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SPECIFICATIONS FOR LABOR AND MATERIALS

FOR

LIVINGSTON COUNTY HIGHWAY DEPARTMENT
NEW MAINTENANCE BUILDING

1705 S. Manlove St.
Pontiac, IL 61764

VOLUME ONE – CONTRACT TERMS – ARCHITECTURAL – FIRE PROTECTION

PROJECT NUMBER: 2575 3521

ISSUE DATE: April 15, 2022

PRE-BID: Tuesday, May 17, 2022 at 10:00 a.m.
Livingston County Highway Department, 1705 S. Manlove Street, Pontiac, IL

BID DATE: Thursday, June 2, 2022 at 10:00 a.m.
Livingston County Highway Department
1705 S. Manlove Street
Pontiac, IL 61764

PROJECT: NEW MAINTENANCE BUILDING

FOR: Livingston County Highway Department
1705 S. Manlove Street
Pontiac, IL 61764

ARCHITECT: Middleton Associates Incorporated
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A/E PROJECT NO: 2575 3521

ISSUE DATE: April 15, 2022

Specifications are divided into two books for convenience:
Volume 1 – Division 00 Procurement through Division 21 Fire Protection
Volume 2 – Division 22 Plumbing through Division 33 Fuel Distribution

VOLUME 1

Drawings Index

ARCHITECTURAL DRAWINGS

DOCUMENT LIABILITY

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END 00 0110

Sealed proposals will be received by: Livingston County Highway Department

For Project: New Maintenance Building

Proposals to be submitted prior to **10:00 a.m., CDT, June 2, 2022.**

Submit to: Livingston County Highway Department
1705 S, Manlove Street
Pontiac, IL 61764

Pre-Bid Meeting: Tuesday, May 17, 2022 at 10:00 a.m., Livingston County Highway Department, 1705 S. Manlove St. Pontiac, IL 61764

Proposals shall be delivered to the Livingston County Highway Department prior to the time of opening. Proposals shall be clearly identified on the outside of the envelope as "Sealed Proposal" and list the project title as shown above. Immediately following the stated time, proposals will be opened and publicly read.

Terms of the proposal:
- Bid Security is required, 5% Bid Bond payable to Livingston County Highway Department.
- Owner protective bonds are required in the amount of 100% of the Contract value.
- Illinois Prevailing Wage Act P.A. 86-799 and Illinois Certified payroll reporting P.A. 094-0515 apply to this contract.
- Revised Statutes of the Illinois Criminal Code, apply,
- No faxed proposals or proposal modifications can be considered.

The County Board has the right to reject or accept any or all parts of all bids submitted and to waive any or all irregularities in the bidding and to accept the lowest responsible bid in compliance with the past experience requirements listed in the bid documents and inconsideration of proposed delivery dates.

Plans and specifications prepared by the Architect, Middleton Associates Incorporated, 1702 W. College Avenue, Suite E, Normal, Illinois 61761-2793, Phone 309/452-1271, FAX 309/454-8049. Plans and specifications may be reviewed without deposit at the office of the Architect.

Bid Documents are available on line at *www.middletonassociates.net* and May be printed directly from the website. Addendums or amendments to the bid documents will be available online, or electronically upon request or if registered with the Architect.

END 00 1116

1. GENERAL

1.1. QUALIFICATION

A. Competency and responsibility of the Bidder, and of their proposed subcontractors, may be considered in making awards. Determination of responsibility prior to award may include:

1. A detailed statement regarding the business, technical organization, crew availability and evidence of capability for the work that is contemplated.
2. Evidence of successful experience of personnel and previously completed construction projects

    a. Contractor and personnel, five years or more commercial construction experience, including recent projects of similar or greater value, similarity of types of work, technical content, and complexity
    b. Evidence that recent projects as described above have been scheduled and delivered on time, aggressively pursued to conclusion without delay.
    c. Experience does not include frivolous claims for additional costs, or work requiring abnormal or extensive corrections.
    d. Evidence that equipment was properly installed and started and functioned without abnormal warranty calls for installation related problems.
    e. Evidence that the contractor coordinated with the Owner, scheduled work in a progressive manner to allow Owner reasonable access to get facilities ready for occupancy in a timely manner.
    f. Evidence that phased projects have been completed without loss of services between phases.

3. Information pertaining to the financial resources of the contractor to pursue the work may be considered prior to making the award:

    a. Evidence of financial resources to cover retainage, meet payrolls, contract for and acquire or pre-pay materials. Resources and Contractor net worth available to this project less than 35% of the contract award may be grounds to disqualify the bid.
    b. Evidence of unpaid bills, unresolved liens, outstanding claims by the Department of labor for wage, benefits or workman compensation violations or failure to provide accurate payroll information.

2. EXAMINATION OF DOCUMENTS, SITE AND WORK INCLUDED

A. LOCATION OF THE PROJECT: New maintenance building, 1705 S. Manlove Street, Pontiac, IL 61764

B. PRE-BID MEETINGS

1. **Pre-Bid Meeting is scheduled for 10:00 a.m. Tuesday, May 17, 2022, Livingston County Highway Department conference room, 1705 S Manlove Street, Pontiac IL.**
   Site may be available for inspection During business hours. Coordinate prior to day of visit if LCHD staff is available.
   a. Schedule with LCHD, 815 842 1184.
   b. Times other than the pre-bid meeting may or may not be able to be scheduled. Dependent on availability of LCHD personnel.

C. EXAMINATION OF SITE AND CONTRACT DOCUMENTS

1. Bidder shall carefully examine bidding documents and inspect the site to obtain first-hand knowledge of existing conditions.
2. Access may not be available on short notice.
3. Do not ask for directions or interpretations of the work during these visits unless in combination with a pre-bid meeting. You may discuss the work but if any clarifications or questions become necessary these must be handled through the A/E and no change to the project requirements will result from verbal clarifications of the work during a visit.
4. Each Bidder, by submitting his bid, represents that he has examined the bidding documents, inspected the site and premises, compared task requirements and time constraints to installation conditions and that he understands the obligations of the bidding documents. By providing a proposal he is certifying that he has familiarized himself with the local conditions under which the work is to be performed. Bidders will not be given extra payment or contract time for conditions that could have been determined by on site examination.

D. INTERPRETATION OF DOCUMENTS

1. Anyone having a doubt concerning the meaning of the Contract Documents, or any other questions, may submit a request for interpretation from the Architect/Engineer. All pre-bid interpretation shall be requested not later than FIVE (5) DAYS prior to the bid due date. Response, other than minor clarification, will be in the form of Addenda and will be mailed to each Bidder.
2. It shall be the Architect/Engineer's responsibility to clarify conflicts in requirements as may be reported to the Architect/Engineer. After bid due date, the Architect/Engineer shall determine the course to be followed for said clarification with no cost change to the Owner.

E. ADDENDA

1. Addenda may be issued before the bid opening date to clarify or modify the Contract Documents. Addenda are posted at www.middletonassociates.net
2. Addenda will be issued electronically. Email address is required to

receive addenda.

3. If you have not registered your interest in the bid with the Architect, and do not receive or seek out the addendums then failure to recognize any Addendum may disqualify the bid.

4. Said addenda shall become a part of the Contract documents and supersede any conflicting specifications and/or clarify intent of same.

F. INTENT, ERRORS AND OMISSIONS

1. Any known conflict between requirements of various portions of the Contract Documents shall be reported to the Architect/Engineer prior bid due date and shall fall under the authority of Interpretation of Documents.
2. The Drawings are descriptive and directive in concept and are not intended to exhaust all detail situations required to complete the work. The procedures detailed shall establish the general character of solutions needed for typical, non-typical, and peculiar situations at the job site.
3. It is the intent of the documents that specified work and equipment be installed in a proper and finished manner, fully operational, at a minimum of generally accepted standards for good quality commercial construction. All necessary materials, labor, controls, accessories, brackets, fasteners, sealants, etc., to properly install and complete the work shall be provided unless specifically noted otherwise.
4. Each Contractor and Subcontractor shall coordinate and cooperate with the other Contractors to provide proper installation. Verify dimensions, services, installation conditions, obstacles to the work and modifications necessary to complete the work and coordinate the fit, finish and scheduling of the work.

G. DOCUMENT INTENT, PROJECT COMPLETION, FITTING AND FINISHING FULLY FUNCITONAL, USER READY

1. It is the intent that all items of work included in the project are to be completely finished and all necessary associated components and accessories for proper completion and operation are to be included in the work.

    a. First quality commercial work, functional, infiltration tight, watertight.
    b. Proper fit and finished appearance.

2. Drawings are schematic in nature; every single element needed is not necessarily labeled, dimensioned or positioned. Unless specifically exempted, the Contractor shall provide as follows:
3. Good quality fit, finish and workmanship at a level of competency and quality equal to or exceeding commercial construction in the area.

a. Sealants, caulks, flashings, transitions, closures and components to assure infiltration and weather tight result and finished appearance inside and out.
b. Sealants, flashings, closures at building connections.
c. Upper and lower flashings, in new construction and whenever possible, to shed water outward.

4. All components and assemblies to assure proper installation and performance of manufactured equipment, per manufacturer's or industry association standards as a minimum.

   a. Mechanical equipment, plumbing, piping, ventilation, valves back checks, connections etc.

      1) Functional
      2) Operating under control, controls programmed.
      3) Code compliant
      4) Commensurate with nominal building controls and operation
      5) Unless specifically noted to be different

   b. Mechanical and electrical coordination, coordination of installation locations, hidden where possible, routed through the construction in the most expedient but concealed manner:

      1) Minor relocation of piping, equipment, installations shall be provided without cost change within 10' either way or reasonable pathways of similar distance.

   c. All other equipment, kitchen, doors, hardware, windows and any other operable equipment.
   d. Service access, filters, repairs always allow for reasonable repair and maintenance access.

5. Electrical circuits

   a. In cases where the drawings or schedules for equipment indicate equipment power requirements, MCA, RLA, always verify with the final submittal on the equipment prior to rough in and pulling the wire.
   b. If a larger capacity circuit is required at an additional cost for breaker or larger wire always report same to the A/E for direction before pulling the wire.
   c. If there is no change in cost proceed with the work and report same to the A/E and note on the as built drawings.

6. Proper protection of dissimilar materials or components for bond problems, galvanic action, movement, moisture, and/or chemical reaction.

7. New finished appearance for all new work and work abutting existing where applicable.
8. Code compliance:

    a. All equipment and installations.
    b. Electrical NEC, circuit protection, grounding, disconnecting means, GFI, and installation practices
    c. Water, back checks, vacuum breakers, back flow preventers, service valves, hammer arrestors, expansion tanks.

9. Construction assembly details, setting forth special requirements, keyed to a specific section, detail or I.D. number, shall be considered applicable to similar assemblies throughout the contracted work unless specifically designated otherwise.

2.2. DRAWINGS & SPECIFICATIONS

A. OBTAINING INFORMATION

1. Drawings and Specifications may be obtained from the Architect, Middleton Associates Incorporated, 1702 W. College Ave., Suite E, Normal, IL 61761-2793, Telephone 309/452-1271, Fax 309/454-8049.
2. Drawings may be printed from website.

B. RETURNING DOCUMENTS

1. All documents printed for bidding remain the property of the Architect and shall be discarded after the project is awarded. The low bidder may keep documents and sub bidders may retain same until awards have been made.

2.3. ALTERNATES

A. The Bidder shall submit a proposal for every alternate listed in the Contract Documents. Failure to provide alternate prices may disqualify the bid.

B. See Section 00 2413, Scope of Bids, for a description of Alternates.

2.4. BID SECURITY

A. The Bidder shall furnish bid security, along with his proposal:

1. Form of security to be bid bond or certified check payable to the Owner.
2. Amount 5% of the base bid proposal
3. Said security shall serve as a guarantee that the Contractor will enter into the Contract with the Owner as per his bid and the contract terms should the job be awarded to him.

B. Should said Contractor refuse or fail to enter into a Contract with Owner

per his bid for the work included in these Contract Documents within fifteen days following notification of award and/or receipt of a contract for signature, said bid security shall become collectible, in full, by the Owner in payment for damages.

1. Failure to enter into an agreement shall mean failure to return or submit:

    a. A signed agreement.
    b. Owner's protective bond(s) for Labor, materials and performance.
    c. Approved subcontractor/supplier lists.
    d. Certificates of insurance within stated time period.
    e. Evidence that this contractor intends to pursue this contract in a timely and deliberate manner, including ordering of materials and committing or arranging for necessary manpower to accomplish the work.

2.5. WITHDRAWAL OF BIDS

A. Bids may be withdrawn by an authorized person prior to the bid due date and time, after which time no bids may be withdrawn for a period of forty-five (45) days unless a Bidder has been released by the Owner's action.

B. Authorized person shall mean an Owner or Officer of the Contractor offering the proposal or other evidence of authority.

2.6. PROPOSAL (BID) FORMS

A. Each bidder shall submit his proposal, on proposal form provided.

1. Submitted bid forms may be copied
2. All applicable blank spaces on forms shall be filled out fully.
3. Numbers shall be stated in writing where noted and in figures.
4. Signatures shall be live in longhand by person authorized to sign bids as Owner or corporate officer or shall include Power of Attorney to sign the bid.
5. No facsimile proposals or modifications can be considered.

B. Completed forms shall be without delineation, clarification, alteration or modification.

1. Correction of contractor inserted is acceptable if clearly identified and initialed by the signatory to the bid. Irregularities of such corrections may be grounds to disqualify the bid.
2. Offers to clarify or modify may be made on voluntary alternates and substitution forms if provided in the bid package, but in no case should the base bid or requested alternate bids offered be based on anything but the document requirements.

C. Voluntary alternates or offers for substitutions may be attached on forms

provided or on the bidder's letterhead. These will be considered at the Owners option. Additional information may be requested prior to consideration.

2.7. AWARD OF REJECTION OF BIDS

A. Although it is the intention of the Owner to accept the lowest qualified bid the Owner specifically reserves the right to waive all formalities and/or informalities, to reject any and all bids and/or accept the bid that, in the Owner's judgment is the lowest responsible bid.

B. Contractor will note all alternates that are applicable, or as may become applicable by addendum, should be bid. Failure to bid an alternate may be grounds to disqualify the proposal, at the Owners discretion.

C. Should the time for award exceed the time stated for the proposal's expiration period, the Owner reserves the right to continue to negotiate with bidders in the line of award succession as a prior option rather than re-bid.

2.8. RETURN OF BID SECURITY

A. After bids have been read along with alternates as applicable and a successful Bidder has been approved by Owner, a Letter of Intent will be sent to the successful bidder and bid security may be returned to the unsuccessful bidders except the deposits of the two (2) most advantageous bidders will be retained until Owner/Contractor agreements have been consummated.

B. Following the signing of the Contracts and receipt of bonds, remaining bid security will be returned. If the successful Bidder fails to accept the Contract and submit acceptable bonds, same will be grounds for forfeiture of his bid security.

2.9. OWNER'S PROTECTIVE BONDS: A 100% of value Labor and Material Payment Bond and Performance Bond including all alternates accepted is required in the Contract and shall be included in the Contractor's Proposal

A. Periodic Change Orders that may occur to the Contract shall be included in each respective bond.

B. Bonds shall cover the entire Contract without regard to the Contractor's assignment of work of Subcontractors or Suppliers.

1. Inclusive of all awarded Alternates.

2.10. AWARD AND LETTER OF INTENT

A. The Owner will make an award based on the selection of the lowest cost responsible bidder. After the award, and the issuance of a Letter of Intent, the contract timeline is as follows:

1. Return signed agreement (10) days

2. Sub Contractor, Supplier list, including any entity to be assigned a significant or skilled trade part of the work, provide list, addresses and contact information, (7) days. Provide references upon request.
3. Labor and Materials Payment, and Performance bond(s), ten (10) days
4. Insurance, ten (10) days
5. Master Cost Breakdown (CSV), ten (10) days
6. Proposed Schedule and time line, Pre Construction meeting

B. Failure or refusal to provide the preceding Contract information in a timely manner may be cause for cancellation of the award or termination of the agreement if signed and the Owner will be entitled to compensation under the terms of the bid security for failure to execute contract terms in good faith.

2.11. LIST OF SUBCONTRACTORS AND SUPPLIERS

A. Within seven (7) business days after notification of intent to award, and prior to the Contract being signed, the Contractor shall submit to the Architect/Engineer, a list of proposed subcontractors and major equipment suppliers and other persons or organizations to be assigned part(s) of the contract.

B. This list is subject to the review and approval of the Owner. Basis for this review may include supporting evidence the proposed Subcontractor or Supplier has experience and adequate resources to accomplish the assigned responsibilities on time and in compliance with the requirements.

1. The Owner reserves the right to request justifiable changes in the list.
2. The changes requested are intended to be made at no additional cost to the Owner.
3. If it is not possible to make requested changes at no additional cost, the Owner reserves the right to terminate the award and negotiate with the next successive bidder based on his original proposal.

2.12. MATERIALS SPECIFIED AND QUALITY OF WORK

A. Materials shall be as specified or approved equal.

1. Approved equal" and "or equal" shall mean that the Contractor shall be required to receive the approval (via the Architect) on any substitute materials.
2. Requests for substitution approval shall be submitted to the Architect/Engineer, seven (7) days prior to the bid due date.
3. Prior to considering substitutions, the Owner and/or the Architect/Engineer may require submission of samples, descriptive, technical and catalog data and lab reports of tests for verification of equivalency.

4. If approved and selected, all adaptations to fit and accommodate the substitute or equal equipment including coordinating other

trades is the responsibility of the Contractor requesting the change.

2.13. PROGRESS PAYMENTS

A. Will be made not more frequently than monthly, per the Owners payment schedule.

2.14. PROJECT ACCESS: The Contractor shall be aware that the Town/City, Township, County or State has authority over various approach roads for site access and the Contractor is responsible to:

A. Observe load limits and arrange for any exceptions to load restrictions that may be required for this project.

B. Make arrangements for road cleanup, barricades and surface patches and repairs shall comply with applicable regulations and be subject to the governing authority approval.

2.15. EQUAL OPPORTUNITY EMPLOYMENT: The following clause is applicable unless this Contract is exempt under the rules and regulations of the Secretary of Labor of the State of Illinois.

A. During the Performance of this Contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, age or national origin. The Contractor will take affirmative action to ensure that all applicants are considered and that employees are treated, during employment, without regard to their race, color, religion, sex, age or national origin."

2.16. ILLINOIS STEEL PROCUREMENT ACT

A. During the performance of this contract, the contractor agrees to:

1. Comply with the 30 ILCS 565
2. Steel products used or supplied in the performance of that contract or any subcontract thereto shall be manufactured or produced in the United States.
3. All requirements of and/or exemptions allowed in this regulation apply.
4. The Owner and A/E cannot interpret the legal requirements as applicable to this contract.
5. Any additional cost incurred by the Owner for a violation of this provision shall be reimbursed by the Contractor.
6. If the regulation cannot be complied with due to product or specification requirement, proceed as allowed in the regulation.

2.17. ILLINOIS DEPARTMENT OF LABOR AND LABOR RELATED REQUIREMENTS

A. IDLR regulations apply to all work on site without exception.

B. Publicly funded projects or projects managed by Public Bodies require the following:

1. PREVAILING WAGE 820 ILCS 130/4: The Contractor shall pay and shall require his subcontractors to pay the prevailing hourly wages as is determined by the Illinois Department of Labor pursuant to the Illinois Prevailing Wage (820 ILCS 130/1 et. seq.) included at the end of this section.
2. CERTIFIED PAYROLL REPORTS: Will be required with each successive pay application for payroll periods preceding the application date.

    a. File on the IDL portal. Provide portal access log in information.
    b. Do not submit record paper copies, electronic may be submitted but are not required.

3. SUBSTANCE ABUSE PREVENTION ON PUBLIC WORKS 820 ILCS 265: All Contractors must be prepared to certify upon request that they have complied with the Illinois Substance Abuse Act, including a written program that meets or exceeds the requirements of this act for the prevention of substance abuse among its employees.

2.18. SALES TAX

A. Materials supplied to a public Livingston County are sales tax exempt.
B. Sales tax exempt number will be provided when project is awarded.

2.19. TOBACCO AND ALCOHOL FOR CONSUMPTION PRODUCTS

A. Smoking, chewing, tobacco use; in accordance with state statute.

B. Alcoholic beverages, controlled substances, substances causing impairment, and/or unauthorized prescription medication are not allowed on site.

1. Working under the influence of any of the above and/or a legal prescription that causes impairment is not allowed.

C. Violators may be removed from the job sites subject to conditional return privileges in the future.

2.20. SEXUAL HARASSMENT POLICY

A. The Owner will not tolerate sexual harassment in any form. Sexual harassment is defined, for the purpose of this policy, as "unsolicited, deliberate or repeated sexually derogatory statements, gestures or physical or implied physical contact that cause discomfort or humiliation. Sexual harassment may involve pressure from a person of either sex against a person of the opposite sex or same sex . . ."

1. Should evidence that a Contractor, or a Contractor's employee, has harassed staff, public or other individuals, that employee shall be removed from the job site permanently or until such time that the circumstances have been determined to have been resolved satisfactorily.

2.21. BUILDING PERMITS

A. This project is subject to all local permit fees associated with the construction.

1. This Contractor shall fully cooperate with the local authorities and shall apply for and obtain all required permits and comply with local regulations and requirements.
2. This contractor shall obtain all required permits from the state, such as for the fuel dispensing tanks.
3. Provide necessary permit related information to local city authorities.
4. Cooperate with all authorities to seek occupancy permits at the close of the work.

2.22. CONTRACT DOCUMENTS CHECK LIST

A. Proposal

1. Proposal Form properly filled out and signed, (live signatures)
2. Bid Bond/Bid Security for 5% of base bid amount (live signatures)
3. Low bidders exempt, return of documents within fifteen (15) working days after bid due date

B. Letter of Intent

1. Supplier - Subcontractors List, (10 days after Award)
2. Employee list and criminal background affidavit, (prior to start on site.)
3. Proposal & Contract Form prepared by the Architect, (signed and returned 10 days after receipt).
4. Labor and Material Payment Bond, two copies (10 days after award)
5. Performance Bond, two copies (10 days after Award)
6. Insurance Certificates, liability and hold harmless, three copies (10 days after award)
7. CSV - Master Cost Breakdown (Preconstruction meeting)
8. Bar Graph/Progress Schedule, copies as required (Preconstruction meeting)

C. Periodically as needed

1. Update employee list and criminal background affidavit as needed.

D. Periodic Application for Payment

1. Submit per the monthly scheduling, to be determined
2. Application and Certificate for Payment, 3 copies (AIA G702A)
3. Contractor's Affidavit, 2 copies (AIA G706)
4. Breakdown Estimate, 3 copies
5. Partial Waivers of Lien, 2 copies

    a. Partial Waiver of Lien from Subcontractors/Suppliers for previous payment, 2 copies.
    b. Updated Progress Schedule, submit with each pay request

6. Certified Payroll to IDL portal for all trades employed on site.

E. Substantial Completion

1. Notification work is ready for inspection.
2. List of deficiencies or incomplete work.

F. Final Application for Payment:

1. Letter to Architect that deficiency work is complete
2. Final Lien Waiver from the Contractor, 2 copies
3. Final Lien Waivers from Subcontractors/Suppliers, 2 copies
4. Final Affidavit showing $0.00 due to Subcontractors and $0.00 due to Suppliers, 2 copies
5. Final Payment Approval Letter from Bonding Co., 2 copies
6. Certification of all guarantees, warrantees and service contracts, O & M Manual
7. Final Application & Certificate for Payment, 3 copies (AIA G702A)
8. Additional certifications as may be requested, 2 copies
9. Operating manuals & instructions, 3 copies-indexed and bound
10. Figure Bonus / Penalty and Liquidated Damages if applicable.

