBA nor more than 110 dBA in all occupiable spaces. The sound level in mechanical rooms shall be not less than 90 dBA. The sound shall be a three-pulse temporal pattern evacuation tone.
- K. Provide visual notification appliances in accordance with the intensity and spacing requirements of NFPA 72.
 - 1. Provide speaker/strobes in accordance with plans and specifications.

2. Synchronize strobes.
- L. Provide individually addressable monitor modules to monitor non-addressable initiating devices and status contacts of other systems.
 1. Monitor modules shall use Class B initiating device circuits to monitor the initiating devices and status contacts.
- M. Provide panel auxiliary relay contacts and individually addressable control module contacts, including the required panel control logic programming, to interface with control circuits of other systems and equipment.
 1. Provide normally closed duct smoke detector contacts to shut down ventilation systems.
- N. Assign each initiating device and control module a unique device address. Label each device with its unique address using a clear adhesive backed nylon or Mylar tape with black text. Install the label on the base of any device with a removable or replaceable head.
- O. Label each initiating device and control module that describes the type, room number/name and exact location of the device.
- P. Provide transient voltage surge suppression for the system.

2.4 DEVICES (all point addressable type that is compatible to the main panel)

- A. **Manual Pull Stations:** Individually addressable, suitable for two wire operation, with a high impact red Lexan body and raised white lettering. Stations shall include an ADA compliant single action operating mechanism with a mechanical latch to hold an operated station open until reset.
 1. Reset shall be accomplished through use of a key common to the panel or a small flat-blade screwdriver. Stations which use allen wrenches or special tools to reset are not acceptable. The point of reset shall be front accessible so stations with tamper-resistant covers can be reset easily.
- B. **Smoke Detectors:** Provide photoelectric type with two wire base for mounting to a 4" octagon box. Furnish smoke detectors for control of the magnetic door holder as shown and noted on the plans. Refer to the current adopted NFPA 72 Fire Alarm Code for the allowable detector for locations.
- C. **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.
- D. **Audio/Visual Units:** Provide horn and strobe units with 24VDC horn and ADA approved strobe for mounting to a 4" square box.
 - E. **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.
 - F. **Magnetic Door Holder:** Flush wall unit. Minimum 25 pound holding force, 120 volt operation. Furnish addressable relay for each pair of doors, also include the door plate with holder assembly. Refer to door hardware schedule for additional project requirements, and for holder type. The schedule shall govern and the holders shall be provided, installed and wired to the fire alarm panel.
 - G. **Audio/Visual and Visual Units:** For ceiling installation shall include vertical lettering. Horizontal lettering is not acceptable.
 - H. Fire alarm panel contact for egress lighting interface to meet Chapter 7 Life Safety Code Article 7.8 requirements.
 - I. **Speakers:** Rated 125 to 12,000 Hertz, include four taps rated at from 1/4 to 2 watts, produce a sound level of 82 dBA at 10 feet when set at the 1/2 watt tap, and with a semi-flush body capable of wall or ceiling mounting.
 1. Speakers for locations with high ambient noise may be high efficiency horns rated 500 to 6,000 Hertz minimum, 10 watts minimum, include four or more taps, produce a sound level of 106 dBA minimum at 1 meter when set at the 1 watt tap, and be capable of wall or ceiling mounting.
 2. Combination speaker/strobes shall consist of the speakers and strobes as specified in this section, but combined on a single mounting plate. Combination units used outdoors and in wet areas shall be waterproof and mounted to waterproof back boxes.
 - J. Emergency voice/alarm communications shall include audio control modules for evacuation tone and voice message generation, controls to choose total building or selected areas communications, audio amplifiers, a local microphone, and a remote microphone at each remote annunciator. All of the components except for the remote microphones shall be located in or adjacent to the fire alarm control panel.
 - K. The audio control module default mode shall provide for automatic total building fire alarm evacuation. The evacuation tone shall consist of a three-pulse temporal pattern followed by a pre-recorded fire alarm voice message. At the end of each voice message, the evacuation tone shall resume. The evacuation tone and voice message shall sound alternately until the alarm silence pushbutton at the fire alarm control panel or remote annunciator has been pressed. Audio tones and voice messages shall be digitally transmitted between nodes.