G. IDL Prevailing wages following pages.

END 00 2113

1. GENERAL

1.1. DESCRIPTION OF DRAWINGS AND LAYOUT

A. Drawing data is intended to be reasonably accurate, however, strict accuracy in detail is not guaranteed.

1. Drawings, particularly Mechanical and Electrical drawings are schematic in nature.
2. The Contractor must verify all of the actual conditions, measurements, dimensions, rough-in requirements; fitting of piping, conduit, wiring, and duct work and coordination necessary for each item, system or piece of equipment in the Contract Documents.
3. Verification is the Contractor's responsibility and shall be completed prior to the fabrication or installation processes.
4. Coordination of all elements of the work must be allowed for with cooperation between the trades particularly for conflicts of limited flexibility of installation. The general priority unless fixed conditions conflict is as follows: structure, placement of equipment, service access, mechanical piping, plumbing piping, and electrical piping. Trade priority in the preceding list does not supersede field cooperation to collectively and most expediently install the work.
5. All corrections necessary to provide properly installed, finished and operable system, in accordance with the intent of the Documents, shall be made at no additional cost.

B. All measurements and conditions must be verified by actual observation at the site.

1. The Contractor shall be responsible for all of his work fitting into place in a satisfactory and workmanlike manner in every aspect and detail subject to the approval of the Architect. The Contractor shall provide layout work and verification measurement at his own cost.
2. The Contractor shall perform all layout work pursuant to site, building, grades and levels, and furnish such engineering services as he may require executing the intent of the work included.

C. Before starting his work, the Contractor shall examine all Contract Area Drawings and Specifications and if discrepancies or conflicts are apparent or occur during the progress of the work:

1. Work first with the conflicting trades or installations to fit and coordinate the work.
2. If there appear to be no practical or agreeable way to coordinate the fitting of the work report same to the Architect as a Request for Instruction, RFI, and obtain direction or interpretation to proceed.

D. The Drawings are instructive and diagrammatic and shall be followed as closely as actual construction will permit. All changes from Drawings necessary to complete the work shall be done at no added cost charge to

the Owner above the amount shown on the Owner/Contractor Agreement.

1.2. OVERLOADING OF STRUCTURE OR EXISTNG FACILITIES

A. Care shall be taken that completed structures are not overloaded during Contractor operations. It shall not be the Owner's, or Architect/Engineer's responsibility to observe and check construction processes and temporary loading conditions that may temporarily occur in the pursuit of the completed installations.

1. Structural design, unless noted otherwise, is designed to accommodate design loads, per code, after completion.
2. Bracing and shoring for loading or stability prior to the installation of lateral support elements and diaphragm assemblies is the responsibility of the Contractor.
3. All structural damage done by overloading the system shall be repaired by the Contractor or Subcontractor overloading the system.

B. Streets, drives and sidewalks shall be protected from damage for overloading, cracking, impact loads, adjacent excavation or operations related to the new construction.

1. Repair or replace any damaged sections as agreed to by the A/E and Owner.
2. While the intent is not to take advantage of this to repair already damaged surfaces, additional damage to an already cracked surface will trigger repairs to be made. If the surface is substantially damaged, failed or settled notify the A/E and Owner prior to operations that you cannot be responsible for additional failure on the particular location.
3. Photo records of before conditions are recommended. Provide copy of same to A/E and Owner upon request.

1.3. MEANS AND METHODS

A. The Architect/Engineer and Owner shall have no authority over the means, methods and procedures of the work and shall make no determination pursuant thereto nor render opinions concerning same.

1. The Architect’s Field Representative does not have authority to render opinions on structural questions.
2. If questions arise submit a Request for Information, RFI, for direction.

B. The Architect/Engineer and Owner and representatives of same shall have no authority over methods employed or safety conditions related to:

1. Erection loads and as they relate to the Contractor’s interest and shall provide no observation of same.
2. Upon request the Architect can provide the design loads employed for the final installation.

3. The contractor shall designate an employee of the contractor as the person in charge of and responsible for directing the work and safety procedures on site.

1.4. PROTECTION OF WORK AND BUILDING

A. The Contractor shall protect all work and stored materials from injury or loss caused by or resulting from operations under this Contract, including but not limited to:

1. Physical damage

a. Poor stacking practices
b. Abuse damage due to adjacent operations or exposures
c. Weather related damage

2. Failure to have reasonably secured stored and in progress work.

1.5. MOVING OF MATERIAL

A. Contractor materials which are temporarily located or stored shall be relocated as needed to allow access by the Contractor, other Contractors and the Owner's personnel in and around the construction area.

1. Prior to storing materials coordinate the operations to avoid conflicts.
2. Such moving of any material shall be at no additional cost to the Owner.

B. At no time shall tools, materials or workmen block an exit unless same has been coordinated with other trades on site and reasonable alternative options are maintained.

1.6. SHORING, BRACING, AND BARRICADES

A. The Contractor shall provide, construct and finally remove all temporary shoring, bracing, underpinning, scaffolding, needling, barricades, etc. as required by local restrictions and as necessary for to protect persons and property from damage or injury.

1. The Contractor shall determine the need for these items.
2. The Contractor shall be responsible for the performance or failure of performance of same and shall repair damages caused by failure or absence of same.

B. Specific temporary shoring supports, etc., may be noted in the Documents, such as for new openings or certain renovations in existing work.

1. All such needed shoring is always not noted but the responsibility of the Contractor or Sub Contractor making the opening or installing the new work as needed
2. Notation on the drawings is an observation that existing support conditions are being impacted by the work and shall be attended to

by the Contractor as needed by conditions discovered.

3. In all cases, observe actual conditions of the work, same may be different than the anticipated conditions and may require shoring bracing and barricades.

1.7. MATERIALS, WORKMANSHIP, AND LABOR

A. All installed materials and equipment shall be new and shall be installed and completed in a first class, workmanlike manner.

B. The Architect reserves the right to direct the removal and the replacement of any item which, in his opinion, does not present a proper, orderly or reasonably neat installation. Such removal and replacement shall be done promptly when directed by the Architect or the Owner. All installations will be subject to the Architect's and Owner's inspections, tests, and approval at all times from commencement of the work to Final Acceptance of the completed Contract.

C. Work needing correction or replacement that is not corrected with reasonable promptness shall be subject to written notice thereof by the Architect. The Contractor by virtue of having tendered his bid for the work, agrees that progress payments by the Owner may be held (no payment made) until said faults have been corrected.

1.8. ALIGNMENT BALANCING

A. The Contractor shall be responsible for supervision of the installation of equipment.

1. Level, adjust, balance and align new equipment and reinstalled or relocated equipment.
2. Provide all alignment per manufacturer set up recommendations, align and balance pumps, belts and pulleys and adjust equipment to work properly.

1.9. CLEANING

A. Work areas shall be maintained reasonably clear of accumulated debris, cartons and unused equipment to allow orderly pursuit of the Work.

B. All surfaces shall be cleaned of any paint, plaster, mortar, gook and other stains.

1. Care shall be taken that no surface is scratched, marred or damaged by the cleaning process.
2. Damaged, marred or scratched surfaces of any type shall be repaired to new or original condition or replaced if necessary to provide a final installation acceptable to the Architect.

C. Final Cleaning - All areas new and renovated areas:

1. Clean and dusted.

2. Floors cleaned ready for occupancy.
3. Marks and scuffs repaired.

1.10. OPENINGS IN CONSTRUCTION

A. Openings required for construction work shall be provided by the Contractor, complete with all necessary reinforcing, lintels, trim, finishing, etc. as shall be needed to complete the Work including openings required for electrical and mechanical work.

1. Openings to be provided for other trades must be laid out and noted by the trade needing same prior to construction of the surface through which the opening is needed.
2. Untimely note of required openings shall be the responsibility of the Contractor or Subcontractor not requesting same.
3. All sleeves, flanges and forms, etc., shall be furnished by the Contractor requiring the opening.

B. Concrete slabs, joists, concrete floors, finished floors, walls and structural elements, and other structural items shall not be cut or disturbed, except as approved by the Architect IN WRITING.

C. Pipes or elements passing through floors or partitions shall have sufficient clearance around pipes to prevent damage to the adjacent finish from expansion and contraction.

1.11. FIRE SEALS

A. All penetrations of fire walls, smoke barriers and floors shall be properly fire sealed to prevent the passage of smoke and maintain the integrity of fire barriers.

1. Such seals are the responsibility of the contractor for whom the penetration is provided.

1.12. SUPPORTS

A. The Contractor shall provide all concrete, steel bases and anchorage except as herein specified otherwise: vibration absorbing foundation bases, hangers, platforms, anchor bolts, etc. for all equipment which he furnishes. These foundations or supports shall be as specified under their respective headings, as shown on the drawings and/or as recommended by manufacturers.

1. Materials and installation requirements for curbs and pads shall be commensurate with the need.
2. Concrete shall be 3500 psi minimum strength, air entrained 5% to 8% by volume. Install following commercial practices.
3. Framed curbs or foundations shall be properly supported.

1.13. PROTECTION OF WORK

A. The Contractor shall protect his work and adjacent existing work from injury by keeping all piping, ductwork, etc. capped, plugged, drained, or otherwise protected from injury including damage done by freezing and damage from building materials, cement and/or dirt, concrete traffic or exposure.

1.14. ELECTRICAL SERVICES TO EQUIPMENT

A. Unless otherwise specified the Contractor shall furnish and install electrical feeders of proper size, and furnish, install and complete all power wiring and the control wiring for each motor, electrified signage and/or piece of equipment affected by the Contract.

1. Although circuits may be called for on the drawings, ALWAYS verify the final equipment requirements before pulling wire in the event it needs to be increased in size.
2. Contractors providing equipment shall verify the circuits and protection level and need for safety switches matches what they are providing.

B. All electrical procedures shall comply with the National Electric Code, whether temporary or permanent.

1.15. SEALANTS

A. Provide sealants in all locations where shown on the Drawings or called for in the Specifications and as necessary for infiltration tight and weather tight building envelope and finished visual appearance.

B. Sealants shall be provided in locations as directed by the Architect, where equipment components or fixtures fit to surrounds, and when cracks between equipment and surrounds are undesirable or excessive. Provide sealants in all interior locations, as necessary to properly trim out.

C. Sealants shall be installed and tooled in strict accordance with the Sealant Manufacturer's recommendations for joint preparation, using foam rope backer bars, etc. Sealant shall be installed by the respective Contractor providing the item requiring sealant installation.

1.16. PAINTING

A. All exposed surfaces or equipment reworked and installations leaving damaged or unfinished surfaces shall be painted or have a corrosion resistant or factory applied finish.

1. Unfinished non ferrous metals such as aluminum and stainless steel do not require painting.
2. Field paint unfinished equipment and surfaces for corrosion protection and visual appearance, except where clearly stated to the contrary on the Drawings.

END 00 2213

1. BASE BID

1.1. DESCRIPTION

A. The Base Bid is to provide the Owner with all materials equipment and labor to complete the specified contract work.

1. All work is a single Contract, Livingston County Highway Department, 1705 S. Manlove Street, Pontiac, IL 61764. The Base Bid proposal must be for the specified work as may be modified prior to the bid time and date by addendum.

a. Do not add any additional description of what is included or excluded from the bid on the proposal form, this may disqualify the bid.
b. Fully fill out the proposal/bid form, omissions and failure to sign will disqualify the bid. Minor irregularities in filling out the bid form may be considered by the Owner as inconsequential to the intended bid and may be declared as such and the bid be accepted.

2. Voluntary Alternates or Substitutions may be offered on the Voluntary alternate and substitution form if provided or on the Contractor's letterhead if desired. Such options should not materially change the intent of the proposal. These may be considered or disregarded at the Owner's discretion without explanation.

B. The Owner has determined that the desired substantial completion date is on or before June 16, 2023 in order to facilitate move in and set up prior to 2024 fiscal operations starting in earnest. Ability to meet this date or as close as possible to it will be a consideration in this award.

1.2. UNIT PRICES

A. None unless requested by addendum

1.3. ALLOWANCES

A. **Include an allowance of $40,000**
1. $25,000 for unexpected conditions. Excess to be refunded – assignment by agreed change order with the Owner.
2. $15,000 for independent Construction and Materials Testing (CMT) Excess to be refunded – assignment by agreed change order with the Owner.
3. CMT services tentatively to be performed by:
Midwest Engineering and Testing, Inc.
geotechnical - environmental - materials engineers
1701 W. Market St., Suite B
Bloomington, Illinois 61701

309-821-0430
FAX 309-821-1242
www.metgeotech.com

4. Allowance is applicable for use by the Owner and Architect in writing.

1.1. ALTERNATE BIDS

A. The alternates are to provide the Owner with options expanding or reducing the project scope and content and for comparative material or equipment prices for use in determining the final construction contract.

B. Work included in alternates shall be commensurate with and in compliance with all the applicable and similar project specifications and conditions and shall include all necessary adjustments and additional labor and/or material as may become apparent to properly complete the alternate into the work. No additional charge will be considered after bidding for the purposes of making additional construction or adjustments in order to accomplish alternative work which has been included in the Contract.

C. Incidental Work: All necessary adjustment in the work shall be made to accommodate accepted alternates without cost change in and above the alternate cost.

D. Alternates are always an add or deduct to the Base Bid proposal and requirements UNLESS a specific alternate is described as an alternate to another alternate

1.2. ALTERNATE BIDS

A. **Alternate #1** – Expand the facility by one nominal 35' bay

1. This is an addition of an interior, bay.

a. Trench drain extends,
b. Wash bay moves north.
c. Extend the radiant heating,
d. Add lighting (and exterior lighting as noted).
e. Add Overhead doors commensurate with the base bid spaces, this adds 2 full width bays/ four (4) overhead doors. Overhead door signage will adjust with this alternate.

2. If taken and building is extended one bay this will eliminate the expansion clear span frame north wall and make the new relocated north wall a standard end wall.
3. This will extend the perimeter slab around the building

B. Alternate #2

1. Spray foam insulated walls, see specification 07 2119

a. This will continue to require the insulation spacers for siding
b. This will continue to require the interior liner panels.
c. This will require the manufacturer's recommended intumescent coating or Class A formulation of materials.
d. Only the insulation system is changed.

2. Alternate 2A, add for this change if Alternate #1 is taken.

C. Alternate #3

1. Spray foam interior insulated roof , see specification 07 2119

a. This will continue to require the insulation spacers for roof panels.
b. This will require the manufacturer's recommended intumescent coating white.
c. Only the insulation system is changed.

2. **Alternate 3A,** add for this change if Alternate #1 is taken.

END 00 2413

1. GENERAL

1.1. SCHEDULING

A. Master Schedule

1. The General Contractor as the Coordinating/Pacesetting Contractor shall prepare and maintain a Master Schedule.

2. Prior to preparation of the Master Schedule, all Subcontractors shall coordinate scheduling needs with the General Contractor.

3. Upon preparation of a detailed schedule, same shall be reviewed by the Architect and the Owner. Once accepted, it shall become the basis for determining the on time progress of the work.

    a. Provide manpower, overtime, and equipment as needed to maintain the schedule. The Owner will not authorize additional payment for overtime or additional manpower needed to maintain, achieve, or make up time to meet the schedule.
    b. The General Contractor shall notify the Architect and the Owner promptly of any deficiency in performance, which is unacceptably impacting the schedule or delaying progress.
    c. The Subcontractor(s) shall immediately notify the General Contractor, in the event any trade area Contractor's progress is impeding their ability to maintain the schedule.
    d. The General Contractor shall immediately provide notification of this report to the Architect and the Owner and shall include a plan of action to regain schedule.

B. Schedule

1. Contractors proposed schedule and timeline shall be delivered for review within seven (7) days or at the Pre-construction meeting.

    a. Schedule will be subject to review and negotiated revision after Owner and Architect input are considered.
    b. Schedule should be available for the Preconstruction meeting.
    c. See also, scheduling of work around Owner activities must be coordinated with the Owner.

        1) For example, do not take existing fuel tanks out of service before new are in place.
        2) Do not remove the existing fenc and gate until new fence and gate is in place.

    d. It is further the goal that the front entrance and the existing office be encumbered for the least amount of time to

reasonably complete the work. There will be acm floor removal to coordinate during the transition to remodel the existing space.

2. Submittals shall be delivered forty-five (45) days following award.

   a. This schedule is adjustable shorter or longer depending on the size and content of the project

3. Upon receipt of review submittals, schedule material and equipment for delivery as needed

4. Confirm that manpower is available and Contractor has adequate capacity to complete the work on a timely basis.

   a. Materials and equipment may be stored on site in trailers or in suitable insured warehouses in or near job site.
   b. Materials and equipment delivered on site or suitably stored with proof of insurance may be submitted for payment, subject to inspection.
   c. The Owner requests that equipment and materials to do the work be on site or readily available for delivery prior to the scheduled time of need.

5. Schedule

   a. The Owner has determined that the desired substantial completion date is on or before June 16, 2023 in order to facilitate move in and set up prior to 2024 fiscal operations starting in earnest. Ability to meet this date or as close as possible to it will be a consideration in this award.

   b. the Proposal shall include the delivery date of the pre-engineered building package and projected completion dates

      1. _____Weeks to prepare pre-engineered building submittal drawings

      2. _____Weeks after approved submittal drawings for pre-engineered package delivery

      3. _____Anticipated substantial Completion date for this project.

   c. Prior to commencing work the Contractor shall prepare a proposed schedule showing the planned substantial completion dates and the trade schedules.

   d. It is intended all work to be complete and fully operational 30 days after receipt of substantial completion punch list.

d. See requirements for Manning the work described hereafter.

e. Work on the addition to begin promptly and as much as possible completed prior to winter

C. Manning the work

1. Contractors shall work overtime, Saturdays and/or double shifts if work falls one (1) week behind prepared schedule or agreed to revision and shall continue to work Saturdays and double shifts, full crews or with additional crews until lost time is recovered.

2. Prepare a plan of action to recoup lost time for the A/E and Owner.

End 00 3000

PROJECT TITLE: New Maintenance Building

DATE OF PROPOSAL: **Thursday June 2, 2022 CDT**

LOCATION OF BID: LIVINGSTON COUNTY HIGHWAY DEPARTMENT
1705 S. MANLOVE STREET
PONTIAC IL 61764

NAME OF FIRM _____

PROPOSAL FOR: All work/All trades - single contract

A/E PROJECT NO. 2575 3521

THE BID ACKNOWLEDGES THE FOLLOWING ADDENDA:
Failure to acknowledge may cause bid rejection

NO. 1 _____, NO. 2 _____ , NO. 3_____, NO. 4_____, NO. 5 _____

EACH BID SHALL INCLUDE:

A. THE BID FORMS AND CERTIFICATIONS COMPLETED AND SIGNED, (*this form may be copied.)*
B. BID SECURITY (*standard industry forms may be employed)*
C. BIDS SHALL INCLUDE $40,000.00 ALLOWANCE – SEE 00 2413

BASE BID: New Maintenance Building:
THE BIDDER AGREES TO PERFORM ALL BASE BID WORK, INCLUSIVE OF ALL TRADES FOR THE SUM OF:

_____**Dollars**
WRITTEN AMOUNT

$_____

ALTERNATES: A bid is not required for every alternate to be considered, however, failure to bid any alternate subsequently selected by the owner for award will disqualify the bid. Determination of the low bid for award consideration is by combination of the base bid plus selected alternates.

ALTERNATE NO. 1: EXPAND BUILDING TO NORTH ONE 35' BAY.

_____**Add. $**_____
WRITTEN AMOUNT

ALTERNATE No. 2: Spray foam insulated Walls

_____**Add/(deduct)$**_____
WRITTEN AMOUNT

ALTERNATE No. 2A Spray foam insulation Walls for Alternate #1 $_____

ALTERNATE 3: Spray foam insulated roof system.

_____**Add/(Deduct) $**_____
WRITTEN AMOUNT

ALTERNATE No. 3A Spray foam roof insulation for Alternate #1 $_____

ALTERNATE _____
SPACE LEFT FOR ALTERNATE IF REQUESTED BY ADDENDUM

_____**ADD$**_____
WRITTEN AMOUNT

The Owner has determined that the desired substantial completion date is on or before June 16, 2023 in order to facilitate move in and set up prior to 2024 fiscal operations starting in earnest. Ability to meet this date or as close as possible to it will be a consideration in this award.

This Proposal estimates the delivery date of the pre-engineered building package

- _____Weeks to prepare pre-engineered building submittal drawings
- _____Weeks after approved submittal drawings for pre-engineered building material delivery.
- _____Anticipated substantial Completion date per this proposal.

VOLUNTARY ALTERNATES OR SUBSTITUTIONS

Did you offer or include voluntary alternates or product substitution on form provided?

YES _____ **NO** _____

SEE PRODUCT SUBSTITUTION OR VOLUNTARY ALTERNATES FORM, ATTACH IF ANY ARE OFFERED. Voluntary alternates or substitutions may or may not be considered in making the award and are not required.

THE BIDDER AGREES TO:

1. Hold this bid open for forty five (45) calendar days after bid opening date.
2. Enter into and execute a contract with Livingston County Highway Department/Livingston County if awarded this contract.
3. Comply with the contract and bidding documents with respect to bid security, all bonds, insurance, work requirements, schedule and Bonus / Penalty Clause
4. Comply with the Contract Documents with respect to scheduling as described in the documents, noted on drawings.

THE BIDDER MAKES THE FOLLOWING REPRESENTATIONS AND CERTIFICATIONS:

A. A surety company has agreed to issue payment and performance bonds to fulfill the contracting requirements.
B. The Bidder is not barred from contracting with any unit of state or local government as a result of violating the bid rigging or bid rotating provisions contained in 720 ILCS 5/33E.
C. The Bidder is not barred from contracting with the State of Illinois as a result of a bribery conviction per 30 ILCS 505/10.2.

D. All on site labor and wage compensation provided by this contractor or his subcontractors will comply with the Illinois Prevailing Wage Act (820 ILCS 130E).

E. This proposal is made without any connection with any person making another bid for the same contract, that the bid is in all respects fair and without collusion or fraud, that no member of the Livingston County Board, other officer or any person in the employment of Livingston County is directly or indirectly interested in the bid or any portion of the profit there from, except as allowed by the Illinois Law.

F. I agree to provide a drug-free workplace as required by the Illinois Drug-free Workplace Act.

H. I do hereby certify that I am either the bidder or duly authorized agent of the referenced bidder, and I am authorized to execute the certifications hereon.

G. I certify that by submission of this proposal the bidder confirms that he is familiar with the site, existing conditions, the Bid Documents, requirements and the project schedule.

Contractor:

Firm Name: _____

Address: _____

_____

Telephone: _____

FAX: _____

Email:_____

Date: _____

Authorized signature:

_____

TITLE:_____

Seal for Corporations only

END 00 4000

The Bidder should include this form with the Bid Forms if a material or equipment option to that specified is offered.

The Base Bid and Alternate Bids include only those products specified in the bidding documents. Following is a list of substitute products or assemblies which bidder proposes to furnish on this project, with the difference in price being added to or deducted from the Base Bid or Alternate Bids.

Bidder understands that acceptance of any proposed substitution is at Owner's option. Approval or rejection of any substitutions listed below will be subject to final review before contract award. Hold open for thirty-five (35) days from Bid Date.

SUBSTITUTIONS

MANUFACTURER'S NAME AND PRODUCT	ADD OR (DEDUCT)
_____	_____
_____	_____
_____	_____
_____	_____

VOLUNTARY ALTERNATE

DESCRIPTION	ADD OR (DEDUCT)
_____	_____
_____	_____
_____	_____
_____	_____

EVALUATION. Contract award will be made in accord with Instructions To Bidders. The Owner reserves the right to consider or reject voluntary alternates and substitutions without explanation.

Attach with herewith or submit on day of bid a written description of the proposed option being offered.

Provide additional detailed information promptly upon request.

END 00 4010

1 GENERAL

1.1 CONTRACT FORM

A. AIA owner contractor Agreement form 105-2017

END 00 4113

1. GENERAL

1.1. GENERAL CONDITIONS

A. The conditions outlined in this and following paragraphs are to supplement and complement the conditions found in the articles of the AIA Document A201, 2017 Edition.

1. Included in these Specifications by reference is AIA Document A201 General Conditions.

B. AIA Document A201, 2017 Edition, can be purchased directly on line from a variety of vendors including the AIA and are available in electronic format as well as printed.

1. AIA A201 2017 version can be reviewed at the Architects office without charge.

C. To the page one of the AIA A201 General Conditions Document:

1. Project: New Maintenance Building, 1705 S. Manlove Street, Pontiac, IL 61764
2. The Owner: Livingston County Highway Department, 1705 S. Manlove Street, Pontiac, IL 61764
3. The Architect: Middleton Associates Incorporated, 1702 W. College Ave., Suite E, Normal, IL 61761
4. The Engineer: MEP: Keith Engineering, 707 NE Jefferson Avenue, Peoria, IL 61603; CIVIL: Hampton Lenzini and Renwick, Inc., 3085 Stevenson Dr., Suite 201 Springfield, IL 62703

1.2. SIGNING OF DOCUMENTS AND INSTRUMENTS OF THE CONTRACT

A. All documents shall be signed by persons fully and duly authorized to so sign. Any documents signed by a person other than person prescribed by the Contractor's legal organization shall enclose with his signature the evidence of "Power of Attorney."

2. SUPPLEMENTARY GENERAL CONDITIONS

2.1. SUPPLEMENTS TO AIA DOCUMENT A201 (2017 EDITION) THE GENERAL CONDITIONS OF THE CONTRACT.

A. The following sections represent modifications or additions to the AIA A201 -2017 Document.

B. TO ARTICLE 1/GENERAL PROVISIONS

1. Subparagraph 1.1.1 Contract Documents delete reference to Instructions for bidders and Addenda relating to bid requirements

as not included in the Contract Documents.

2. Add Subparagraph 1.1.1.1 The information provided to the bidder in Division 0 of the documents, shall be included without deletion as part of the Contract Agreement.

C. TO ARTICLE 3 CONTRACTOR

1. Add Subparagraph 3.2.1.1 Easements off site required by the Contractor to execute the work, such as space for storage, access, scaffolding, lane enclosure, etc., shall be arranged for by the Contractor and included in the contract amount.

2. To Subparagraph 3.3.1, delete the last two (2) sentences listed under 3.3.1 in their entirety.

3. To Subparagraph 3.3.1 insert: If the Contractor determines that such means, methods, techniques, sequences or proceedings may not be safe, or may not be appropriate to the equipment and task as becomes apparent, then said Contractor shall have included in his proposal amount allowance to complete this work per his revised plan for which he can assume responsibility and shall notify the Owner and Architect before proceeding. In no case do the Owner and Architect take responsibility for directing Contractor Operations.

4. Add paragraph 3.5.3 Contractor shall be responsible for latent defects for 10 years. A latent defect is work or equipment that is later discovered to have not met the contract or code requirement.

5. To Subparagraph 3.12

   a. Add 3.12.6.1 Submittals obviously not reviewed by the Contractor will not be reviewed at the Architect's option. Said unmarked submittals may be returned to the Contractor for re-submittal and the time loss shall not extend the time of completion of the project.
   b. Add 3.12.6.2 Submittals reviewed by the A/E and returned or held as a record copy presume the Contractor responsibilities in paragraph 3.12.6 have been included whether noted or not.
   c. Add 3.12.6.3 Submittals that include a change from the specification shall be specifically brought to the A/E attention by separate attached correspondence.
   d. Add 3.12.6.4 Review of a submittal in no circumstance accepts a change in specified requirements unless specifically noted by the A/E.

D. TO ARTICLE 5 SUBCONTRACTORS

1. To Subparagraph 5.2

a. Add 5.2.5 The assignment of work or a portion of the work by the Contractor to Subcontractor(s) is the election of the Contractor and in no way changes or reduces the Contractor's final obligations under the Contract to properly complete the work and/or provide clear title to the work, including the work by said Subcontractor(s).

E. TO ARTICLE 7 CHANGES IN THE WORK

1. To Subparagraph 7.1.2

a. Add 7.1.2.1 The Contractor and/or his Subcontractor shall not proceed with any work, directive or change for which he intends to claim extra cost without providing timely written notice to the Architect.
b. Add 7.1.2.2 The Architect and Owner shall provide response to claims for additional cost within a reasonable time period upon receipt of notice or quote.
c. Add 7.1.2.3 Work for which an agreement cannot be reached prior to implementation and at direction of A/E and Owner can proceed as time and material work with all parties to agree on what is additional work over that which should have been included to complete the work as originally intended.

2. To Subparagraph 7.2.2

a. Add 7.2.2.1 Change Order quotes shall be based on an approved quote or estimate which shall be based on labor and material cost, actual or estimated as prior agreed upon, and:
b. Add 7.2.2.2 Overhead and profit may be charged proportional to this category of work on the Contractor's CSV or not to exceed the greater of:

1) Eighteen percent (18%) for the Contractor's own work forces
2) Ten percent (10%) Subcontractor plus ten percent (10%) Contractor, for twenty percent (20%) total for work completed under a Subcontractor arrangement.
3) These allowances shall include all off site and indirect costs, including insurance, project management, bonds and profit.

F. TO ARTICLE 9 PAYMENT AND COMPLETION

1. To Subparagraph 9.6.1

a. Add 9.6.1.1 Wherein the Owner is governed by a public Board, payment requests must be received by the A/E 5

days prior to the established time for entering into agenda prior to the next regular Board Meeting. Payments will endeavor to be made within twenty-five (25) days following Board approval. Failure to make agenda dates will result in a minimum one (1) month delay in payment.

G. TO ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

1. To Subparagraph 10.2.1

a. Add 10.2.1.4 The Contractor shall be responsible to provide and maintain on site MSDS Sheets for all required materials to be brought on site.

1) These sheets shall be readily available upon request to the owner on remodeling renovation projects which are Owner occupied.
2) Comply with VOC regulations.
3) Comply with IEPA regulations.

2. To Subparagraph 10.2.3

a. Add 10.2.3.1 Provide for the general safety of public and Owners employees, such safety provision shall be adjusted as appropriate to the age and volume of public anticipated in the project vicinity.
b. Add 10.2.3.1 Provide for traffic safety as appropriate to the operations; cooperate with the governing authorities on road activities, lane closures, excavations, surface cleaning etc.

H. TO ARTICLE 11 INSURANCE & BONDS

1. To Subparagraph 11.1.2

a. Add 11.1.1.1 Minimum Limits of Liability for preceding coverage are:

1) Workers Compensation - Statutory Limit
2) Applicable Federal *(such as Longshoreman's)* Statutory limits.
3) Liability Insurance may be written as Comprehensive General Liability policy form or Commercial General Liability policy form with the following coverages:

a) Bodily Injury - $1,000,000 each occurrence, $2,000,000 aggregate
b) Property Damage - $1,000,000 each occurrence, $5,000,000 aggregate.
c) Property Damage – Broad Form - $1,000,000 each occurrence, $2,000,000

aggregate.

d) Personal injury (*with employment clause deleted*) $1,000,000 aggregate.

e) Products and completed operations $1,000,000 to be maintained one year following final completion.

f) Business Automobile Liability, (*including owned and non-owned and hired vehicles*)

g) Bodily Injury and Property damage $1,000,000 each person, $1,000,000 each occurrence.

4) Umbrella Insurance may be employed to supplement primary insurance limits to meet required limits.

5) Contractor is responsible for any self insured limits not to exceed $10,000 for any self insured hazards each occurrence

6) In the event that a claim is filed or a settlement reached whether related to this project or not which compromises the aggregate limits of liability then the Owner and Architect shall be notified and arrangements shall be made to provide additional insurance as needed to keep aggregate limits in force for the remainder of the Contract.

2. To Subparagraph 11.1.1

a. Add 11.1.1.2 The Owner, Architect, and Consulting Engineers including their employees and representatives shall be included as Additional Insureds or Named Insureds on the insurance and shall be shown as such on the Certificate.

3. To 11.2. Property Insurance – Builder’s Risk

a. Add 11.2.1.1 The Owner's property and vandalism, Builder’s Risk insurance has $5,000 deductible. The Contractor shall insure and thus pay the costs not covered by the Owner’s deductibles.

b. Add 11.2.1.2 The Owner's Builder's Risk will cover only normally included Owner risks, on site, Owner's interest only, excluding tools and property of the Contractor and improperly stored or unsecured materials or loss/damage resulting from contractors operations.

4. To Article 11

a. Add 11.6.1 Contractor's insurance shall be maintained in force through basic warranty and guarantee periods, not less than one (1) year following Final Completion.

5. To Paragraph 11.7.1 add the following Subparagraphs:

a. Add 11.7.1.1The Contractor shall furnish Performance and Labor and Material Payment Bonds covering the faithful performance by the Contractor of the work specified in accordance with the plans and specifications and according to the time and terms and Conditions of the Contract, and also that the Contractor shall properly pay all debts incurred in the prosecution of the work, including those for labor and materials furnished and including labor obligations as interpreted by the Illinois Department of Labor and/or the courts.

b. Add 11.7.1.2 The cost of each bond shall be included in the Contract Sum plus any changes to the Contract Sum. The Contractor shall include in all bonds provisions as will guarantee faithful performance of the prevailing wage provisions of the Contract if applicable.

c. Add 11.7.1.3 Bonds shall be written by surety, approved by Owner, with a minimum rating of B or better, Financial Class V, or higher, in A.M. Best's Insurance Guide, current edition. The company must also be licensed in the State of Illinois.

d. Add 11.7.1.4 The Contractor shall require the attorney-in-fact who executes the bonds on behalf of the surety to affix thereto a certified and current copy of power-of-attorney.

e. Add 11.7.1.5 The Contractor shall deliver the required bonds to the Owner not later than fifteen (15) days following the date the agreement is executed.

I. TO ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

1. To Subparagraph 12.2.2.1 After Substantial Completion:

a. Add 12.2.2.1.1 Latent Defects, for a period of 10 years after Substantial Completion, upon demand by the Owner, the Contractor shall promptly repair or replace, including associated work repairs and cleanup necessary, non-code compliant installations, defective or non-conforming work resulting from or constituting latent defects, fraud, fraudulent concealment, negligence or gross negligence.

b. Add 12.2.2.1.2 Seasonal equipment such as temperature controls and building systems subject to seasonal loads such as heating equipment and air conditioning, shall be warranted to perform as intended for two years. Exception would be equipment damaged by incorrect operation or maintenance procedures, specifically covered in training, but improperly implemented by the Owner.

c. Add 12.2.2.1.3 Prompt Repair. Upon notice from the Owner or Architect of defects or nonconforming work, the Contractor shall promptly visit the site in the company of the Owner's representative to determine the extent of all defects

or nonconforming work. The Contractor shall provide all labor, material and equipment to promptly repair or replace the defective or nonconforming work. The repair shall include all adjacent work not necessarily provided by the Contractor, but damaged as a result of correcting or remedying such defects or non-conforming work. If the Contractor does not promptly pursue correction, the Owner may repair or replace such work and charge the cost to the Contractor. Work which is repaired or replaced by the Contractor shall be inspected and shall be warranted by the Contractor in accordance with this Article.

d. Add 12.2.2.1.4 The warranties set forth herein are in addition to all warranties or guarantees expressed or implied by operation of law, statute or ordinance.

1. To Subparagraph 12.2.2.3, Delete the word 'not'. Clarification; all materials and equipment are expected to perform satisfactorily for one year, items or equipment needing periodic attention during the first year of use, shall continue to be serviced by the Contractor until such time that the material, item or equipment is deemed to be doing its intended purpose without repeated service.

2. To Subparagraph 12.2.5

   a. Add 12.2.5.1 Extended Warranties and Commercial Warranties. The Contractor shall deliver all commercial and extended warranties received from manufacturers to the A/E prior to Final Payment. Extended warranties and guarantees will be as described under the various trade work sections of these documents, and may be the responsibility of third parties to the contract such as dealers or manufacturer's from whom such extended coverage is specified or as advertised such as a commercial limited warranty of performance or service. Such extended warranties may or may not include labor unless specified, or in the case of commercially advertised warranties as offered by the party selling the product or equipment.

   b. 12.2.5.2 Prompt Repair. Upon notice from the Owner or Architect of such defects or nonconforming work, the Contractor shall promptly visit the site in the company of the Owner's representative to determine the extent of all defects or nonconforming work. The Contractor shall provide all labor, material and equipment to promptly repair or replace the defective or nonconforming work. The repair shall include all adjacent work not necessarily provided by the Contractor, but damaged as a result of such defects or non-conforming work or as a result of remedying them. If the Contractor does not promptly repair or replace defective or non-conforming work, the Owner may repair or replace such work and charge the cost thereof to the Contractor. Work which is repaired or replaced by the Contractor shall be

inspected and shall be warranted by the Contractor in accordance with this Article. The warranties set forth herein are in addition to all warranties or guarantees expressed or implied by operation of law, statute or ordinance.

B. TO ARTICLE 13 MISCELLANEOUS PROVISIONS

1. To Subparagraph 13.1

a. Add 13.1.1 Location of the project is Illinois.
b. Add 13.1.2 The Contractor shall, to the best of his knowledge and capability, perform all work encompassed by the documents, in compliance with the Environmental Barriers Act (Ill. Rev. Stat. 1985, ch. 111-1/2, pars. 3711 et seq. as amended), the Illinois Accessibility Code, 71 Illinois Administrative Code 400; The Uniform Federal Accessibilities Standards (UFAS); Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990 (effective January 26, 1992) known as ADA requirements. This obligation shall apply to the contractual work described as the project and the conduct of work processes initiated to accomplish the work.
c. Add 13.1.3 All parties to this Contract are subject to the rules and regulations of the Illinois Department of Human Rights and the statutory requirements thereof, including the requirement that every party to a public contract shall have adopted written sexual harassment policies (PA 87-1257).
d. Add 13.1.4 It shall be mandatory that the Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry, age, marital status, physical or mental disabilities.
e. Add 13.1.5 Illinois Department of Labor requirements. It shall be mandatory upon the Contractor to whom the Contract is awarded and upon any Subcontractors thereof to be in compliance with applicable wage and reporting regulations. This project is a Prevailing Wage Public Works contract.

2. To Subparagraph 13.3.

a. Add 13.3.1 Notice served by facsimile (fax) to facsimile number used during bidding and construction shall be official written notice.
b. Add 13.3.2 Notice served by electronic means (email) to the electronic address used during bidding and construction shall be official written notice.
c. Add 13.3.3 The Bidder shall notify the Architect and/or the Owner at anytime of changes in the facsimile or electronic

contact addresses that will reach the contractor. Failure to so notify is the Contractors responsibility.

C. TO ARTICLE 15 CLAIMS AND DISPUTES

1. To Subparagraph 15.3.1 Delete the word ‘SHALL’ and Insert the word ‘MAY’.

   a. Add 15.3.1.1 Mediation may be employed to resolve disputes if agreed to by both parties to the Contract.

2. To Subparagraph 15.4.1 Delete the word Shall and insert the word ‘MAY’.

   a. Add15.4.1.1 Arbitration may be employed to resolve disputes if agreed to by both parties to the Contract.

End 00 7000

1. GENERAL

1.1. REQUIREMENTS INCLUDE

A. Work covered by Contract Documents

1. The Contract includes all phases of the construction work pursuant to the New Maintenance Building as set forth in these Specifications and the accompanying Drawings.
2. All work, single Contract.

    a. All labor and materials necessary to complete and finish properly and all systems operable unless specifically noted as by owner.
    b. General Construction Work (GC) Prime
    c. Plumbing, (PC) Subcontractor
    d. Mechanical (MC) Subcontractor
    e. Electrical Work (EC) Subcontractor
    f. Fire Protection FP subcontractor
    g. Interior and Exterior Work, site work, paving grading utilities
    h. Equipment as specified in the Documents

1.2. PRODUCTS FURNISHED BY OTHERS:

All products, components, spaces, and equipment furnished by the Owner are currently in place and are to be relocated, disconnected and reconnected as set forth in these Documents (Specifications and Drawings) and/or required to accomplish these Documents. All added components shall be new and furnished by the Contractor.

A. Contractor's Incidental Duties

1. Designate specific delivery date for each product in approved construction schedule.
2. Promptly inspect delivered products, report damaged or defective items.
3. Handle at site, including unloading, uncrating, and storage.
4. Protect from exposure to elements, from damage.
5. Repair or replace items damaged as result of Contractor's operations.
6. Install, connect and finish products in assembly function ready including incidental related work.

B. By others duties

1. It is the intent that the parking areas, after removal of topsoil and subgrade prepared by this contractor, will be brought up to final grade with HMA recycled material and placed by the Owner or his selected contractor.
2. The concrete apron to Manlove Street/Weston Blacktop, will be performed by the Owners forces or their selected vendor.

1.3. WORK SEQUENCE

A. Coordinate the work schedule with the Owner and site administrator.

1. Owner forces will pour the Drive Apron to Manlove Street.

1.4. SCHEDULE

A. Project Schedule

1. Immediate start upon award, expedite as materials equipment and pre-engineered structure are available.
2. Following award submit a proposed schedule with anticipated delivery dates identified for major components.
3. Final Completion: **fifteen (15) days after Punch List.**

B. Work not completed prior to student occupancy to be completed:

1. Second shift
2. Weekends

1.5. CONTRACTOR USE OF PREMISES

A. Confine operations at site to areas permitted by:

1. Law
2. Contract
3. The Owner's Representative, per 1.3.B. above.

B. Do not unreasonably encumber site with materials or equipment. Do not block the Owner's pedestrian traffic patterns except as prior arranged with the Owner's approval.

C. Do not load structure, or components thereof, with weight that will endanger or damage structure.

D. Assume full responsibility for protection and safekeeping of products stored on premises.

E. Move and relocate as necessary all stored products or equipment that interferes with operations of the Owner.

F. Obtain and pay for use of additional off site storage or work area needed for operations.

G. Limited use of site for work and storage

1. Use public access ONLY, now in service. Parking ONLY as prearranged with the Owner.
2. All vehicular on site activity shall have been prearranged and approved by the Owner.

H. Cooperate with the Owner's use of the premises and other Contractors providing work on site under separate Contracts with the Owner.

1.6. CONTINUOUS OCCUPANCY BY OWNER

A. Owner will occupy areas for purposes of conducting educational athletic and physical education and general maintenance during construction.

B. Contractors shall provide

1. Access by Owner's personnel when applicable.
2. Operation of existing Mechanical and Electrical systems with a minimum of down time.
3. Operation of exhaust systems with a minimum of down time.
4. Adequate security of the premises in which work is in progress.

C. Upon (after) the work being completed and accepted by Owner, the Owner shall provide:

1. Custodial services
2. Security
3. General custodial maintenance

1.7. ASBESTOS

1. There is no known ACM condition on this project:
2. Upon determination prior to bidding, or after bidding discovery by the Contractor that an asbestos hazardous condition does exist in the path of execution of the work of his Contract, he shall so notify the Owner IN WRITING.
3. Pursuant to Item 1.6.B.1 above, the Owner (Livingston County Highway Department, Pontiac, IL) may implement the following action:

a. Eliminating that portion of the work by revision and change order to these documents.
b. Institute removal or acceptance encapsulation.

4. Wherein concealed asbestos is discovered or suspected, the Contractor shall notify the Owner of the existence of said apparent asbestos which may require analysis for hazardous determination. This notification shall be IN WRITING at no cost to the Owner. Should analysis indicate that hazardous substance does prevail the procedure shall be set forth under Item 1.6.B.2. above.

a. NOTE: DELAY IN THE CONTRACTOR'S WORK DUE TO SUCH CONCEALED DISCOVERY AND/OR OWNER RESPONSE THERETO SHALL NOT BE GROUNDS FOR CLAIM FOR EXTRA EXPENSE BY THE CONTRACTOR CHARGEABLE TO THE OWNER AS AN EXTRA TO THE CONTRACT AMOUNT.

1.8. COORDINATION AND COOPERATION

A. It is the intent and purpose of the Owner to cooperate with the Contractor to the extent feasible under existing applicable laws and regulations and the Owner and the Contractor alike shall not construe this portion of the documents, that is, Section Paragraph 1.6.A, and B to the disadvantage of the other.

B. Should the bidding Contractor not understand the foregoing, he shall notify the Architect/Engineer for clarification prior to bidding in accordance with Section 00040, Paragraph 1.3, 1.4, and 1.15.

C. This Contractor shall cooperate with other Contractors and their Subcontractors working on site duly employed by the Owner to perform service related and unrelated to work outlined by these Documents.

D. The Owner has the right to employ other contractors or his own forces to be working on site in concurrence with this Contractor's work. Coordinate and cooperate to the extent reasonable under the contract so all parties can collectively accomplish the work scheduled.

1.9. FITTING AND FINISHING THE WORK

A. Contractor shall verify all field conditions, dimensions, elevations that relate to the work and properly accommodate these in the work as appropriate to the intended result within the Contract amount.

1. In place construction, obstacles and site conditions and elements which can be seen and reasonably inferred.
2. New construction, obstacles and conditions that can be seen or are to occur in the completion of the work.
3. Allow to fit structural elements and all equipment as occur or will occur during the implementation of the Contract.
4. Make adjustments as needed to fit and properly complete the work. This includes coordination of work by all trades.

B. Contractor and his Subcontractors shall coordinate, accommodate, adjust and fit as appropriate all work to achieve the intended finished intent to normal commercial industry standards.

1. Provide finishing elements, trim, sealants, scribes, receivers and accessories necessary and normal to the installations proposed and as recommended by manufacturers for proper use of products.
2. All construction (all trades) to be weather and infiltration tight. Include appropriate weather seals, infiltration barriers, sealants, non-corrosive flashings and sealants to properly complete the intent of the project.
3. Provide all necessary work to complete all installations, equipment and parts of the work to be complete and properly operable, under control for motorized equipment, in a finished appearance and condition, unless specifically noted otherwise.

a. Conceal piping and conduit to the extent possible
b. Run piping and conduit and supports parallel and/or

perpendicular to main structural elements when possible.

c. Avoid creating trip hazards or low headroom hazards when possible
d. Always allow for service access.

4. Always comply with the Illinois Energy Code

a. Infiltration tight
b. Watertight
c. Insulation and continuous insulation, types and assembly U or R values as well as component ratings.
d. Air barriers continuous to the extent possible at assembly junctures, windows to walls, walls to roof assembly, walls floor to floor.