- L. The audio control modules shall provide for manual total building or selected area live voice communications. Upon keying of the local or a remote microphone, a three second continuous alert tone shall sound over the speakers indicating a live voice message will occur.
- M. The evacuation and alert tones shall be digitally generated by programmable software so that changes can be made without component rewiring. The pre-recorded voice messages shall be stored digitally in non-volatile memory.
- N. Audio amplifiers shall have a frequency response of 125 Hz to 12,000 Hz minimum.
- O. **Microphones:** Hand-held, push-to-talk, noise-canceling type with a frequency range of 200 Hz to 4000 Hz and a self-winding five foot coiled cable. An LED shall indicate the microphone push-to-talk pushbutton has been pressed and the speaker circuits are ready for transmission.
- P. **Remote Microphones:** Enclosed in remote annunciator cabinets with lockable doors. Remote microphones shall duplicate the manual voice transmission capability of the local microphone at the fire alarm control panel. The fire alarm control panel microphone shall have priority over any remote microphones.

2.5 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. Magnetic door holder wiring. Furnish addressable relay for each pair of doors. Interwire the door holder to the main fire alarm panel. Complete the associated ceiling smoke detectors wiring to the holders and to the main fire alarm system.
- G. Fire alarm supplier to provide circuiting to comply with voltage drop and load calculations per Code requirements.
- H. All wire sizes indicated are minimum.

2.6 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.

2.7 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.

2.8 REMOTE ANNUNCIATOR

- A. The remote annunciator shall duplicate the backlit LCD display; the alarm acknowledge, supervisory acknowledge, trouble acknowledge, alarm silence, and system reset pushbuttons; the alarm, supervisory, and trouble audible signals; the alarm, supervisory, trouble, and power "on" LED's; and the programmable function keys of the fire alarm control panel. A key "enable" switch or door lock, keyed to match the fire alarm control panel door lock, shall permit activating or deactivating the controls.
- B. A remote microphone shall be included with the fire alarm system with emergency voice/alarm communications, along with the same pushbuttons as the fire alarm control panel for selecting pre-recorded voice messages, and the same controls to choose total building or selected areas communications.

2.9 BATTERIES

- A. Batteries shall be lead calcium and supervised so that a failure produces a "TROUBLE" signal.

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. Manual pull stations shall be mounted a maximum of 48” from the floor level to the activating handle or to the lever. The current adopted Michigan Building Code edition fire protection system Section 907 shall govern over NFPA 72 Fire Alarm Code for mounting heights.
- H. Electrical Trades shall complete the entire fire alarm system in accordance with plans and specifications.
- I. Electrical Trades to install the door plate as part of the door holder installation. Mount the plate to hollow metal door. Do not use thru-bolts. The door hardware schedule and the specified architectural installation methods for use by the hardware installer shall govern over the door plate described method.
- J. 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.
- K. 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.
- L. 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.
- M. 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. The test station locations are not shown on the drawings.
- N. Contractor shall be responsible to wire fire pump controller monitoring points defined as phase loss, phase reversal, power loss and frequency sensitivity. Include fire alarm panel points as part of overall fire alarm panel points.
- O. Contractor shall be responsible to wire tamper switch to the fire alarm panel. Include fire alarm panel points as part of the overall fire alarm panel points.
- P. Electrical Trades shall complete all fire alarm interface wiring to coiling shutter doors, food service fire suppression system connections, at all sprinkler riser

locations. Exterior horn/strobe associated with exterior fire protection fire department hose connections/flow and tamper switches.

- Q. Fire alarm vendor shall wire elevator smoke detectors to elevator controller.
- R. Electrical Trades shall furnish and install a circuit breaker lock for the 120 volt circuit serving the fire alarm panel. Label the panelboard directory branch circuit text in red.
- S. 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: 2024-9506