END 01 1000

1. GENERAL

1.1. SPECIFIED PRODUCTS

A. All bids shall be based on providing products exactly as specified or equal as prior approved.

B. Products specified only by reference or performance standards, shall be met or exceeded by the standards of any manufacturer's material and subject to the Architect/Engineer's approval.

C. Products specified by naming several products or manufacturers shall be selected from any product and manufacturer named.

1.2. SUBSTITUTIONS, BIDDER/CONTRACTOR OPTIONS

A. PRIOR TO BID OPENING - The Architect/Engineer will consider requests to amend the bidding documents to add products not specified, provided such requests are received in adequate time prior to bid opening date.

1. Requests received after ten (10) days before bid due date will not be considered.
2. If a request is approved, the Architect/Engineer will endeavor to issue an appropriate addendum not less than seven (7) calendar days prior to bid opening date.
3. Ten (10) days is based on the start bid date, and will not be extended by bid extension unless same is extended more than ten (10) days.

B. WITH BID - Substitutions will not be considered with the bids.

C. AFTER AWARD OF CONTRACT - No substitutions will be considered after Notice of Award, except under one or more of the following conditions:

1. Substitution is required for compliance with final interpretations of code requirements or insurance regulations.
2. Unavailability of specified products, through no fault of the Contractor.
3. Subsequent information discloses inability of specified product to perform properly or to fit in designated space.
4. Manufacturer/fabricator refusal to certify or guarantee performance of specified product as required. This does not alter the requirement.
5. When a substitution would be substantially to the Owner's best interest.

1.3. SUBSTITUTION REQUIREMENTS

A. Submit four (4) copies of each request for substitution. Include in each request for substitution:

1. Complete data substantiating compliance of proposed substitution with Contract Documents.
2. For products:

    a. Product identification, including Manufacturer's name and address.
    b. Manufacturer's literature.

        1) Product description.
        2) Performance and test data.
        3) Reference standards.

    c. Samples, if applicable.
    d. Name and address of similar projects on which product was used and date of installation.

3. For construction methods substitution:

    a. Detailed description of proposed methods.

4. Itemized comparison of proposed substitution with product or method specified, including accurate and true cost data on proposed substitution in comparison with product or methods specified.
5. Data relating to changes in construction schedule.
6. Identify:

    a. List other contracts affected, if applicable.
    b. List changes or coordination required.

B. In making requests for substitution, bidder/contractor represents:

1. He has personally investigated proposed product or method and determined that it is equal or superior in all respects to that specified.
2. He will provide the same guarantee for substitutions as for product or method specified.
3. He will coordinate installation of accepted substitutions into work, making all such changes as may be required for work to be complete in all respects.
4. He will provide complete cost data including all related costs under his contract (and other Prime Contract's, as applicable) whose work may also be affected by the substitution in product or method.
5. He will assume full responsibility for all additional costs and expenses to the Owner, Architect/Engineer (and other contractors employed on the same project, as applicable).
6. The Contractor agrees that it is the Contractor's sole responsibility to stand any costs that may be attributable to an allowed substitution that may surface as construction proceeds toward finalization.

C. Substitution will not be considered if:

1. It is indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with Paragraph 1.4 above.
2. Acceptance will require substantial revision of Contract Documents.

END 01 2500

1. GENERAL

1.1. MANAGEMENT OF THE CONTRACT

A. The contractor shall provide necessary project support to manage necessary support documentation in an accurate and timely fashion.

1. Following award, ten (10) calendar days, submit two (2) copies:

   a. Signed contracts
   b. Insurance
   c. Bonds, Labor and Material payment and Performance or approved Owner protective bond.
   d. Subcontractor/supplier List – provide promptly prior to signing the of contract to the extent possible.
   e. Contractor Schedule of Values, labor and materials and by trade and task breakdown.

2. Pre-Construction meeting:

   a. Provide proposed schedules
   b. Project access for remodel/renovation projects
   c. Project security plans, fences, storage facilities, public access control.
   d. Proposed schedule
   e. Contact information
   f. Identify Project management team, Superintendent of the work
   g. Provide minutes of the Pre-Construction meeting including list of attendees and copies of schedules, notices RFIs as applicable to the meeting

3. Periodic Progress meetings

   a. Schedule to be agreed to, not less than bi weekly nor more frequently than weekly during periods of active progress.
   b. Provide representation by subcontractors whose work is currently or projected to soon be active.
   c. Provide updates on recently completed progress since previous meeting and work planned for the immediate future.
   d. Provide Revised schedules or notice of major changes to projected schedules
   e. Provide minutes of the Progress meeting including list of attendees and copies of schedules, notices RFIs as applicable to the meeting

4. Prior to start of the work on site:

   a. Apply for and NOI - SWPPP permit from IEPA as applicable

on projects excavating over 1 acre or more and/or as required by municipal authorities if smaller excavation area is designated by local code.

1) Contractor to provide necessary erosion control plan as needed for the permitting process.

b. Permits as applicable

1) Regulatory permit fees as applicable to this project charged by authorities having oversight.
2) IEPA payable by the contractor
3) ROE application and any fees by the Owner
4) City of Pontiac, any fees charged will be negotiated by the County and is charged reimbursable.

c. Have in place the safety plan and assigned safety person on the site. Safety is the responsibility of the contractor, and is not monitored or directed by the Owner or the A/E except in apparent emergency situations where the Owner or the A/E might assist in determination of safety accommodations as identified by the contractor.

d. Have in place the fences and barricades to control public or non-contractor access to the site.

1.2. SUPERINTENDENT OF WORK

A. The Contract shall designate a person who shall be General Superintendent of on site construction work encompassed by the Contract Documents.

1. Said designated superintendent shall have prior served as project superintendent of construction of similar nature and size. Qualifications shall be subject to the Owner’s and Architect's review.

2. Superintendent shall remain superintendent for the duration of the project unless said person shall become disabled, no longer employed by the Contractor. The Contractor shall provide notice to the Architect and the Architect and Owner shall approve the personnel change.
3. Owner can request superintendent replacement for cause at any time.

1.3. AWARD AND LETTER OF INTENT

A. The Owner will make an award based on the selection of the lowest cost responsible bidder that has demonstrated past experience and evidence of adequate resources to accomplish the work. After the award, and the issuance of a Letter of Intent, the contract timeline is as follows:

1. Return signed agreement seven (7) days
2. Sub Contractor, Supplier, or any entity to be assigned a part of the work, provide list, addresses and contact information. Seven (7) days. Provide references upon request. Seven (7) days:
3. Labor and Materials, Payment, and Performance bonds, 15 days
4. Insurance, 15 days
5. Master Cost Breakdown (CSV), 15 days
6. Proposed Schedule and time line, 15 days

B. Failure or refusal to provide the preceding Contract information in a timely manner may be cause for cancellation of the award or termination of the agreement if signed and the Owner will be entitled to compensation under the terms of the bid security for failure to execute contract terms in good faith.

1.4. MATERIALS SPECIFIED AND QUALITY OF WORK

A. Materials shall be as specified or approved equal.

B. "Approved equal" and "or equal" shall mean that the Contractor shall be required to receive the Owner's approval (via the Architect) on any substitute materials seven (7) days prior to the bid due date.

C. Requests for substitution approval shall be submitted to the Architect/Engineer.

1. Prior to considering substitutions, the Owner and/or the Architect/Engineer may require submission of samples, descriptive, technical and catalog data and lab reports of tests for verification of equivalency.
2. Said submittals shall be presented to Architect/ Engineer.

1.5. PROGRESS PAYMENTS

A. All payments by the Board of Education require Board approval.

1. Payment requests must be submitted prior to the first Monday of the month for consideration and entry into the agenda.
2. Untimely submission of payment request will result in a one (1) month delay for consideration.
3. The Contractor will be notified of the regular Board meeting schedule upon request.
4. Payment will be made within twenty (20) days following board approval, or a notice of board concerns will be provided.

B. In accordance with the terms of the Contract periodic partial progress payments may be made monthly to the Contractor for: 90% of the value of the labor, materials, and/or equipment incorporated in the construction.

1. Payment will be for completed progress materials only.
2. Materials properly stored and protected on site may be billed
3. Payment for Materials off site may be considered if properly

warehoused, dedicated to this project and insured, submit all information and same will be reviewed and may be approved or denied for payment.

4. Progress pay requests shall indicate amounts completed of all items listed from the master breakdown.
5. 10% of each request will be retained by Owner until work has been satisfactorily completed.
6. Submit lien waivers for preceding payments made.
7. Submit lien waivers from subcontractors and suppliers.
8. Submit notarized Contractor's affidavits with each pay request showing that total owed on Contract by Owner (after subject request has been paid to Contractor) is more than the amount to become due the Contractor for material, subcontractors and labor.

C. All the applications for payment shall be made in three (3) copies with all copies bearing live seals and signatures, notarized and complete and accurately filled in.

1. Applications for payment shall be submitted to Architect/Engineer on AIA G-702A Forms or other standard formats containing similar information.

D. Public Projects require: One (1) copy of Contractor’s Certified Prevailing wage payroll with Pay Request or on monthly schedule coordinated with payroll dates, in accord with Illinois Dept. of Labor requirements. Include Payroll for the major Subcontractors and upon request any minor or intermittent on-site Subcontractor.

1. Certified payrolls are not required for personal making deliveries of materials, Officers and management team making inspections but not doing physical work on site. The extent of compliance is as established by the IDL and state law and exception to or compliance with is the responsibility of the contractor.
2. Submit beginning with the first application for payment for all workers employed on site
3. Submit for each successive month or pay periods as applicable.

1.6. FINAL PAYMENT: The final application for payment shall not be made until all work and deficiency (punch list) items have been satisfactorily completed and approved by the Architect/Engineer for documents compliance.

End 01 3000

1. GENERAL

1.1. DESCRIPTION

A. Prior to commencing the work, the Contractor shall provide submittals on all materials and equipment proposed for the work.

1.2. Shop Drawings, Submittals, and Submittal Brochures

A. Submit four (4) copies minimum unless noted otherwise in a particular section.

1. Electronic PDF submittals are preferred.
   a. Preferred direct email of submittals not a submittal service with log in and electronic tracking of comments.
2. Electronic submittals **shall be edited to be relative to this specific project.**
   a. For example, do not submit an electronic file of a manufacturer's 25 page catalog with applicable selections circled or marked with in the body of the submittal. Select the applicable pages and submit only those.

B. Architect, engineer and/or Owner will retain up to three (3) copies.

C. Contractor will receive remaining copies for his use.

D. Shop drawings and material schedules shall be accompanied by catalog cuts or literature providing all data, description, function, and capacity of item or component submitted.

E. Catalogs and fliers with multiple component descriptions shall be clearly and precisely marked as to submittal item. The Architect/Engineer's office will provide no sorting to assure the submittals match with documents requirements.

1.3. Samples

A. When samples are requested submit 0ne set minimum.

1. Color and pattern related materials submit actual chip kits or sample rings or samples to allow accurate discernment, printed or electronic pdf is generally not adequate.
2. Upon request, provide an oversize, 12" x 12" or nominal cross section of actual color or pattern being considered to confirm a selection being made from a small color kit.

B. All samples will be retained unless otherwise noted in the documents or requested by the vendor. Samples for return may be held until the material is installed on site.

1.4. Project record information

A. The Contractor shall, within seven (7) days of Notice of Award, submit to the Architect the following:

1. Name of person under Contractor employment at the job site in charge of the work and safety.
2. Provide a contact list including emergency contact information for all relative parties to the work, including the superintendent, the project manager, major subcontractors, and major vendors.

1.5. Project Record Documents

A. Operating and Maintenance Manuals.

1. Submit three (3) bound, indexed copies minimum.

a. Or optional one (1) copy bound and a PDF electronic copy

2. These manuals shall include:

a. Shop Drawings and Submittals,
b. All Equipment Brochures, Operating Manuals, Operating Instructions.
c. Names, addresses, and telephone numbers for warranty work. This information may appear in the various trade areas but should also be clearly organized on a single document at the beginning of the O&M information.
d. all bound into a good quality binder or loose-leaf notebook, clearly labeled.
e. pdf properly indexed

f. THE SHOP DRAWINGS RETAINED BY THE OWNER AND A/E ARE NOT AVAILABLE FOR PREPARING THESE MANUALS. If additional copies are required for this, the Contractor shall make allowance and copy additional sets.

g. Include warranty information and warranty contact information.

B. Record drawings: Maintain as work proceeds record drawings marked to show any variances in installations, particularly underground and concealed services.

1.6. AS-BUILT DRAWINGS

A. The Contractor shall provide the Architect/Engineer's Office with one marked set of drawings showing changes from the original drawings. Marked As-Built Drawings shall be submitted upon progress having Substantial Completion progress.

1. Preferably markings should be in red, clearly legible and easily understood.
2. Clearly and boldly label the set As Built or Record Drawings.

1.7. IDENTIFICATION OF SUBMITTALS

A. The Contractor shall clearly mark each submittal of the Shop Drawings, Catalog Cuts, Pamphlet, or Specification Sheet for identification and record, for example:

1. DATE: As submitted
2. BUILDING: Project Name
3. LOCATION: City
4. TYPE OF EQUIPMENT: (Example – AHU 1)
5. SUBMITTED BY: Contractor's Name and contact information for questions.

B. Data shall also indicate model number selected for furnishing and indicate capacities or conditions or operation.

1. Catalog data of general advertising nature, without specific outline or rating for equipment, will be rejected.
2. Marked product manufacturer's catalogs and engineering data shall accompany the submittal.

1.8. REVIEW OF SUBMITTALS

A. Submittals will be reviewed by the Architect and/or the Owner and will be checked for Contract compliance and the basic fabrication methods.

1. Submittals are reviewed as a convenience to the contractors and do not change the contract requirements unless specifically noted.

B. The Contractor must verify all the dimensions, field conditions, field clearances, and rough-in requirements with adaptations as necessary.

1. The A/E review may ask questions or make observations about dimensions and quantities, but actual conditions supersede.

C. Submittals are to be reviewed and corrected first by the Contractor. If submittals contain obvious oversights or conditions that make it apparent they have not been checked, they will be returned for re-submittal.

D. Architect/Engineer review of a submittal shall not relieve the Contractor of contract compliance unless any variance is specifically brought to the attention of the Architect and/or Owner IN A LETTER FORM attached to the submittal data and subsequently responded to by the Architect/Engineer IN WRITING.

E. An omission on the shop drawings or a review oversight by the Architect/Engineer shall not be construed as the calling of specific attention

thereto.

F. It is not the responsibility of the Architect Engineer to request submittals, failure to submit presumes contract compliance is understood.

G. It is not the responsibility of the Architect Engineer to provide rapid review turnaround on a delayed submittal to maintain schedule. The Contractor shall make submittals in a timely manner generally allowing at least ten (10) days for review.

1. If timely response to submittals is not forthcoming from the A/E please notify the A/E to be sure that the submittal has been received. Particularly with electronic submittals there can be delivery issues.

END 01 3300

1. GENERAL

1.1. GENERAL TERMS USED IN THE CONTRACT

A. OWNER: Livingston County Highway Department
1705 S. Manlove Street
Pontiac, IL 61764
Telephone: 815/842-1184

B. CONTRACTOR: A person, firm or corporation with whom a Contract or Agreement is made by the Owner.

C. GENERAL CONTRACTOR: The General Contractor furnishes all of the work in the documents. Pursuant to these Documents the Designating Contractor, General Contractor and Prime Contractor shall be one and the same.

1. Abbreviations employed on the drawings include:

a. GC General Prime Contractor
b. PC Plumbing subcontractor
c. MC Mechanical subcontractor
d. HC, HVAC, or VC is referring to subcontractors involved in the installation of heating ventilating and/or air-conditioning systems.
e. EC electrical subcontractor
f. TC Temperature Control subcontractor

D. ARCHITECT OR A/E: Middleton Associates, Incorporated, 1702 W. College Ave., Suite E, Normal, IL 61761 - Telephone 309/452-1271, Fax 309/454-8049, e-mail: russ@middletonassociates.net
Design Mavens consulting Architect, Jean Underwood, email: jean@design-mavens.com

E. ENGINEER: MEP: Keith Engineering, 707 NE Jefferson Avenue, Peoria, IL 61603 – Telephone 309/938-4005, email: austinf@kedmep.com CIVIL: Hampton Lenzini and Renwick, Inc., 3085 Stevenson Dr., Suite 201 Springfield, IL 62703 – Telephone 217/546/3400, email:

F. CIVIL ENGINEER: HLR/Hampton Lenzini and Renwick, Inc, 2035 Stevenson Drive Ste 201, Springfield, IL 62703 – Telephone 217 546 3400 Joe Frazee jwfrazee@hlreng.com

G. DOCUMENTS: The Drawings, Specifications and Contract as apply to all areas of the work.

H. WORK: All obligations undertaken by the Contractor, pursuant to the Contract Documents.

1. Work includes, but is not limited to, the furnishing of all of the materials, labor, equipment, supplies, plant, tools, scaffolding, transportation, unloading, superintendence, insurance, bonds, taxes and all other services, facilities, required demolition (major and minor as applicable) and expenses necessary for the full performance and completion of requirements of the Contract Documents.

2. Work also means that which is produced, built, or constructed, pursuant to the Contract Documents.
3. Work includes all labor and materials to properly install and make functional.

I. PROVIDE: Furnish and install (including materials, accessories and labor) ready for the Owner's use. Comply with manufacturer's installation requirements as minimum standard, Drawings and Specifications where installation requirements exceed manufacturer's recommendations.

J. EQUAL, APPROVED EQUAL: Alternative products meeting or exceeding the base specification product or process and approved by the Architect/Engineer IN WRITING as suitable for this application. If not accepted prior to bidding, acceptance is discretionary.

K. SUBSTANTIALLY COMPLETE: When work progress has arrived at the point where the Owner may have full use of the installation for the purpose for which the same was installed, all components installed, equipment operating under control and minimum code compliance achieved, then, the work may be declared substantially complete if so requested by the Contractor and specifically approved by the Owner.

L. PUNCH LIST/DEFICIENCY LIST: Those items, components, installation inclusive of labor and materials (in place) which, in the opinion of the Architect/Engineer or the Owner do not conform to the intent of the Contract Documents and/or adequately satisfy the purpose and intent of the Owner.

M. DESIGNATED WORK: Wherein the documents designate that one contractor shall provide specified material and labor for another trade area contractor, the cost of the work and material shall be included in the bid of the contractor that is designated to provide the material and labor.

N. AND/OR: Wherein employed in the documents shall be either and both, singularly and together, as applicable to the intent of the Project Documents.

O. CONCEALED: Concealed building components, services, and obstacles subject to Change Orders, shall be limited to those components, services, obstacles, etc., not designated or known to exist, not typical to the type of construction observed and not available for inspection without destructive action. Opening of access panels, looking above accessible ceiling systems or inside chase walls is not considered concealed items.

1.2. In general, definitions of words employed in the Contract Documents shall be as

defined in "Webster's New World Dictionary" the latest edition. The Architect shall be the interpreter in the case of multiple meanings. Exceptions to this shall include longstanding meanings in the construction industry but have not been so defined in Webster's Dictionary. Determination shall be in accordance with these Specifications.

END 01 4216

1. GENERAL

1.1 GENERAL SCOPE OF THE WORK

A General Contractor's quality control and control of installation.

B Tolerances.

C References.

D Mock up requirements.

E Testing and Inspection Services.

1 Include in the contract proposal an allowance of $15,000 for testing by an independent qualified testing engineer.

a. Contractor will be compensated out of the allowance for all testing requested
b. Any unused portion of the testing allowance will be refunded to the Owner by closeout change order.

2 Submit the selected engineering firm and estimate of services for owner approval. Prior approved within this budget includes:

Midwest Engineering and Testing, Inc.
geotechnical - environmental - materials engineers
1701 W. Market St., Suite B
Bloomington, Illinois 61701
309-821-0430
FAX 309-821-1242
www.metgeotech.com

F. Manufacturers' field services.

G. Examination.

1.2 RELATED DOCUMENTS

1.3 This section supplements the General Conditions, Supplementary Conditions, the Drawings, and all other parts of the Contract Documents.

1.4 Consult the individual sections of the specifications for specific items required under those sections.

A Testing per allowance by independent certified vendor.

1. Compaction testing, fill, and backfill, clay, granular, approved recycle granular.
2. Concrete, compression testing, air entrainment testing.

B Inspection

1. Concrete reinforcement, placement and cleanliness
2. Steel welding
3. Steel installation, plumb,

4. Steel bolted joints including torque testing
5. Testing as requested by the Owner or A/E

2 QUALITY CONTROL AND CONTROL OF INSTALLATION

2.1 The General Contractor shall provide inspections, tests, and quality control services specified herein and in individual specification sections and required by governing authorities having jurisdiction, except where they are specifically required under a filed sub-bid section of the specification. In those cases they will be the responsibility of the filed subcontractor. Monitor quality control over suppliers, manufacturers, products , services, site conditions, and workmanship, to produce Work of specified quality.

2.2 Comply with manufacturer's instructions, including each step in sequence.

2.3 When manufacturer's instructions conflict with the Contract Documents, request clarification from the Architect before proceeding.

2.4 Comply with specified standards as a minimum quality of Work except where more stringent tolerances, codes, or specific requirements indicate higher standards or workmanship.

2.5 Perform the Work using persons qualified and experienced to produce the required and specified quality.

2.6 Verify field measurements are as indicated on Shop Drawings or as instructed by the manufacturer.

2.7 Secure products in place with appropriate positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

3 TOLERANCES

3.1 Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not allow tolerances to accumulate.

3.2 Comply with manufacturer's tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from the Architect before proceeding.

3.3 Adjust products to appropriate dimensions; position before securing products into place.

4 REFERENCES

4.1 For products or workmanship specified by associations, trade or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

4.2 Conform to reference standard by date of issue current on the date of Bid Opening. Except where specific date is established by applicable code.

4.3 Obtain copies of standards where required by product specification sections.

4.4 When specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.

4.5 Neither contractual relationships, duties, nor responsibilities of parties, nor those of the Architect shall be altered from the Contract Documents by mention or inference otherwise in reference documents.

5 MOCK UP REQUIREMENTS

5.1 Tests will be performed under provisions identified in this section and identified in respective product specifications.

5.2 Assemble and erection specified items with specified attachment and anchorage devices, flashings, seals and finishes.

5.3 Accepted mock-ups shall be the comparison standard for remaining Work.

5.4 Where mock-up has been accepted by the Architect and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by the Architect.

6 TESTING AND INSPECTION SERVICES

6.1 The Owner may employ and pay for specified services of an independent firm to perform testing and inspection.

6.2 Reports will be submitted by the independent firm to the Architect and Contractor indicating observations and results of tests.

6.3 The Contractor and all Subcontractors shall cooperate with the independent firm, furnish sample materials, design mixes, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

A Notify the Architect 24 hours prior to expected time for operations requiring services.

B The Architect will make the final decision as to when services or testing will or will not be performed.

C Make arrangements with the independent firm and pay for additional samples and tests for the Contractor's use.

6.4 Testing and employment of testing agency or laboratory shall not relieve the Contractor of the obligation to perform work in accordance with the requirements of the Contract Documents.

6.5 Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect. Payment for re-testing or re-inspection will be charged to the Contractor by deducting testing charges from the Contract Sum.

6.6 Testing Agency responsibilities:

A Test samples of mixes submitted by the Contractor.

B Provide qualified personnel at the site. Cooperate with the Architect and Contractor in performance of services.

C Perform specified sampling and testing of products in accordance with specified standards.

D Promptly notify the Architect and Contractor of observed irregularities or non-conformance of Work or products.

E Perform additional tests required by the Architect.

F Attend progress meetings if requested by the Architect.

6.7 Testing Agency Reports: After each test, promptly submit two copies of the report to the Architect and to the Contractor. Provide interpretation of the results when requested by the Architect. All test reports shall include:

A. Date issued.

B. Project title and number.

C. Name of inspector.

D. Date and time of sampling or inspection.

E. Identification of product and specification section(s).

F. Test location.

G. Type of inspection or test.

H. Date of test.

I. Results of tests or inspection.

J. Conformance with Contract Documents.

6.8 Limits of Testing Agency Authority

A. Testing Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Testing Agency may not approve or accept any portion of the Work.

C. Testing Agency may not assume duties of the Contractor.

D. Resting Agency has no authority to stop Work.

7 Manufacturers' Field Services

7.1 When individual specification section(s), require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces to receive work, and installation quality of workmanship, start-up of equipment , test, adjust, and balance equipment as applicable and to initiate instructions when necessary these services shall be provided at no additional cost to the Owner.

7.2 Submit the qualifications of any observers to the Architect and Owner prior to of required observations. Observers are subject to the approval of the Owner based on the observer's credentials. This submission shall be made allowing adequate time for the Architect to review the observer's credentials. This approval does not relieve the Contractor of any obligation to complete the Work in accordance with the Contract Documents.

7.3 Report to the Architect, observations and site decisions or instruction given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

8 EXAMINATION

8.1 The Contractor shall verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

8.2 The Contractor shall verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

8.3 The Contractor shall examine and verify specific conditions described in individual specification sections.

8.4 The Contractor shall verify utility services are available, of correct characteristics, and in correct locations.

END 01 4500

1. GENERAL

1.1. WORK INCLUDES

A. Contractor shall provide and maintain specified temporary utilities and as required to complete the work.

B. Contractor may extend water for construction services from Owner's existing exterior hydrants on buildings.

1. Tap on and extension of services shall be implemented and paid for by the Contractor requiring utility.

    a. Tap on arrangements must be coordinated with the Owner and shall not compromise the Owners operations or equipment.

2. Return tap on surrounds to original or contracted configuration and circumstances at close of job by the Contractor.
3. Extension shall not compromise Owner’s operations.

C. Temporary electrical service will be required to be set, removed and utility costs paid for by the contractor.

1. Provide a power center for all trades to extend necessary power or charge cordless tools
2. Provide temporary lighting as needed to generally light the interior areas to 5 fc. Work specific lighting is to be extended by the trade requiring additional light.
3.

D. Contractor shall furnish (included in his Base Bid):

1. The cost of all utilities required by him which:

    a. Are in excess of existing available at the building and are necessary for the completion of his work.
    b. Exceed the capacity of existing or permanent systems and are necessary for the completion of his work.
    c. Required prior to permanent enclosure.

2. Extension cords, extension lights and lamps from approved temporary power centers to his work.
3. Ventilation for his storage spaces containing volatile or hazardous materials.
4. Security for materials and equipment.
5. Heating as needed to protect construction form freezing or frost damage.

E. Furnished by Owner

1. None except use of water hydrants for construction operations.

F. Water Service:

1. For construction purposes:

a. The Contractor shall provide and maintain temporary water service connection throughout construction period.
b. The Contractor shall supply adequate water hoses from available owner hydrants to the point of his operations.

2. For temporary fire protection and cleaning.
3. Maintain adequate volume of water for all purposes.
4. The Contractor provides drinking water for his own forces.
5. Water source: On or off site.

1.2. COST OF INSTALLATION, OPERATION, MAINTENANCE & CONSUMABLES

A. Installation, operation and maintenance:

1. The Contractor requiring service extensions shall pay all costs of installation, operation, maintenance, restoration and equipment warranty extension of temporary utilities for designated time periods.
2. The Contractor shall not overload the system.

B. Consumables:

1. Contractor pay all costs of consumables for temporary utilities, as designated:

a. Heating Fuel via Temporary Heating Units: Contractor requiring same.
b. Heating
c. Electrical Energy Contractor except as properly extended.
d. Lamps: Contractor requiring same.
e. Water: Owner as properly extended.
f. Toilets and Supplies: Contractor.

1.3. MONITORING OF TEMPORARY UTILITIES

A. The Contractor extending or providing a temporary utility extension shall be responsible for all damage to his work or to the existing facility caused by a defect in temporary utilities or utility extensions.

1. Enforce compliance with specified codes and standards.
2. Enforce safe practices.
3. Prevent abuse of services and utilities.
4. Prevent damage to finishes.

B. Upon completion of work, or when directed by Architect/Engineer, restore existing systems to original condition.

1.4. TOILET FACILITIES.

A. Temporary toilet facilities are the responsibility of the Contractor, Owners facilities are not available for use by Contractor personnel.

2. PRODUCTS (Not applicable)

3. EXECUTION

3.1. ALL TEMPORARY UTILITIES AND EXTENSIONS

A. Comply with DIVISION 15 and DIVISION 16 Specifications and Federal and State regulations.

B. Install work in a neat and orderly manner.

C. Be made structurally, mechanically and electrically sound throughout.

D. Be maintained to give safe, continuous service, and to provide safe working conditions.

E. Be modified and extended as work progresses.

3.2. INSTALLATION

A. Electrical:

1. May install the conduit for the permanent power from the MDP to and use that for temporary power service, or extend overhead temporary service to a field work center with adequate facilities for the work, GFIC as appropriate, main breaker shut off.
.
   a. Provide a rain tight power center for the construction site
   b. If this option is employed, MAKE SURE to coordinate with the Fire Protection contractor for piping location coordination.
   c. Owners power may be used to the extent the privilege is not abused or the usage and or equipment start loads does not impact the owners operations in any way.
   d. An example of abuse of power service would be use of Owner power for electrical resistance heating.
   e. Abuse or negative impact on the Owners power service by surges or other power behavior will require the contractor to address the issue or set up an independent temporary service AT THE CONTRACTORS EXPENSE.

2. Protect branch circuits or extension wiring on floor or on ground from damage.
3. Provide ground fault outlets

4. Wiring for temporary heating and ventilating equipment:

a. Wire all safety devices specified for operation or equipment.
b. Verify proper operation of all safety devices.

3.3. REMOVAL & REINSTALLATION

A. At the conclusion of the work, completely remove temporary materials and equipment.

B. Repair all damage caused by installation. Restore to original condition or better.

END 01 5000

1. GENERAL

1.1. WORK INCLUDES

A. Completed Deficiency List

B. Final Cleaning

1. Clean all finished areas ready for occupancy, dust, remove debris, mop or vacuum as appropriate, seal and wax if specified. Concrete sealers free of scuffs and scratches
2. Unoccupied areas, above ceilings, tunnels, chases, Mechanical areas, roof, etc, free of debris reasonably cleaned up of construction scraps, tools boxes.
3. Equipment cleaned and ready for occupied use, new filters, and spare filters stored in location directed.
4. Site and exterior cleaned up, no debris, equipment, tools removed.

    a. Sidewalks clean
    b. Earthwork finish graded, seeded if specified
    c. Drainage ways open

C. Project Record Drawings

1. Include Contact list of Installing Contractor and Subcontractors.

D. Guarantees, Warranties and Bonds

1. Contact list for warranty claims.
2. List of extended warranties such as roofs, sectional doors factory finishes etc.

E. Submittal

1. Care and maintenance instructions for all finishes and operable equipment
2. All materials shall be submitted in multiple copies in an orderly and labeled fashion.
3. Generic documents not filled in, dated, and job specific are not acceptable.

1.2. EVIDENCE OF COMPLETION OF THE CONTRACT

A. Equipment and Building

1. All equipment operational as intended, under control, installed per Manufacturer's recommendations.
2. All construction completed, finished and in new condition.
3. All deficiencies addressed to the satisfaction of the A/E and Owner.

    a. Return Punch List with each completed item initialed by the

Contractor representative who has inspected the corrective work.

1.3. COORDINATE FINAL CODE INSPECTIONS

A. Work with governing authorities for occupancy inspection.

1. Municipality
2. IDPH for plumbing and any other IDPH permitted work.
3. A/E for called inspection when applicable.
4. Fire Marshall, local / state / compliance certifications for:

a. Sprinklers, if applicable.
b. Fire alarm, if applicable.
c. Walk-through
d. As requested by authorities

1.4. WARRANTIES

A. Extended warranties beyond the one (1) year 100% labor and material overall warranty shall be provided showing:

1. Terms and dates
2. Contact information
3. Installing Contractor
4. Exact system / material as applicable.

B. Extended warranties

1. As listed in various Specification Sections.
2. As advertised by Manufacturers.
3. As required for:

a. Hardware – five (5) years
b. Refrigeration equipment – five (5) years.
c. Roof system – twenty (20) years
d. Insulated glass – ten (10) years

4. Items requiring chronic repair during the warranty period shall have an extended 12-month warranty until repairs are not needed over a 12-month period.

1.5. PROJECT RECORD DOCUMENTS

A. Submit Project Record Documents to reasonably provide information on:

1. Hidden utilities
2. Products used.
3. Any hidden from view structural or mechanical or electrical variations from plans.
4. Notation of alternates where same impacted the Base Bid

Drawings.

B. Provide listing:

1. Contractor / Subcontractor / Vendor list with:

a. Product or service.
b. Contact information.

1.6. FINAL PAY APPLICATION

A. Final Lien Waivers – Major Subcontracts and direct Suppliers.

B. Final Affidavit showing $0.00 due to all vendors.

C. Letter from Bond holder approving closeout payment.

D. Final paperwork on allowances, adds or deductions agreed upon by Change Order.

E. Final acceptance as applicable.

END 01 78 00

1. GENERAL

A. Report prepared by Ramsey Geotechnical Engineering follows this page. Ramsey Geotechnical is now part of Midwest Engineering and Testing, Inc.

B. Fifteen-page report attached.

END 02 3000

1701 West Market Street, Suite B
Bloomington, Illinois 61701
(309) 821-0430

Report of Soils Exploration

Maintenance Building
Livingston County Highway Department
Pontiac, Illinois

Middleton Associates, Inc.

October 14, 2021

RGE Job 21-260

REPORT OF SOILS EXPLORATION
MAINTENANCE BUILDING
LIVINGSTON COUNTY HIGHWAY DEPARTMENT
PONTIAC, ILLINOIS

PREPARED FOR

MIDDLETON ASSOCATES, INC.

1702 WEST COLLEGE AVENUE

NORMAL, ILLINOIS 61761

PREPARED BY

RAMSEY GEOTECHNICAL ENGINEERING LLC

1701 WEST MARKET STREET

BLOOMINGTON, ILLINOIS 61701

309-821-0430

October 14, 2021
RGE Job 21-260

REPORT OF SOILS EXPLORATION
MAINTENANCE BUILDING
LIVINGSTON COUNTY HIGHWAY DEPARTMENT
PONTIAC, ILLINOIS

INTRODUCTION

This report presents results of our site exploration which was performed to determine subsurface soil and groundwater conditions for the proposed maintenance building planned at the Livingston County Highway Department facility in Pontiac, Illinois. The geotechnical services were performed at the request of Mr. Russ Middleton of Middleton Associates in accordance with the scope of services outlined in Ramsey Geotechnical Engineering LLC (RGE) Proposal No. 21-071, dated May 11, 2021. Results of field and laboratory work and recommendations based upon that work are included in the following sections of this report.

SITE/PROJECT DESCIRPTION

The Livingston County Highway Department facility is located at 1705 South Manlove Street in Pontiac, Illinois. The new maintenance building will be located on the northeastern portion of the facility. The building will be one story, slab on grade structure with overall plan dimensions of approximately 110' x 190'. We have assumed that moderate changes to the existing grades will be required to complete the planned construction.

The location of the new building extends from a grass covered lawn area, north into agricultural crop land. Based upon ground surface elevations determined by RGE, the site generally slopes down slightly from the south to the north. The change in grade within the limits of our exploration is approximately one foot.

FIELD EXPLORATION

A total of five (5) soil test borings were completed on the project site near the corners and center of the building. Each of these borings were drilled to a depth of 15 feet below the existing ground surface. The boring locations are shown on the Boring Location Plan included in the Appendix of this report.

The borings were drilled and sampled according to currently recommended American Society for Testing and Materials (ASTM) specifications. Soil sampling was performed at 2-1/2 foot intervals to the bottom of the borings. Samples were obtained in conjunction with the Standard Penetration Test, for which the driving resistance of a 2 inch diameter split-spoon sampler provides an indication of the relative density of granular materials and consistency of cohesive soils. Water level readings were taken during and following completion of the drilling operations.

LABORATORY TESTING

Soil samples were examined in the laboratory to verify field descriptions and to determine classifications in accordance with the Unified Classification System. Laboratory testing included moisture content determinations on all cohesive soil types. Measurements of unconfined compressive strengths on natural cohesive soil samples were made. A calibrated penetrometer was also utilized to provide estimates of the unconfined compressive strength.

All phases of the laboratory testing program were conducted in general accordance with applicable ASTM standards. The results of these tests are shown on the boring logs included in the Appendix of this report.

SUBSURFACE CONDITIONS

Soil Profile and Groundwater Conditions

Surface deposits of dark brown clayey topsoil were noted at each of the boring locations. The topsoil is on the order of one foot thick.

The soils directly below the topsoil and extending to a depth of 3 feet consist of silty clay. These cohesive soils are stiff to hard in relative consistency with unconfined compressive strength values that range from 1.0 to 4.5 tons per square foot (tsf). Corresponding moisture content values are somewhat variable, ranging from 11 to 21 percent.

Deposits of sand and clayey sand were encountered at a depth of 3 feet. These soils are loose to medium dense in relative density with N values ranging from 6 to 21 blows per foot. The sand extends to depths ranging from approximately 8 to 11 feet.

Underlying deposits of silty to very silty or sandy clay were encountered at each boring, extending to the termination depth. Unconfined compressive strength values in these deposits are in the range of 1.0 to 3.0 tsf with moisture content values typically near 15 percent.

Free water was noted in each of the bore holes while drilling at depths ranging from 6 to 8 feet. Upon completion and removal of the augers, the water levels in the bore holes at were at depths of 5 to 6 feet.

ANALYSIS AND RECOMMENDATIONS

Foundation Design

As previously noted, the soils in the upper 3 feet consist of stiff to hard silty clay. However, there are deposits of loose sand directly below these soils. In order to limit the stress increase on these loose soils, we recommend a net allowable design bearing pressure for design of the foundations of 2,000 pounds per square foot (psf).

The loose sand encountered at a depth of 3 feet can become unstable due to disturbance during the excavating process. If this occurs, the soils can be re-densified by compacting them with a vibratory plate compactor. Alternately, the unstable soils can be removed to a depth of 6 inches below the bottom of the footing and replaced with clean crushed aggregate to provide stability.

Where removal and replacement of loose bearing soils is required, the foundation undercuts should exceed footing dimensions by at least 6 inches along each side for every foot of overdig as measured at the base of the excavation. Replacement material should consist of crushed stone having a maximum size of 3 inches and a minimum size of ¼ inch and containing no fines. Illinois Department of Transportation (IDOT) gradation specifications for CA-1, CA-3, CA-5 and CA-7 meet these criteria. The structural fill should be spread in 12 inch layers loose thickness with each layer densified using vibratory compaction equipment.

For frost considerations, all exterior footings should be constructed at least 3-1/2 feet below the exterior finished grade and 4 feet below grade for foundations located outside of heated building limits. Interior footings may be constructed at higher elevations as long as they are protected against frost heave in the event of winter construction.

Dewatering/Excavation Stability

Based upon measurements made in the bore holes, it appears that the groundwater level at the time the borings were completed was at a depth of 5 feet. Providing the excavations do not extend into the water bearing sand at or below this depth, moderate amounts of groundwater seepage are anticipated into the excavations. We anticipate that the water seepage can be controlled by pumping the water from temporary construction sumps located outside the perimeter of the excavations. If excavations extend below a depth of 5 feet, multiple sump points possibly operating on a continuous basis will likely be required to maintain dry conditions.

The subsurface profile at each of the boring locations to a depth of 3 feet include layers of stiff clay. These deposits are classified as Type B soil as defined by the Occupational Safety and Health Administration (OSHA) in 29 CFR Parts 1926.650 through 1926.652. The underlying sand is classified as Type C soil. In accordance with OSHA, unprotected slopes in Type B and C soil cannot be steeper than 1 horizontal to 1 vertical and 1-1/2 horizontal to 1 vertical, respectively. If site limitations require slopes steeper than those allowed by OSHA, excavation bracing will be required in the overlying soils.

Site Subgrade Preparation/Fill Placement

After topsoil removal, the subgrade soils in the planned building area should be proof-rolled in order to detect the presence of unstable conditions prior to placement of fill. The proof-roll should be performed using a loaded dump truck or other approved piece of heavy rubber-tired construction equipment. All soft or unstable materials defined by proof-rolling should either be reworked and recompacted or, if that does not improve subgrade stability, removed and replaced. The soils directly below the existing topsoil on the northern half of the site have moisture content values that are near 20 percent. Based upon these values and the relative strength of these near surface soils, areas of moderate subgrade instability are anticipated, particularly if these soils become saturated during wet weather conditions.

Clay soils can typically be stabilized by reducing the moisture content and recompacting. For obvious reasons, this will work best in hot, dry and windy weather which may or may not be the case at the time construction is completed. Based upon an estimated optimum moisture content in the range of 15 to 20 percent for the site subgrade soils, reductions in the moisture of up to 5 percentage points may be required in the planned pavement areas.

In areas where unstable subgrade conditions are encountered, removal and replacement with select granular fill can also be used for stabilization. Typically, placement of 12 to 24 inches of coarse aggregate can be required. The coarse aggregate may consist of crushed stone or gravel between about ¼ to 3 inches in size and containing no fines. The aggregate should be placed in 12 inch thick lifts and compacted to a dense and sable state. A geotextile fabric cloth can also be used as a separation layer between soft soils and the aggregate to provide additional stability.

New fill otherwise should consist of approved granular materials or inorganic silty clays of medium to high plasticity. The on site soils are considered suitable for use as fill, however, reductions in the moisture content will likely be required in order to achieve the recommended degree of compaction. It is recommended that compaction for building pad areas be to a minimum of 95 percent of the maximum dry unit weigh as determine by the Standard Proctor Test (ASTM D 698). The fill should be placed in approximate 9-inch lifts loose measure with each lift compacted to the specified dry unit weight prior to placement of additional fill.

Moisture control is important in the compaction of most soils. It is recommended that the moisture content of the existing subgrade or new fill be within 1 percentage point on the low side and 3 percentage points on the high side of the optimum moisture content as established by the Standard Proctor Test. If the soil is compacted too dry, it will have an apparent stability which will be lost if it later becomes saturated. If the soil is too wet, the Contractor will not be able to achieve proper compaction.

Providing the preceding recommendations are followed, we recommend a modulus of subgrade reaction (k) of 150 pci for use in design of floor slabs on grade.

CLOSURE

We recommend that full time site observations and testing be provided by RGE personnel during foundation construction to document that soils capable of achieving the recommended bearing capacity have been encountered at the planned bearing elevation. In addition, monitoring of building materials and fill placement and compaction should be completed to document compliance with the recommended procedures and specifications.

The analysis and recommendations submitted in this report are based upon the data obtained from the five (5) soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur beyond these borings, the nature and extent of which may not become evident until during the course of construction. If variations are then identified, the recommendations contained in this report should be re-evaluated after performing on-site observations.

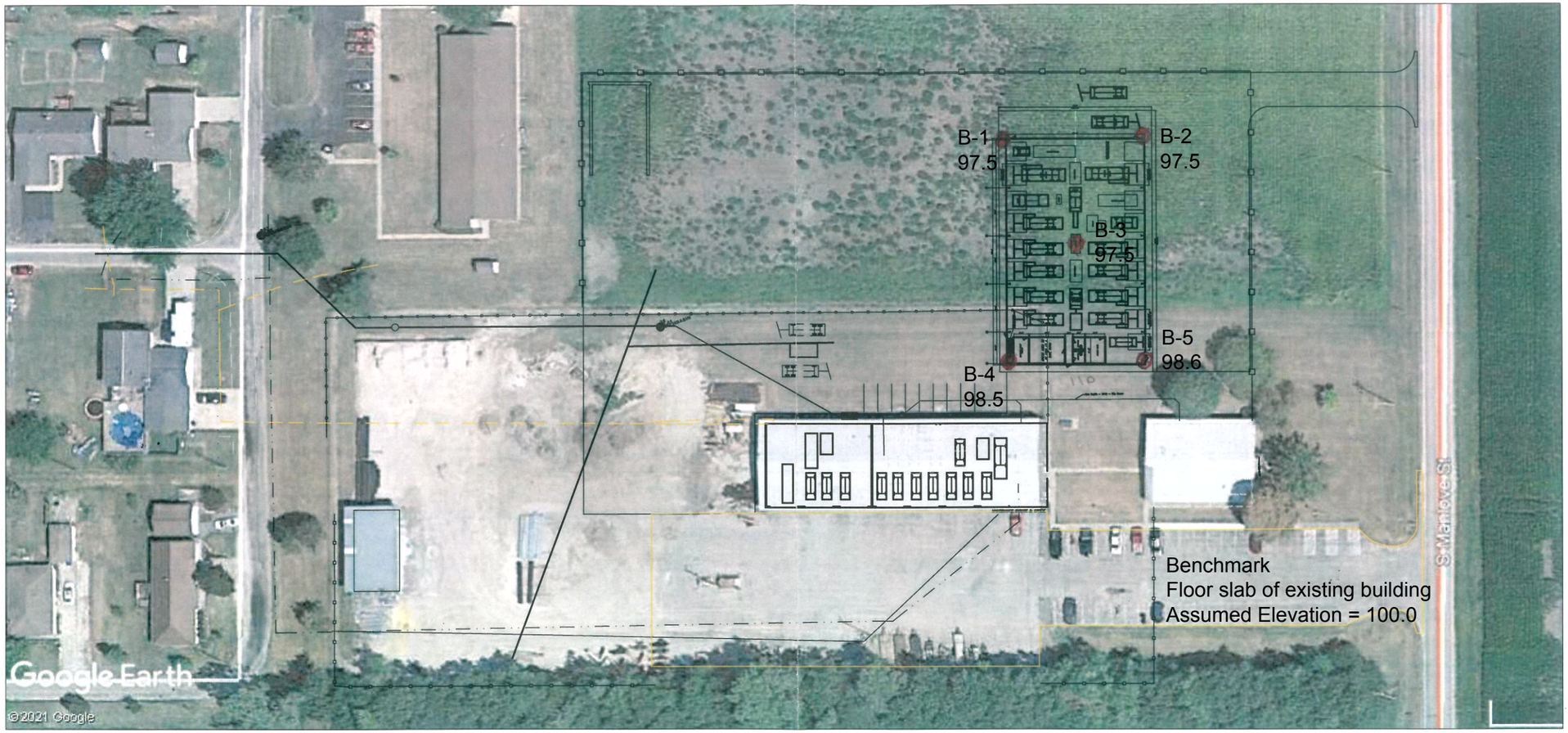
Douglas P. Ramsey
Licensed Professional Engineer
Illinois No. 062-040905

APPENDIX

BORING LOCATION PLAN

BORING LOGS

Ramsey Geotechnical Engineering
Boring Location Plan
RGE Job 21-260
September 27, 2021



1" = 80'

SITE PLAN
SCALE: 1" = 40'
0 20' 60' 120'

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LIVINGSTON COUNTY HIGHWAY DEPARTMENT
NEW MAINTENANCE BUILDING
for LIVINGSTON COUNTY HIGHWAY DEPARTMENT
1705 S Manlove St
Pontiac, IL 61764

SITE PLAN

REVISIONS		
NO.	DATE	REMARKS

PROJECT NO.	25753521
ISSUE DATE	2021
SHEET	C-1.0
OF	SHEETS

PROJECT **Livingston County Highway Department Maintenance Building, Pontiac, IL**

CLIENT **Middleton Associates, Inc., 1702 W. College Ave., Normal, IL 61761**

BORING **B-1** DATE STARTED **9-27-21** DATE COMPLETED **9-27-21** JOB **21-260**

ELEVATIONS

GROUND SURFACE **97.5**

END OF BORING **82.5**

WATER TABLE

▼ WHILE DRILLING **7.0 '**

▽ AT END OF BORING **5.0 '**

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		Dark brown clayey TOPSOIL (OL)
							1.0	96.5	Very stiff brown-dark brown silty CLAY, trace sand (CL)
	1	SS	6	18.4	2.52 2.5*				
							3.0	94.5	Loose brown fine to coarse SAND (SP)
	2	SS	8	9.8					▽
							6.0	91.5	Medium dense gray fine to medium SAND (SP)
	3	SS	12						▼
	4	SS	12						
							11.0	86.5	Stiff to very stiff gray silty CLAY, trace sand and gravel (CL)
	5	SS	6	15.5	1.19 1.25*				
	6	SS	10	12.9	3.08 3.0*				
									End of Boring at 15.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

DRILL RIG NO. **CME 55**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Livingston County Highway Department Maintenance Building, Pontiac, IL**

CLIENT **Middleton Associates, Inc., 1702 W. College Ave., Normal, IL 61761**

BORING **B-2** DATE STARTED **9-27-21** DATE COMPLETED **9-27-21** JOB **21-260**

ELEVATIONS

GROUND SURFACE **97.5**

END OF BORING **82.5**

WATER TABLE

▼ WHILE DRILLING **8.0 '**

▽ AT END OF BORING **6.0 '**

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		Dark brown clayey TOPSOIL (OL)
							1.1	96.4	
	1	SS	4	21.2	1.0*				Stiff brown-dark brown sandy CLAY, trace gravel (CL)
							3.0	94.5	
	2	SS	9	9.5					Loose brown fine to medium SAND (SP)
							6.0	91.5	▽
	3	SS	10	11.8					Medium dense gray fine to medium SAND (SP) ▼
	4	SS	10						
							11.0	86.5	
	5	SS	8	15.0	1.72 1.75*				Stiff to very stiff gray silty CLAY, trace sand and gravel (CL)
	6	SS	8	14.8	2.09 2.0*				
							15.0		End of Boring at 15.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

DRILL RIG NO. **CME 55**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Livingston County Highway Department Maintenance Building, Pontiac, IL**

CLIENT **Middleton Associates, Inc., 1702 W. College Ave., Normal, IL 61761**

BORING **B-3** DATE STARTED **9-27-21** DATE COMPLETED **9-27-21** JOB **21-260**

ELEVATIONS

GROUND SURFACE **97.5**

END OF BORING **82.5**

WATER TABLE

▼ WHILE DRILLING **6.0 '**

▽ AT END OF BORING **5.0 '**

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		Dark brown clayey TOPSOIL (OL)
							1.0	96.5	Stiff brown silty CLAY, little sand (CL)
	1	SS	6	19.8	1.25*				
							3.0	94.5	Loose brown fine to coarse SAND (SP)
	2	SS	9	12.2					
							6.0	91.5	Medium dense gray fine to coarse SAND (SP)
	3	SS	20						
							8.0	89.5	Stiff gray sandy CLAY, trace gravel (CL)
	4	SS	12	13.6	1.5*				
							11.0	86.5	Stiff to very stiff gray silty CLAY, trace sand and gravel (CL)
	5	SS	7	14.1	1.39 1.5*				
	6	SS	8	14.6	2.17 2.0*				
									End of Boring at 15.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

DRILL RIG NO. **CME 55**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Livingston County Highway Department Maintenance Building, Pontiac, IL**

CLIENT **Middleton Associates, Inc., 1702 W. College Ave., Normal, IL 61761**

BORING **B-4** DATE STARTED **9-27-21** DATE COMPLETED **9-27-21** JOB **21-260**

ELEVATIONS

GROUND SURFACE **98.5**

END OF BORING **83.5**

WATER TABLE

WHILE DRILLING **6.0 '**

AT END OF BORING **5.0 '**

24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		
							0.7	97.8	Dark brown clayey TOPSOIL (OL)
	1	SS	8	11.0	4.5+*				Hard dark brown silty CLAY, little sand (CL)
							3.0	95.5	
	2	SS	6	13.6					Loose brown-gray clayey fine to coarse SAND (SC)
							6.0	92.5	
	3	SS	14						Medium dense to loose brown fine to coarse SAND (SP)
	4	SS	8						
							11.0	87.5	
	5	SS	9	23.0	1.75*				Stiff gray silty CLAY, trace sand (CL)
							13.0	85.5	
	6	SS	8	17.1	2.0*				Very stiff gray very silty CLAY, trace sand and gravel (CL)
									End of Boring at 15.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

DRILL RIG NO. **CME 55**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Livingston County Highway Department Maintenance Building, Pontiac, IL**

CLIENT **Middleton Associates, Inc., 1702 W. College Ave., Normal, IL 61761**

BORING **B-5** DATE STARTED **9-27-21** DATE COMPLETED **9-27-21** JOB **21-260**

ELEVATIONS

GROUND SURFACE **98.6**

END OF BORING **83.6**

WATER TABLE

▼ WHILE DRILLING **6.0 '**

▽ AT END OF BORING **5.0 '**

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		Dark brown clayey TOPSOIL (OL)
							1.0	97.6	Very stiff dark brown silty CLAY, little sand (CL)
	1	SS	8	13.6	2.0*				
							3.0	95.6	Loose gray-brown clayey fine to coarse SAND (SC)
	2	SS	7	15.9					▽ ▼
							6.0	92.6	Medium dense brown fine to coarse SAND (SP)
	3	SS	12						
							8.0	90.6	Medium dense gray fine to medium SAND (SP)
	4	SS	21						
							11.0	87.6	Stiff gray silty CLAY, trace sand and gravel (CL)
	5	SS	11	17.5	1.5*				
	6	SS	8	14.6	1.56 1.5*				
									End of Boring at 15.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

DRILL RIG NO. **CME 55**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

1. GENERAL

1.1. DESCRIPTION

A. General Contractor shall furnish all of the labor and materials necessary to complete all concrete work of every description called for in the Documents, including forming, finishing, placement, preparatory work, reinforcing, stripping, rubbing, curing and sealing.

B. Construction joints, score joints and slab panels shall be selected to optimize concrete strength and performance and minimize shrinkage, cracking or other undesirable performance characteristics.

1.2. QUALITY ASSURANCE

A. All materials and mixes shall comply with applicable ASTM Specifications. All requirements of the American Concrete Institute Building Code Requirements for Reinforced Concrete (ACI 318-71); as applicable to the forming, placement and handling of concrete materials shall be followed.

B. Admixtures shall be employed in accordance with Manufacturer recommendations. The compatibility of admixtures to achieve proper results shall be verified by the Ready-Mix Supplier. NO INCOMPATIBLE ADMIXTURES SHALL BE EMPLOYED. The Architect/Engineer shall approve any alternative mix design proposed.

C. TOLERANCES

1. Footings: True to top grade, 3/8” high to 1" low; true to width - 0" and + 6"; true to bottom grade 0" high, 4" low.

    a. LCHD building coordinate footing with required compacted granular fill under primary frame pad footings.

2. Slabs: True to grade and plane, F 50, maximum variance 1/8" in 4’ ¼” in 10', 3.8" overall; slope uniformly to drains over areas identified on the Drawings; no ponding of water shall occur at any location on slabs, unless so specified.

    a. Flatness ff 50 overall
    b. Flatness ff 40 local

3. All Other Work: Not exposed to view, 1/2"; exposed to view work 1/16" in 2' and 1/4" overall.

4. Embedded Steel Placement: All work 3/8" plus or minus from specified position.

    a. Clear cover 3” to unformed earth exposure.
    b. Clear cover 2” to formed face earth exposure
    c. 1” to exposed face exposure unless noted otherwise.

1.3. SUBMITTALS

A. Identify the Concrete Supplier.

B. Submit a description of the mix to be employed, identifying the quantities and types of all materials and admixture to be employed in the mix.

C. Submit reinforcing steel shop drawings for all prefabricated steel work.

1.4. TESTING

A. The Contractor shall be responsible for securing and paying for all testing as requested by the inspector at the job. Tests may be requested on the average of every fifty (50) cubic yards of work and on each day of pouring, whichever is the greater frequency.

1. Testing clarification: Testing of concrete is to be included in the Contractor's Contract. Air entrainment testing will rarely be requested and will only be applied to concrete subject to freeze-thaw cycles such as sidewalks or curbs. Typically, concrete supplies have access to an air meter and we will accept the results provided by on site personnel who know how to use such a device. All concrete testing can be done by on site personnel with break results being provided by an engineering lab. The Contractor should keep at the site a slump cone and cylinder molds.

B. Test date shall be sent directly form the Testing Laboratory to the Architect and shall include the following information:

Project Name
Date of pour
Location of job
Job conditions, temperature, weather, etc.
Type of failure
Strength at failure
Slump results (if requested by the inspector)
Air entrainment (if requested by the inspector)

C. At any time pouring is contemplated the Contractor shall have available, at the job, standard concrete testing cylinders. The Contractor, when requested to test, shall make three (3) at twenty-eight (28) days and one (1) in reserve to allow for verification in the event unsatisfactory results occurred at the twenty-eight (28) day test.

D. The Contractor or his Supplier shall have available a slump cone and an air meter which can be brought to the job, if such a request is made by the inspector.

2. PRODUCTS

2.1. MATERIALS

A. Cement - to comply with ASTM C-150, Type I Portland Cement.

B. READY MIX - to comply with ASTM C-94.

C. AGGREGATES - to comply with ASTM C-33, maximum size aggregate to pass 1-1/2" ring for footings, 1" ring for other work.

1. No slag
2. No fly ash
3. No chert
4. No coal
5. Mix of aggregate gradation may be plant standard.

D. WATER REDUCING ADMIXTURE - without chloride ions to comply with ASTM C-494, Type A. Use Type D retarding at temperatures exceeding 90 degrees F.

E. AIR ENTRAINMENT ADMIXTURE - to comply with ASTM C-260,

1. To be employed in concrete subject to moisture and freezing
2. Exterior concrete slabs and paving
3. Foundation walls above grade, adjacent to paving

F. ANTI-SPALLING COMPOUND - to be combination product, minimum 50% linseed oil, meeting ASTM D-260 and maximum 50% mineral spirits or approved VOC carrier, meeting ASTM D 235.

G. WATER - shall be clean, potable water, free of dissolved salts or detrimental substances at a minimum temperature 50 degrees F.

H. BONDING agent- for rubbing and repairs shall be "Daraweld-C", "Elmer's Pro Bond", or "FlexCon" latex bonding agent.

I. REINFORCING STEEL - to comply with ASTM A615, Grade 60 deformed bars.

1. Epoxy coated reinforcing where noted

a. Exterior work or high moisture exposure structural work.

J. WELDED WIRE FABRIC - to comply with ASTM A185, Grade 60 minimum.

K. EXPANSION JOINT MATERIAL - minimum ASTM A185, Grade 60.

1. Two (2) part/top 1/2" removable to allow S-4 sealant installation where appropriate on exterior pavements and sidewalks.

L. JOINT FILLERS - asphalt impregnated, 1/4" interior, 1/2" for exterior and as noted on Drawings and in Specifications.

1. See sealant specification for joint sealants over fillers.

M. VAPOR BARRIER - shall be 10-mil (.010") polyethylene or vinyl film, Visqueen, WR Meadows, or similar.

N. CURING COMPOUND - to comply with ASTM C-309 and to be compatible with finish treatments, adhesive and floor coverings.

O. FLOOR SEALER, acrylic or polymer base sealer such as Sherwin Williams 4401, apply minimum 2 coats or as needed for uniform shine

P. ANTIFREEZE ADMIXTURES WILL NOT BE ALLOWED.

Q. CONCRETE - shall be designed to conform to the following in-place minimum standards:

Seven (7) day strength	2500 psi.
Twenty-eight (28) day strength foundations	3500 psi.
Twenty-eight (28) day strength, other work	4000 psi
Cement content foundations - minimum/cu. yd 5 bag..	470 lb bags
Cement content other work – minimum/cu yd 5.5 bag..	517 lb
Air content by volume, all work	5% to 8%

Concrete shall contain water reducing admixture and air entrainment admixture, as recommended by additive manufacturers.

R. EXTERIOR CONCRETE PAVNG.

S.

1. May be IDOT mix normally employed in Livingston County Illinois for new paving projects with IDOT approved aggregates.

T. FIBER REINFORCING

1. Manufactured by Fibermesh, Inc., or equal, 4019 Industry Dr., Chattanooga, TN 37416 or equivalent by ASTM standards.

   a. Fibermesh Macro 650 or equal polyolefin fiber

2. When noted on the drawings or specifically called out in these specifications.

   a. Employ in all flat slabs, floors, paving, topping slabs. Use in all unreinforced slabs. If rebar mat or WWF is installed fiber is not required.
   b. Material shall be incorporated in the mix at 3.0 lbs. per cu. yd. concrete or as directed.

3. EXECUTION

3.1. ENVIRONMENT AND JOB CONDITIONS

A. Concrete shall not be poured at an air temperature below 40 degrees F. or above 100 degrees F.

B. The concrete, as specified, shall not be poured at temperatures below 40 degrees F. and shall be provided a means of maintaining not less than 60 degrees F. for five (5) days or 50 degrees F. for seven (7) days.

C. NO USE OF CHLORIDES OR ANTIFREEZE WILL BE ALLOWED.

D. When WRITTEN APPROVAL is issued, pouring of concrete at below 40 degrees F. may be allowed.

E. When so approved, and when outside temperatures are between 25 degrees F. and 40 degrees F., Type III cement shall be used or an additional 30 lb. portland per cubic yard of cement shall be used and placed materials shall be maintained at 60 degrees F. for three (3) days or 45 degrees F. for four (4) days and concrete shall have a temperature of 70 degrees F. to 85 degrees F. at the time of placement. Additional requirements may apply, depending upon the applicable circumstances.

F. NO CONCRETE SHALL BE PLACED OVER A FROSTED BASE, ON FROSTED FORMS, OR WITH FROSTED REINFORCING, ALL SURFACES SHALL BE ABOVE FREEZING IN TEMPERATURE.

G. All concrete shall be protected form direct sun, direct wind and adverse weather for two (2) days after placement, regardless of air temperature.

3.2. FORMING

A. Construct forms accurately to the shapes; and dimensions set forth and adequately brace, secure and tie forms to maintain line and level during pouring operation. Form bracing shall be of a type to allow adjustment thereof.

B. Any failure of the forms to properly maintain position or properly perform in any manner shall be the responsibility of the Contractor.

C. Forms shall be designed and installed in a manner which will not be injurious to the concrete when removed. Forms shall remain in place until the concrete is hardened, two (2) days minimum.

D. Bank forming is allowed for footings only.

3.3. REINFORCING

A. Size and locate reinforcement as called for in the Documents and accurately position and secure reinforcement to prevent shifting during pouring. Reinforcing steel shall be continuous around corners and through points of thickness variation.

1. Epoxy coated nose bars, per details
2. Epoxy coated cross tie bars per details.

B. All reinforcing steel shall be kept covered and protected from deterioration at all times. Reinforcing steel shall be free of rust, scales, pints, form oil or bond reducing surface condition prior to pouring.

C. Bars larger than #4 shall be shop fabricated to shape. Field heating for bending is not permitted.

D. All splices shall be 36-bar diameters minimum. Welded wire fabric shall be lapped one (1) wire spacing (two (2) parallel cross wires).

E. All steel shall be positioned to provide concrete clear cover as noted for the following conditions:

Earth, banked formed such as footings……	3"
Earth, formed	2"
Exterior weathering	1-1/2"
Interior	1"
Interior, fire rated	1-1/2"
Slab steel *(includes wire mesh)*	1"

F. Form oils employed shall be non-staining and shall not leave a residue that will be detrimental to sealants, mastics or finished which may be applied to the surface.

G. All elevated slabs on steel deck to be reinforced.

H. All other slabs, sidewalls, paving, to be reinforced unless detailed otherwise.

1. Sidewalks w1.4/w1.4 (6x6 10/10)
2. Pavement slabs w4.0/w4.0 (6x6 4/4)

3.4. FOOTINGS

A. All of the footing trenches shall be clean cut and full in measurement. Fill or backfill under footings shall not be permitted on the job. All footings shall rest on solid undisturbed earth unless specifically set forth otherwise.

B. No loose materials (dirt knocked in during excavation or forming), debris of any type, muck or water shall be present within the footing trench at the time of concrete pour.

C. All concrete shall be thoroughly mixed to achieve a uniform consistency of cement, fine aggregate and course aggregate without lumps or segregation at the point of placement. The water content shall be controlled by the Supplier to assure a workable mix at the point of placement.

3.5. PLACEMENT AND HANDLING

A. Concrete shall be deposited in place in a manner to minimize segregation of aggregates. It shall be accurately deposited in the forms in a manner which will not allow significant horizontal flow of the concrete.

B. Forms shall be uniformly filled the full length of the pour in approximately 3' lifts maximum.

C. All concrete, except slabs, shall be compacted by means of a vibrator (slabs optional). The vibrator shall not be used to convey the concrete. Where a vibrator is employed in a vertical pour, it shall be used in a manner which does not disturb previous lifts and cause injury thereto.

D. All of the interior slabs on grade shall be poured on 6 mil polyethylene vapor barrier. Lap joints and tape, or roll joints and staple.

E. Concrete shall be placed in a continuous operation until the pour is completed. Construction joints not called for on the Drawings shall be approved by the Architect.

3.6. CONSTRUCTION JOINTS, EXPANSION, CONTRACTION, BOND BREAKERS

A. Provide expansion joints, bond breakers and thermal breaks as detailed on the drawings.

B. Exterior slabs shall have 1/2" asphalt impregnated expansion joints along all building walls, curbs and at approximately twenty-foot (20') center to center.

1. Material shall be two (2) piece with top removable to provide for sealant S-4.

a. See Section 07 6200.
b. See Drawings for special locations.

C. Exterior sidewalks shall have uniformly spaced score joints not to exceed 5'-0" o.c.

D. Where practical, slab pours shall be made in approximately square sections. In no case, should the proportion of length to width on a slab pour exceed 3 to 1 without a joint.

1. “Green” cut scores will be allowed on large pours.
2. Joints and cut scores shall be planned to be unobtrusive, extend off inside corners.
3. Fill joints after 90 days prior to floor installation. Select filler appropriate to floor cover.
4. Coordinate with floor finishes.

E. All construction joints in walls subject to weathering or earth shall have 1/2" X 1" reglet, provided with Styrofoam rope and be sealed with appropriate sealant.

F. Joints shall occur where detailed or where approved by the Architect. Do not provide construction joints at locations other then those detailed, unless approved. Additional reinforcing may be required at non-detailed construction joints and shall be installed as directed at no additional charge to the Owner.

3.7. SLABS

A. True to grade, full thickness.

1. Checked any time prior to completion: slabs shall be within assigned level, F 50 1/8" in 4', ¼" in 10', 3/8" max. across entire floor.
2. Ponding of water shall be limited to small areas, in compliance with above and not over ¼" ponded depth.
3. Floor drains shall always be below slab perimeter unless calls out otherwise.

    a. Sump around drain, approximately 1/8" per foot in 4' X 4' area.
    b. Slope toward drains full rooms or marked areas 1/16" per foot.
    c. Sump at open site drains ¼" to 3/8" per foot 2' X 2' area.

4. Floors sloped to drains should not pond water.

    a. Grind if necessary to achieve drainage.

5. Level areas beyond drains should not be lower than rim surrounding the sloped floor area. In some cases shaping the sump creates an artificial rim effect; this shall be avoided.

B. Expansion joints

1. Use zip strip and sealant type ½" unless noted otherwise in details.
2. Expansion joint shall ALWAYS, be placed in a manner that NO slab concrete can contact the adjacent concrete or hard surface, always rake base or add sand as needed to assure no direct contact points of expansion joint application to fully aloe expansion joint materials to function as intended.

C. Joints in slabs

    a. Construction joints smooth dowels 3/8ths x 16" at 12" mid point of slab, interior, exterior, all locations
    b. Green cut joints in an approved layout approximately 15' to 20'spacing, but adjusted to natural slab breaks, inside corners and conditions of known crack risk.
    c. Green cut slabs to be 25% of slab depth
    d. Seal all cut joints or open joints of any nature with pourable urethane SL1 sealant (if slope exceeds pourable functional conditions, use non leveling urethane sealant of similar generic make up).

3.8. FINISHING

A. Concrete footings and foundation footings shall be given float finish unless specifically set forth otherwise on the Drawings or herein these Specifications.

B. All slabs, stairs and horizontal surfaces shall be toweled to a very dense, hard, smooth surface.

C. Walls at occupiable spaces, crawl spaces, tunnels, subject to backfill shall have voids filled, ties removed, lattice removed and be suitable to coating with damproofing.

D. The walls above grade, not subject to view, utility and mechanical areas, shall have forms removed, voids filled, and ties removed.

1. Polish walls above grade with limestone block using 50-50 cement and sand plus 2.1.H. bonding admixture.

E. Walls in basement areas subject to view shall be filled, shall have ties removed and shall receive a medium rubbed surface of 50/50 sand to cement plus 2.1.H. bonding admixture.

F. Trowel in abrasive, non-slip grit on stair treads and landing surfaces.

G. Sidewalks shall be steel troweled and light broom finished.

H. NO MISTING OR ADDITION OF WATER TO THE SURFACE FOR FINISHING OPERATIONS WILL BE PERMITTED. All concrete shall be poured at a workable slump and at a rate that will allow proper finishing with the manpower provided.

3.9. CURING

A. All work shall be properly cured.

B. All slabs shall receive a coat of Curing-Sealing Compound immediately following finishing. Sealer applied as curing does not count as seal coat to be applied at conclusion of job.

C. Keep all freshly poured concrete protected for a period of seven (7) days with forms in place or mist frequently to prevent drying out. Maintain at 50 degrees F. during this period.

D. Avoid loading or causing impact loading on new concrete for seven (7) days.

E. Apply anti-spalling compound on all new exterior concrete slabs in October of the year of Owner occupancy. Apply no sooner than twenty-one (21) days following placement on all exterior slabs placed later than October when Owner occupancy is scheduled during that winter or spring season.

3.10. SEALING FLOORS

A. All floors shall receive the following cure and seal treatment.

1. All concrete

a. Cure and seal at time of pour ASTM C309

2. Sealed floors

   a. Thoroughly clean up of spots, stains and repair of abrasions
   b. Muriatic acid wash
   c. Two (2) coats (to uniform sheen) or of a clear urethane type floor sealer suitable for wet locations
   d. Strictly follow the product Manufacturer's recommendations. For multi coat system to bring floor to uniform maintainable sheen.

END 03 3000

1. GENERAL

1.1. WORK INCLUDES

A. All masonry work of every description or the project.

Concrete units, CMU

a. Standard weight units, fire rated

2. Reinforced construction and core filled at safe room construction.

3. Bearing wall construction
   1) At wall is safe room areas for storage deck above

B. See drawings for extent of work

1. Sizes and dimensions
2. Details of installation

C. Coordination

1. Provide openings requested by various trades prior to laying walls.
2. Install sleeves or lintels.

D. Provide openings in existing masonry for ducts.

1.2. RELATED REQUIREMENTS

A. Specified elsewhere

1. 03 3000 – Concrete
2. 04 7200 – Architectural Cast Stone
3. 05 3100 – Metal Decking
4. 05 5000 – Metal Fabrication

1.3. QUALITY ASSURANCE

A. Qualifications of installing contractor

1. Five (5) years experience on similar size or larger, commercial prevailing wage work.
2. Experienced and trained masons.

B. Code Compliance

1. 2015 International Building Code (IBC)
2. ACI 530-92 / ASCE 5-92
3. ACI 530.1-92 / ASCE 6-92

C. Mock-up panel

1. Not required

D. Aged materials, we request CMU materials be aged minimum 30 days prior to installation on the job to allow for normalization and initial shrinkage.

1.4. SUBMITTALS

A. Mortar – each type, data sheet

B. Grout – each type, data sheet

C. Concrete masonry units – samples at job site

D. Flashings – sample of each type.

E. Reinforcing – data sheets

1.5. DELIVERY AND HANDLING

A. Deliver and handle carefully.

1. Protected from abuse, chipping, fire or other detrimental handling conditions.

B. Store materials in a manner to prevent damage.

1. Protect from excess moisture exposure.
2. Keep clean; do not employ muddy units.
3. Protect from excess handling, chippage or unit edge damage.
4. Mortar cement and lime to be kept dry prior to use.

1.6. JOB CONDITIONS

A. Cleanliness

1. Do not lay units that will have loss of bond due to dirt, water, foreign substance frost, below freezing material temperature.

2. Surfaces to receive masonry shall be clean and provide suitable bond.

B. Protection

1. In place masonry shall be protected form water accumulation in cores.
2. Fresh masonry shall be protected from joint erosion or inadequate cure due to rain, heat, wind or abuse.

2. PRODUCTS

2.1. FACE BRICK none specified on this project

2.2. STONE none specified on this project

2.3. SPLIT FACE CMU none specified on this project

2.4. GLAZED STRUCTURAL TILE none specified on this project

2.5. COMMON BRICK, BEARING BRICK, MASONRY BEARINGS

A. Masonry bearing: Always provide solid bearing for all steel structural members bearing on or embedded into masonry construction.

1. As detailed.
2. If not detailed, brick bearing or grout core filled 8" X 8" up to 8' span.
3. Over 8' span, grout filled hollow or solid masonry, 12" X 12" minimum, but not less than 1" X 1" per foot of span (i.e., 12' span 12" X 12" / 20' span 20" X 20").
4. Embed bolts or studs into grout.

2.6. CONCRETE BLOCK

A. All block used shall be:

1. Standard weight aggregate all locations.

B. All units shall be sound, straight, free of cracks and voids and shall have reasonably clean, full edges.

1. Block shall be 7-5/8" in height to be laid one (1) course equals eight inches
2. (8"). The running dimension 15-5/8" to be placed to equal sixteen inches (16").
3. Dimensional variance shall not exceed three percent (3%) between like units.

C. Average compression strength of five (5) units at the time of delivery onto the job site shall be based on an 8 X 8 X 16 unit gross area compressive test. (This job uses 10” in some locations. The Contractor shall furnish said test record upon the Architect/Engineer's request. The block shall conform to ASTM-C90T. Type P-1, except block exposed to weather shall be Type U-1; moisture content shall not exceed three percent (3%).

1. Standard weight aggregate, hollow CMU units, average of three tests 2000 psi gross area (3750 psi net).
2. Hollow lightweight CMU units 1700 psi gross area (3200 psi net)

D. Chippage and honeycombing in block shall be repaired to be indistinguishable in all exposed locations. Repairs may be made after the

first coat of wall finish where a multiple coat system is employed. Replace unsatisfactory units.

2.7. MORTAR

A. All prepared mortar shall conform to ASTM C270, Portland Cement/lime mortar.

1. Concrete block, foundations, walls above grade, brick bearings, Type S, 1800 psi at twenty-eight (28) days.
2. Core fill lintel bearing, etc., Type S or grout (preferred) may use up to 3/8" aggregate limited by flowability in large voids.

B. Prepared masonry cement may be employed, such as "Brixment" as manufactured by Louisville Cement Company, Lone Star, Lehigh, or approved equal, in proportions of one (1) part masonry cement to not more than three (3) parts damp loose sand. Sand shall have a fineness modulus of 1.96.

1. Type ‘S’, all CMU and brick work except exterior veneers.
2. Type ‘N’ exterior veneer work.

C. All mortar shall include a water-reducing plasticizer

1. Such as Master Craft 750HS as manufactured by Master Builders or approved similar product, in strict accordance with the Manufacturer's directions.
2. The goal is to improve workability with less water in the mix.

D. The mortar shall be installed within 2-1/2 hours of adding moisture to the mix. Mortar 2-1/2 hours old shall be discarded and replaced with new.

E. USE OF CEMENT ACCELERATOR OR ANTIFREEZE WILL NOT BE ALLOWED without negotiated provision for accommodation as agreed upon with the Architect.

2.8. GROUT

A. Where called for, grout to be per ACI 530-92.

1. Minimum 2000 psi.
2. Aggregate size per ACI 530.1.
3. Consolidate into place.
4. Bond beam
5. Vertical Core fill

B. Non-shrink where called for at steel bearings.

1. Non-metallic cement based, ASTM C-827.
2. Exterior rated.

3. Protect from freezing.

C. Limited locations such as lintel bearings, may be mortar, grout or concrete as available.

2.9. MASONRY REINFORCEMENT

A. Exterior wall reinforcement double wythe, hot dip galvanized eye and pintle ladder style, 16" eye spacing 9-gauge by 9-gauge cross ties and 9-gauge eyes with adjustable seismic clip interlock and #9 gauge veneer joint reinforcing snapped into seismic clips.

1. Dur-o-wal, D/A 3700ES, adjustable seismic tie and clip
2. Hohmann and Bernard, LOX-ALL, adjustable seismic tie and clip
3. Masonry Reinforcing Corp., Wire Bond Series 800 with seismic tie and clip
4. Or equal
5. See Plans for wall thickness and conditions.

B. CMU wall reinforcement - single wythe, hot dip galvanized ladder style, 9-gauge X 9-gauge.

1. See Plans for wall thickness.
2. Lap minimum 8”
3. Lap around corners minimum 8”

C. Interior wall reinforcing - single wythe, mill galvanized, or hot dipped galvanized ladder style, 9-gauge X 9-gauge.

1. See Plans for wall thickness.

D. Bond beams and vertical reinforcement as detailed shall be clean Grade 60 deformed reinforcing steel. Lap splices 18".

1. Exterior walls use epoxy coated
2. Interior walls use clean steel
3. #3 or #4 bar size or as detailed
4. May use H and B “Spyra Lox” in lieu of rebar laps in masonry.
5. See plans for bar size and quantity.

E. Control joints

1. CMU, 3/8” X 24” oiled smooth bars, (1) 4” and 6” walls, (2) 8” and 10” walls, (3) 12” and 16” walls
2. Unbonded intersections, ½” square, hot dip galvanized, 3” x 8” x 16 gauge mesh wall ties, 2” X 8” or as appropriate, alternate courses.
3. Masonry veneers, ½” square, hot dip galvanized, 16 gauge mesh wall ties, or 6” lapped #9 wire, one side
4. As detailed.

F. Ties

1. To embedded steel, weld on wire ties and Vee slip anchors
2. To intersecting walls, foundation support to wall support, galvanized 3” x 8” x16 gauge galvanized fabric ties.
3. Appropriate ties for other conditions, all unbounded intersections veneers or other conditions to be tied.

2.10. FLASHING

A. Through wall flashings or termite shield shall be two multiple piece flexible long life adhesive type such as:

1. Hohmann and Bernard H&B Mighty Flash
2. W R Grace Perma Flash

B. Splicing cement

1. Shall be modified asphalt cement for metal flashing for all horizontal laps. Not required for joints lapped shingle fashion
2. Not required for adhering flexible types.

C. At through wall louvers provide:

1. Full wall width sill flashing. Coordinate with Mechanical Contractor. Flashing shall be 30 gauge stainless steel or as detailed. Provide 1/2" turned up back edge and jamb edges and seal corner where possible.
2. Drip flashings above louver. Coordinate with louver style.

2.11. MOISTURE REPELLENT: SEE 07 2400

2.12. INFILTRATION BARRIOR, See 07 2400 and EIFS specification for barrier by EIFS applicator.

2.13. WEEP ROPES: $^{5}/_{16}$” ~ $^{3}/_{8}$” cotton rope x 12” to 16” long

3. EXECUTION

3.1. WORK INCLUDED

A. All masonry work and materials and associated work to complete the project and work indicated on the drawings.

B. General Contractor shall furnish all labor and materials and complete all masonry work, of every nature, called for on the accompanying drawings, as need to complete the work and specified herein these Specifications.

C. OPENINGS

1. The Contractor shall leave or cut all of the openings in masonry

construction required for work by the other Contractors and/or Subcontractors.

2. Provide and install lintels of proper size over all openings needed.
3. Where said lintel sizes are not established by schedule on the Drawings or herein these Specifications, sizes shall be determined in conference with the Architect.
4. Install sleeves in the walls as provided by the various Contractors and Subcontractors at locations as directed.
5. Provide openings in walls as coordinated with other contractor/sub contractors in a timely fashion prior to construction of the work and when noted on the drawings.

D. INSTALLATION OF MASONRY

1. This Contractor shall make all repairs needed at masonry openings, etc., after other Contractors and Subcontractors have completed their work.
2. All masonry work shall be laid straight, plumb and true, and in a workmanlike manner, employing full head joints and continuous bed joints.
3. All masonry walls are to be carried up to the exact heights that are properly leveled for sills, joists, beams, floors, etc. All masonry shall be properly protected from damaging weather. The Contractor shall be completely responsible, and shall replace, at his own expense, all masonry which, in the Architect's opinion, has been damaged by adverse weather conditions.
4. Where masonry work is called for to be laid up immediately over structural steel, a header course shall be laid directly over the steel.
5. All masonry units shall be sound and reasonably straight as judged by the Architect, in keeping with specific use to which the units are put. Unit sizes shall be standard for the material and shall comply with the coursing set forth on the Drawings.

6. All joints shall be struck evenly and regularly and, in a manner, and style as shall be determined in conference with the Architect.

    a. All put-log holes shall be determined in conference with the Architect.
    b. All put-log holes shall be carefully filled and struck.
    c. All head bed joints shall be cut clean at their intersections.

7. Wherein the Drawings show masonry fill-in at the abandoned openings, the same shall comply with these documents, with each face finished to match the existing adjacent wall finish.

E. MASONRY BEARINGS:

1. All steel or concrete beams, lintels, headers, columns, precast concrete require solid bearing.

a. Embeds when called out in schedules or detailed.
b. Core filled and re-bar walls as noted on plans or details
c. Brick or grouted bearings

1) As detailed
2) Joists and beams

a) If not detailed not less than 8" x 8" or 1" x 1" per foot of span, i.e. 15' span 15" x 15", 20' span 20" x 20", *(whichever is greater)*
b) Bearings are intended to be approximately 450 psi bearing load and spread the load out to 60 psi on the gross area.

d. Set joist bearing plates, embed studs.
e. Set Beam bearing plates and anchor bolts as coordinated with the steel work.

3.2. INSTALLATION

A. BONDING

1. All masonry work shall be bonded unless specifically indicated otherwise on the accompanying Drawings or herein these Specifications.
2. All piers shall be bonded each course, insofar as this is practical. All walls and piers intersecting structural walls shall be bonded with structural wall every other course.
3. Where bonding is not practical, approved galvanized metal ties shall be used and the ties shall be set approximately one (1) per 1¾ square feet of wall surface.
4. All block work shall be laid in common bond.
5. Bond intersecting corners of foundation supported walls.
6. Rake and caulk and tie intersecting walls slab supported with foundation supported.

B. JOINTS, BACKPLASTERING AND PARGING

1. All joints shall be struck evenly and regularly and in a manner and style as shall be determined in conference with the Architect. All put-log holes shall be carefully filled and struck. Head and bed joints shall be cut clean at their intersections.
2. All head and bed joints in all masonry work shall be full joints and SHALL BE CROSS WEBBED when possible.
3. Tool all joints with V groove or round groove toll as directed.

C. COLD WEATHER CONSTRUCTION

1. Strictly comply with ACI 530-99/ASCE 5-99/TMS 402-99.
2. Implement the following requirements when the ambient

temperature falls below 40 deg. F. or the temperature of masonry units is below 40 deg. F.

3. Do not lay masonry units having a temperature below 25 deg. F. Remove visible ice on masonry units before the unit is laid in the masonry.
4. Heat mortar sand or mixing water to produce mortar temperatures between 60 deg. F. and 120 deg. F. at the time of mixing. Maintain mortar above freezing until used in masonry.
5. When the ambient temperature is between 25 deg. F. and 20 deg. F., use heat sources on both sides of the masonry under construction and install windbreaks when wind velocity is in excess of 15 mph.
6. When ambient temperature is below 20 deg. F., provide an enclosure for the masonry under construction and use heat sources to maintain temperatures above 32 deg. F. within the enclosure.
7. When mean daily temperature is between 40 deg. F. and 32 deg. F., protect completed masonry from rain or snow by covering with a weather-resistive membrane for 24 hours after construction.
8. When mean daily temperature is between 32 deg. F. and 25 deg. F., completely cover completed masonry with a weather-resistive membrane for 24 hours after construction.
9. When mean daily temperature is between 25 deg. F. and 20 deg. F., completely cover completed masonry with insulating blankets or equal protection for 48 hours after construction.
10. When mean daily temperature is below 20 deg. F., maintain masonry temperature above 32 deg. F. for 24 hours after construction by enclosure with supplementary heat, by electric heating blankets, by infrared heat lamps, or by other acceptable methods.
11. Do not lay glass unit masonry during cold weather construction periods.

D. HOT WEATHER CONSTRUCTION

1. Strictly comply with ACI 530-99/ASCE 5-99/TMS 402-99.
2. Protect from wind when air temperature exceeds 90 deg. F.

E. RAIN / FLOWING WATER

1. Protect newly laid masonry from exposure to rain or running water.
2. Consult A/E prior to surface repair of eroded joints in an unexpected exposure.

F. REINFORCING

1. Horizontal joint reinforcing

   a. Reinforcing shall be placed in bed joints continuous at 16" spacings, measured vertically, beginning a maximum of 16" above footing. Extra reinforcing in the first bed joint immediately above and below openings shall be continuous

for a distance of 4'-0" beyond each jamb of the opening.

b. Lap reinforcement sufficiently at splices, 8" minimum, to ensure continuity; corners shall be cut and bent.
c. Reinforcing shall not pass through vertical masonry control joints, except where required for structural reasons as noted on the Drawings.
d. Reinforcing shall be proper size for all thicknesses.
e. See Drawings for Bond Beams.
f. Pintle and tie veneer reinforcing loops, min. one (1) per two (2) sq. ft.

1) Seismic clips and wire in brick joints.

G. CLEANING DOWN FINISHED MASONRY: All block work shall be cleaning of mortar drippings, joints finished down, and the entire surface stoned or brushed as required and chips repaired.

H. Windbreak and wall to wall anchorage

1. Wherein the Drawings indicate new exterior masonry wall abutting existing masonry walls, provide the following system:

a. 4" X 4" X 1/4" windbreak steel angle full height of intersection walls/leg bolt to (E) wall - 3/8" dia. X 4" at approximately 2'-8" spacing.
b. Provide corrugated anchors/wall to wall at 8" spacing/each wythe.
c. Provide foam rope and sealant bead struck smooth/full height at exposed wall intersections.

2. Wherein the Drawings indicate interior new masonry walls abutting existing masonry walls,

a. Provide ¼" drilled shear pins spaced max. 16" vertically per wythe/two (2) ties per wythe where masonry wythe exceeds 6".
b. Where new walls abut existing masonry walls exposed to view/rake the joint and provide paintable sealant bead struck smooth.

END 04 2000

1. GENERAL

1.1. DESCRIPTION

A. Provide structural steel as shown on the Drawings and specified herein, including but not necessarily limited to:

1. All steel normally falling under definition of structural steel as set forth in latest edition of AISC Code of Standard Practice, Section 2.
2. All steel items reasonably implied but not specifically mentioned on the Drawings or specified herein to render work secure and complete. This includes all connections and erection accessories.
3. All structural steel (beams, lintels, bearing plates, etc.) exposed to the building exterior envelope - atmosphere shall be galvanized (see 2.1.F.) and finish coated/09 90 00) after shop welding.

1.2. RELATED WORK

A. Specified elsewhere:

1. DIVISION 00 – PROCUREMENT REQUIREMENTS
2. DIVISION 01 – ADMINISTRATIVE REQUIREMENTS
3. 03 3000 – Concrete
4. 03 4113 Hollow Core Precast
5. 04 2000 – Unit Masonry
6. 05 5500 – Metal Fabrications

1.3. QUALITY ASSURANCE

A. Manual of AISC, Fourteenth Edition – Allowable Stress Design (ASD)

1. ASIC "Code of Standard Practice for Steel Buildings and Bridges"
2. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel of Buildings" including Supplement No. 3

B. Independent Construction Materials Testing will be provided on this project, as specified under specification 01 4500 within the $15,000 allowance in the General work contract.

C. ASTM A6-72 "General Requirements for Delivery of Rolled Steel Plates, Shapes and Bars for Structural Use"

D. AWS - "Standard Code of Arc and Gas Welding in Building Construction"

E. "Specifications for Assembly of Structural Joints Using High Strength Steel Bolts" as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation

F. Prime coat, whether factory or field applied, shall have nicks and skins touched up, wherein the primer coat is the final coat or the primer coat is

base for the pursing coatings.

G. Structural welding shall be completed by certified welders in shop or field.

1. Non structural critical welds such as back to back lintels, accessories welded to structure, masonry accessories such as wire ties, may be welded by a competent welder subject to inspection for uniform penetration and good appearance.

H. PROOF TESTING SERVICES Testing shall be applicable only whereupon the Architect/Engineer has rejected the Contractor's work and so notified the Contractor thereof.

I. The Contractor may employ, at his own expense, a Testing Laboratory (or laboratories) selected by the Architect/Engineer to perform all tests and submit reports of all tests specified.

J. The Testing Laboratory shall be responsible for conducting and interpreting the tests and shall state in each report whether or not the test results conform to the Contract Documents.

K. The Owner may employ an independent inspector.

1.4. SUBMITTALS

A. Submit shop drawings with complete fabrication and erection details and schedules in accord with Section 01 7800, Project Closeout.

1. Shop drawings shall have been thoroughly checked by the Fabricator before being submitted to the Architect/Engineer for review. Review is a precautionary measure only and shall not relieve the Fabricator of full responsibility of correctness of all materials, sizes, dimensions and details.
2. In case structural sections or details indicated on Drawings cannot be readily obtained, substitution of sections of details of equal strength which conform tot he requirements of design may be made only if approved.
3. Fabrication shall not proceed until shop drawings have been reviewed. Fabrication, assembly and erection shall conform to reviewed and approved shop drawings.

2. PRODUCTS

2.1. MATERIALS

A. Structural Steel: ASTM A 36-70a.

B. Welding Electrodes: AWS Specifications, Designation A233 (E-60 or E-70)

C. High Strength Bolts: ASTM A325-71a – beam to beam / beam to column

1. Always provide washers.
2. Beveled washers where needed.

D. Standard Bolts: ASTM A 307-76b – anchor bolts

E. Rivet Steel: ASTM A 502-76

F. Galvanizing: ASTM A 123 two (2) oz. per square foot for all steel embedded in exterior walls supporting the exterior wythe (brick).

G. Priming: All steel shall be given one (1) shop coat (two coats for members, embedded in exterior walls) of Red Oxide Alkyd primer, lead free.

2.2. FABRICATION

A. Material shall be properly marked and match-marked where field assembly so requires. The sequence of shipments shall be such as to expedite and minimize the field handling of material.

B. Beams and girders shall be cambered as required for loading conditions.

C. Built up sections assembly by welding shall be free of warpage and all axes shall have true alignment.

D. Welding

1. Welds not specified otherwise shall be continuous fillet welds, using not less than the minimum fillet as specified by AWS.
2. 1/16" less than thinnest material up to 1/4" weld, then as specified.
3. Structural welding shall be completed by certified welders in shop or field.
4. Non structural critical welds such as back to back lintels, accessories welded to structure, masonry accessories such as wire ties, may be welded by a competent welder subject to inspection for uniform appearance and penetration.

E. Take field measurements as required to verify and supplement dimensions shown on the Drawings.

F. Provide anchor bolts and embedded plates for anchoring structural steel to the supporting concrete and masonry. Furnish, as soon as possible, detailed plans showing exact locations of all bolts to be built into concrete or masonry. Furnish templates as required.

G. Connections:

1. Field connections shall be bolted, unless otherwise noted on the Drawings. Field welded connections shall be used only where they are specifically shown on the Drawings or with A/E's approval.

a. Beams bearing on column cap plates may employ slotted holes for easy field fit.
b. Beam to beam or beam web connections are bearing type connection. Properly tighten turn of nut or torque wrench.

2. Shop connections may be riveted, welded or bolted with high strength bolts at Contractor's option. All shear connections shall be welded or bolted with high strength bolts.
3. If high strength bolts are used, they shall be installed in strict compliance with AISC Specifications and ASTM A325 requirements for installation of A325 bolts.
4. All structural critical field and shop welds shall be by certified welder only. The Certificates should be available for inspection by the Architect/Engineer.
5. All connections not specifically shown shall fully develop critical load for member being connected.
6. Bolts, where used, shall have cut washers under nuts and no threads allowed to bear on parts being connected.
7. Bearing ends of columns shall be milled or sawed for true bearing on base plates. Rough bearing ends shall not be used.

H. Masonry to steel tie

1. All columns adjacent to or embedded into unit masonry shall have adjustable anchors at alternate block courses, 16” spacing up contact side(s) of steel.
2. All beams with masonry above shall have not less than 3” x 3/8” studs at 24” unless specifically detailed otherwise.
3. See Drawings for specific exceptions and designations.

2.3. CLEANING - SHOP PAINTING

A. All steel furnished shall be cleaned of rust, mill scale, dirt and foreign matter before application s to shop coat of paint.

B. Paint structural steel with one (1) coat of red oxide VOC compliant primer suitable for field painting with acrylic systems or DTM paint.

1. Apply additional coats as needed on surfaces skinned, nicked, burnt or peeled after assembly and erection.
2. Steel embedded in exterior masonry wall such lintels and beams shall be hot dip galvanized

C. All steel under this heading, unless specifically noted otherwise shall be given one (1) smooth, shop coat of 2 mil dry film thickness.

D. Hand clean and solvent-clean all unpainted and damaged shop coat areas and touch up with a compatible shop coat primer.

2.4. GALVANIZING - all lintels embedded in and supporting exterior face brick shall be hot dip galvanized. Only the portion effecting brick work is required to be galvanized.

3. EXECUTION

3.1. INSTALLATION

A. Material stored at the job site shall not exceed design loads on structures so the members will not be distorted or otherwise damaged and all materials shall be protected against corrosion or deterioration.

B. Confer with other contractors and procure necessary templates and other information required to establish number, size and location of holes or other details necessary for attachment of blocking, windows, purlins.

C. Burning shall not be used to form holes, enlarging of holes or matching of unfair holes. No member shall be altered in field unless approved IN WRITING by the Architect/Engineer.

D. Throughout all phases of erection and construction temporary bracing shall be introduced wherever necessary to take care of all loads to which structure may be subjected including equipment and operation of same. Wherever piles of material, erection equipment, or other loads are carried during erection, proper provisions shall be made to safely support these abnormal loads.

E. All members shall be cut neat, square and should be erected true and flush without twists and open joints. Light drifting to draw holds together may be used. Reference should be made to codes and specifications listed in this Section under Quality Assurance which governs all phases of fabrication, details, erection and workmanship. Responsibility for all errors of fabrication and for proper fitting of various members shall be assumed by the Contractor.

F. Column bases shall be set on steel shims. Grouting of column bases shall be with a non-shrink, non-metallic grout.

G. All steel exposed to view shall be free of surface imperfections and ground off to true surfaces. Exposed welds shall be ground smooth.

H. Provide steel lintels at all locations of mechanical work passage through walls.

1. Locate in conjunction with mechanical installers.

3.2. CONSTRUCTION BRACING

A. A/E design and detailing is for finished product only. Erection rigging, bracing and handling practices are the Contractor's responsibility.

1. A/E neither directs nor schedules installation.
2. A/E inspects only for installation conditions related to finished product.

B. Provide all necessary additional bracing, clips, anchors and reinforcement

as needed.

1. Remove after erection when exposed to view or when design load shifts will result.

3.3. ANCHORAGE

A. All structural steel shall be mechanically anchored.

1. As detailed.
2. Similar to detailed work for items not specifically detailed.

B. Masonry lintels may be an exception.

1. Loose set except where noted.
2. Weld back to back lintel angles 2" weld at 12" spacing top to bottom.

C. Fully embed steel in masonry unless detailed otherwise directed by A/E in field.

3.4. PROOF INSPECTIONS

A. Welded connections shall be inspected by the selected CMT consultant or Architect/Engineer in accordance with the following:

1. All welds will be visually inspected for minimum size, length and for defects.

B. Bolted connections will be inspected in accordance with the following:

1. High strength bolted connections shall be checked and approved by the "inspecting wrench" method outlined in the "Specifications for Assembly of Structural Joints Using High Strength Steel Bolts" hereinbefore specified.
2. Proof test as requested by the Architect.

END 05 1200

1. GENERAL

1.1. BASE BID WORK INCLUDES

A. Mezzanine decking

1.2. ALTERNATE BID WORK INCLUDES

A. None.

1.3. UNIT COST WORK INCLUDES

A. None

2. PRODUCTS

2.1. MATERIALS

A. Metal Decking - mezzanine

1. Decking, Type UFX 24 gauge or UFX-36 26 gauge
2. ¾' puddle welding or pneumatic pins *(or Type B or F or UFX-2 x 26 or heavier gauge as might be available for timely delivery).*

a. 12/12/12 anchor spacing along support members.

1) Weld washers for decking less than 22 gauge

b. Mechanical fastener systems, ¼" minimum pneumatic, tested to not less than:

1) fastener 500 lb pull out/600 lb shear ultimate average test rating.
2) Decking 200 lb pull over/200 pound shear.

c. Subject to approval Power actuated drive fasteners with tested pull out/pull over for selected deck and structure.
d. Mid span lap screws at spans exceeding 34"

1) Not less than # 8 self drill or equivalent
2) Place at 1/3 span points.

B. Reinforcing Flat Metal

1. 16 gauge galvanized x minimum 16" wide, as required for change in direction or deck transitions, ridge, valley or similar conditions.

a. Fasteners # self tap screws pattern as conditions warrant.

b. Areas subject to reinforcement are to be laid out in conference on site with the A/E representative

C. Trim and closure pieces

1. Provide 16 gauge or as detailed deck perimeter closures
2. At all roof perimeters, J edge closure
3. All points of discontinuity
4. Roof edges to wall closure pieces to be installed following insulation work to seal deck connection.

3. EXECUTION

3.1. INSTALLATION

A. Openings in structural decking.

1. Openings greater than 16” should be reinforced
2. Openings greater than 23” should receive structural frame

a. Consult with A/E if frame is not called for or opening was not anticipated.
b. Provide foam seals where appropriate.

B. Reinforcing flat metal

1. The intent is none or minimum locations.
2. Where deck changes direction, or is warped and misaligned
3. Where deck requires cutting top of deck to fit or bend to slope change.
4. Any odd closures which become necessary such as over cut openings, wall closures, etc.

C. Provide anchorage to structure.

1. Anchorage is directly to main structural 12/12/12 along supporting members.

a. Anchorage screws approved mechanical screws, pneumatic actuated or ¾” puddle welds with weld washers.

1) Provide test data on any mechanical fastening system
2) Puddle welds by certified welder and inspected for integrity

END 05 3100

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor shall provide incidental metal work required and shown on the Drawings.
2. A schedule of miscellaneous metal work is included on the drawings but may not have every incidental sub-structural or detail metal work delineated in the schedule
3. Contractor shall:

    a. Consult the drawing for incidental, ornamental and safety fabricated metal work.

        1) Railings

            a) Stair
            b) Mezzanine railings and gates

                (1) See structural sheet S104

        2) Lintels
        3) Stairs

            a) Stringers
            b) Treads
            c) Risers decks

        4) Roof opening or suspended equipment supports

            a) If not provided in pre-engineered building package
            b) Mechanical

        5) Bollards

    b. Take field measurements and submit Shop Drawings.
    c. Hangers.
    d. Mechanical equipment supports.

1.2. RELATED WORK

A. Specified elsewhere

1. 03 3000 - Concrete
2. 04 2000 - Unit Masonry
3. 06 1000 - Rough Carpentry
4. 06 2000 - Finish Carpentry

5. 07 6200 - Sheet Metal Flashing & Trim
6. 07 9200 - Sealants & Caulks
7. 09 9000 - Painting
8. DIVISION 23 - MECHANICAL
9. DIVISION 26 - ELECTRICAL

1.3. REFERENCES

A. ASTM A36-77a - Structural Steel

B. ASTM A53-80 - Hot-Dipped, Zinc-coated, Welded and Seamless Steel Pipe

C. ASTM A307-80 - Low-Carbon Steel Externally and Internally Threaded Fasteners

D. ASTM A325-80a - High Strength Bolts for Structural Steel Joints

E. ASTM A386-78 - Zinc-Coating (Hot-Dip) on Assembled Steel Products

F. ASTM A123-A - 2 oz. Hot Dipped Galvanizing

G. AWS D1.1 - Structural Welding Code

H. Paint - See Section 09 9000

1.4. QUALITY ASSURANCE. Regulatory Requirements: Illinois Steel Products Procurement Act, as amended (Illinois Revised Statutes, ch. 48, par. 1801 et. seq.).

1.5. SUBMITTALS

A. Submit Shop Drawings in accordance with 01 3300.

1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
2. Include erection drawings, elevations, details as applicable.
3. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
4. Prepare structural Shop Drawings under seal of a professional structural engineer registered in the State of Illinois.

1.6. DELIVERY, STORAGE AND HANDLING

A. Deliver and store products to site in accordance with 00 2213/1.14.

2. PRODUCTS

2.1. MATERIALS

A. Steel Sections: ASTM A36-77a.

B. Steel Tubing: ASTM A53, Grade B.

C. Bolts, Nuts, and Washers: ASTM A36-77a minimum.

D. Welding Materials: AWS D1.1; use correct type for materials being welded.

E. Primer: Red for shop application and field touch-up. See Section 09 9000.

2.2. FABRICATION

A. Verify dimensions on site prior to shop fabrication.

B. Fabricate items with joints tightly fitted and secured.

C. Fit and shop assemble in largest practical sections for delivery to site.

D. Grind exposed welds flush and smooth with adjacent finished surface finished surface. Ease exposed edges to a 1/8" uniform radius.

E. Exposed Mechanical Fastenings: Flush countersink screws or bolts, unobtrusively located, consistent with design of structure, except where specifically noted otherwise.

F. Make exposed joints butt tight, flush and hairline.

G. Supply all components for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

H. Hot dip galvanized metal fabrication where indicated on the Drawings or in these specifications

2.3. PRIMING PROTECTIVE COATINGS

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Clean all ferrous metal in accordance with applicable requirements of SSPC-SP1 (Solvent Cleaning) followed by cleaning with applicable requirements of SSPC-SP2 (Hand Tool Cleaning).

C. Apply specified primer to all ferrous metal surfaces by brush or spray to a dry film thickness of 2 mils. (100% cover)

D. Paint with bituminous coating dissimilar metals which are or will be in contact with on another. Coating shall not extend onto surfaces which will be exposed.

E. Primer paint applied on ferrous materials shall be in accordance with Section 09 9000.

3. EXECUTION

3.1. PREPARATION

A. Obtain Architect/Engineer's WRITTEN APPROVAL prior to site cutting or making adjustments not scheduled.

B. Clean and strip site primed steel items to bare metal where site welding is scheduled.

C. Make provision for erection loads with temporary bracing. Keep work in alignment.

3.2. INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

1. In case of stair railing - parallel to stair noses.

B. Perform field welding in accordance with AWS D1.1.

C. After installation, touch-up, field welds, scratched or damaged surfaces with primer. Primer shall be same material as shop primer.

D. Bollards: 8’ x 6” std steel pipe, galvanized pipe or hot dip galvanize

1. 44” in ground 50” out
2. Concrete fill
3. Set into I cubic yard concrete foundation below slab
4. Provide OSHA yellow, Ribbed HDP covers x 56” +/-

a. Such as Grainger catalog, Ribbed yellow
b. https://www.grainger.com/category/security/access-barriers-and-crowd-control/bollard-covers-and-post-sleeves?brandName=GRAINGER+APPROVED&filters=brandName
c. Four (4) per overhead door
d. Two (2) outside building corners North end
e.

3.3. MISCELLANEOUS FRAMES AND SUPPORTS

A. Provide miscellaneous metal angles, plates and assemblies shown on Drawings with anchors, bolts and accessories required, including but not necessarily limited to the following:

1. Steel lintels at all openings/typical per opening shown on the Drawings.
2. Clip angles
3. Seat angles
4. Sub-structural members per Detail Drawings
5. Pipe hangers

3.4. MISCELLANEOUS SPECIALTIES

A. Provide miscellaneous assemblies shown on the Drawings, with anchors and accessories required, <u>including but not limited to:</u>

1. Schedules on Sheet S-1.4

    a. Miscellaneous steel
    b. Lintels
    c. Although this specification endeavors to schedule miscellaneous steel details and installation may indicate additional items.
    d. Stairs and railings Sheets S103 and S104

2.

3. See details and structural plans for additional miscellaneous steel used throughout the work

END 05 5500

1. GENERAL

1.1. REQUIREMENTS INCLUDE

A. The Contractor shall provide rough carpentry (white wood) as shown on the Drawings, specified herein, and as needed to complete the work.

1. Treated lumber is not specified or required unless required by application, code or ground contact. If treated is employed, fasteners must be rated for exterior treated use or be stainless steel.
2. Framing, blocking, furring and miscellaneous carpentry.

1.2. RELATED WORK

A. Specified elsewhere

1. Means and methods, AIA A201 General Conditions and Supplementary General Conditions.

1.3. PRODUCT DELIVERY, STORAGE AND HANDLING

A. Immediately upon delivery to site, place materials in area protected from weather.

B. Store materials a minimum of 6 in. (150 mm) above ground on framework or blocking and cover with protective waterproof covering, providing adequate air circulation or ventilation.

1. Do not install wet materials

C. Seasoned materials shall not be stored in wet or damp areas.

2. PRODUCTS

2.1. MATERIALS

A. Lumber

1. Dimensions

a. Specified lumber dimensions are nominal: verify actual filed conditions and field verify dimensions and provide materials required to accomplish the intent of the details shown.

1) Rip or adjust sizes as needed to accomplish detail results.

b. Lumber dimensions conform to industry standards

established by the American Lumber Standards Committee and the rule writing agencies.

2. Moisture content: Nineteen percent (19%) maximum at time of permanent close in of building or structure, for lumber 2" or less nominal thickness.
3. Surfacing: surface four sides (S4S), unless otherwise shown, or specified.
4. General framing lumber: Nominal 2” (51 mm) to 4” (102 mm) thick X 2” (51 mm) to 12” (306 mm) wide/deep:

    a. Any commercial softwood species, stud/standard grade unless otherwise noted or specified.
    b. Free of unruly warp or wind, bark, splits or major defects affecting the strength or stability of the board or ability to maintain line and level.

5. Structural Framing lumber: Nominal 2” (51 mm) to 4” (102 mm) thick X 2” (51 mm) to 12” (306 mm) wide/deep:

    a. Yellow Pine, Douglas Fir, Hemlock or other approved species, grade stamped.
    b. Not less than Construction grade for bearing stud walls and plates, unless noted otherwise.
    c. Not less than #1 and better for horizontal framing, unless noted otherwise
    d. Not less than Select Structural for horizontal free span framing where span to nominal depth ratio exceeds:

        1) Roof joists – 25/Roof Beams – 15
        2) Ceiling rafters - 20
        3) Floor joists – 18/Floor Beams – 12
        4) LVL and Glue Lam type products may be considered if appearance is not an issue.

6. Boards: 1 in. (25 mm) to 2 in. (51 mm) thick; any commercial softwood species, unless otherwise shown or specified. Furring and grounds shall be minimum No. 1 Common Grade.

B. Heavy timber structure, nominal 4” x 6” or larger primary members.

1. May be Glue Lam, Micro Lam or similar manufactured timber product

    a. Sized on drawings
    b. Bending F_b =2400 or greater min.
    c. Elasticity E = 1.8 x 10^6 min.
    d. Compression parallel F_c 750 min.
    e. Shear F_v =275 min.
    f. Waterproof glue

2. May be Structural graded #2 or better, fir larch or southern yellow pine.

    a. Kiln dried,
    b. Straight
    c. Free of parallel to grain splits and major checks.
    d. Graded not less than 1500 psi in bending.

C. Plywood: CDX exposure rated and clearly stamped on material, thicknesses and listed on Drawings.

1. 5 ply minimum.

D. Rough Hardware:

1. Any hardware used in treated lumber or plywood shall be stainless steel or finish rated for treated lumber exterior use.
2. Any fasteners used in exposed to weather applications shall be stainless steel, or other corrosion finished appropriate for the application, zinc plated is not a weathering corrosion finish.
3. Drawings may detail framing plates, and accessories:

    a. TECO, Simpson, Phoenix or similar, galvanized minimum.
    b. Details may use catalog numbers for one of the above, to establish shape, gage and load applications, but similar shapes by all may be used.

4. Bolts: FS FF-B-575C
5. Nuts: FS FF-N-836C
6. Expansion Shields: FS FF-B-561C (limited use, see Drawings)
7. Lag Screws and Bolts: FS FF-B-561C
8. Toggle Bolts: FS FF-B-588C
9. Wood Screws: FS FF-S-111C
10. Nails and Staples: FS FF-N-105B
11. FABCO/H-3, or equal, Stainless Steel Top Seal Fasteners
12. Top Seals/H-3 Stainless Steel, Carbon Steel and Cadmium plated as applicable with Weath-R-Seal washers
13. Tuff Tites #305 Stainless Steel and Cadmium plated as applicable.
14. Top Seal/H-3 stainless steel, cadmium plated and carbon steel (as applicable) structural screws.
15. RED HEAD, Fastenal, Hilti or approved equal, structural rated stud anchors

    a. Wedge type, double wedge when noted
    b. Epoxy
    c. Drive in type

E. Heavy timber connectors

1. TECO, Simpson, Phoenix or similar, galvanized minimum.
2. Details may use catalog numbers for one of the above, to establish

shape, gage and load applications, but similar shapes by all may be used.

3. See drawings for selections using Simpson catalog

    a. Miter intersection HSULC 412
    b. Perpendicular HUCTF 412
    c. Tie down HTS 30”
    d. All 16 gauge or heavier

2.2. QUALITY ASSURANCE

A. Grading Rules:

1. Lumber grading rules and wood species shall conform with Voluntary Product Standard PS 20-75.
2. Grading rules of the following associations shall also apply to materials produced under their supervision:

    a. Northeastern Lumber Manufacturer's Association, Inc. (NELMA).
    b. Southern Pine Inspection Bureau (SPIB).
    c. West Coast Lumber Inspection Bureau (WCLIB).
    d. Western Wood Products Association (WWPA).
    e. Redwood Inspection Service (RIS).

3. Plywood shall conform to the following:

    a. Softwood Plywood - Construction and Industrial: Product Standard PS 1-74.
    b. Hardwood Plywood: Product Standard PS 51-71.

B. Identify all lumber and plywood by official grade marks.

1. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, where applicable, and condition of seasoning at time of manufacture.

    a. S-GRN: Unseasoned.
    b. S-Dry: Maximum nineteen percent (19%) moisture content.
    c. MC-15 or KD: Maximum fifteen percent (15%) moisture content.
    d. Dense.

2. Softwood Plywood: Appropriate grade trademark of American Plywood Association.

    a. Type, grade, class and identification index.
    b. Inspection and testing agency mark.

C. Requirements of Regulatory Agencies:

1. Preservative Treated Lumber and Plywood: American Wood Preservers Bureau, Quality Mark.

3. EXECUTION

3.1. PREPARATION

A. Examine receiving surfaces and verify that no rot or detrimental condition such as poor anchorage exists.

1. Application or installation of materials constitutes acceptance of existing application conditions.

B. Verify all dimensions of in place and subsequent construction.

1. Adjust framing or additional framing as needed to accomplish the intent of the work and as needed to complete the work properly.

C. See Drawing Details.

3.2. INSTALLATION

A. Frame wood members to be close fit, set accurately to required lines and levels and secured rigidly in place in accordance with the Drawings.

1. In continuous runs, stagger members of such as multiple member plates or curbs.
2. Anchor all members typical to industry standards as a minimum.

a. As detailed
b. Sill plates not more than 48” anchor spacing, ½” bolts nor 12” from plate ends.
c. Roof edge curbs, not less than 60 pounds per lineal foot pull off resistance any direction.

3. Cut and fit framing, blocking etc. to accommodate the other work, other trades and MEP work.

4. Interlock plate and curbing corners.

B. Framing Roof perimeter

1. Provide dimensioned wood for all framing, blocking, furring, nailing strips built into, or adjacent to, exterior masonry walls, wood in contact with concrete and wood in conjunction with roofing.

a. Roof perimeter is intended to be infiltration tight, provide sealant, foam fill shields, and or insulation as need to accomplish this.

END 06 1000

1. GENERAL

1.1. WORK INCLUDES

A. The Contractor shall provide finish carpentry as shown on the Drawings, required to execute the documents, and specified herein.

1. Provide in accordance with requirements of Section 08200 Flush Wood doors.
2. Verify all door sizes on the job.
3. Install and reinstall hardware as indicated per drawing notes.
4. Install new doors, frames, and hardware as noted on the Drawings, Sections 08 11 13, 08 14 00, and 08 71 00.
5. Provide trim as required to complete the project.
6. Provide 5/8" Type "X" gypsum wallboard and ceiling in all areas where single thickness material is designated.
7. See Drawings for double twin layered separation wall between (E) and new addition.

1.2. RELATED WORK

A. Specified elsewhere:

1. DIVISION 0 - PROCUREMENT REQUIREMENTS
2. DIVISION 1 - ADMINISTRATIVE REQUIREMENTS
3. 06 1000 - Rough Carpentry
4. 06 4116 - Laminate Clad Cabinets
5. 08 1113 - Hollow Metal Work
6. 08 1400 - Flush Wood Doors
7. 09 2116 - Gypsum Wallboard
8. 09 9000 – Painting

1.3. QUALITY ASSURANCE:

All custom woodwork shall comply with the applicable requirements of the AWI Quality Standards established by the Architectural Woodwork Institute.

2. PRODUCTS

2.1. MATERIALS

A. Softwood for Paint Finish: Ponderosa Pine, Sugar Pine, or Northern White Pine.
B. Softwood Plywood: Product Standard PS 51-71.
C. Solid Core Doors. See Section 08 1400.
D. Hollow Metal Work. See Section 08 1113.

2.2. FABRICATION

A. Exposed wood trim for natural finish shall be 3/4" clear select Birch or oak as is most compatible with surrounds. Poplar allowed for painted wood

trim.

B. Install architectural trim plumb, level and in line; scribe to other finished work. Miter corner on casing trim. Provide blind fastenings and nailing to the extent feasible. Set all exposed nails with a nail set below the surface of the wood and fill all nail holes flush and color compatible.

3. EXECUTION

3.1. INSTALLATION - GENERAL

A. Examine all surfaces to receive the parts of the work that are specified herein. Verify all dimensions of in-place and subsequent construction. Application or installation of materials constitutes acceptance of conditions.

B. Install architectural woodwork plumb, level and in line; scribe and cope to other finished work. Miter corner on casing trim. Provide blind fastenings and nailing to the extent feasible. Set all exposed nails with a nail set below the surface of the wood and fill all nail holes flush and color compatible.

C. Ease edges -- finish ready.

1. 1/16" bevel on all exposed edges, trim, doors, etc.

3.2. INSTALLATION OF METAL FRAMES

A. Set metal frames accurately in location, in perfect alignment, plumb, straight and true.

B. Brace frames to prevent displacement. Extend frame anchorages below fill and finishes, except over membrane-waterproofed areas, or as shown otherwise.

C. Anchor bottom of frames to floors with anchor bolts or with power fasteners. Coordinate the installation of built-in anchors for wall and partition construction, as required with other work.

3.3. INSTALLATION OF DOORS

A. Apply hardware in accordance with the Hardware Manufacturer's instructions.

B. Drill and tap for machine screws, as required. Do not use self-tapping sheet metal screws except as otherwise shown or specified.

C. Adjust door installation to provide uniform clearance at head and jambs and to contact stops uniformly.

D. Remove and replace doors which are found to be warped, bowed, or otherwise damaged and cannot be properly fitted in frames.

3.4. INSTALLATION OF FINISH HARDWARE

A. Receive finish hardware as shown and called for on the drawings and/or sections of these Specifications. Store in a locked space to prevent loss.

B. Apply finish hardware as recommended by the Hardware Manufacturer and as required. Fit lock and latch sets in their respective doors and remove before finishing of doors. Reinstall hardware after finishing of doors is

completed.

C. Upon completion of finish hardware installation, adjust and lubricate hardware for proper operation.

3.5. REHAB INSTALLATIONS

A. Match existing conditions where encountered.

END 06 2000

1. GENERAL

1.1. DESCRIPTION

A. Provide all laminate clad cabinetwork shown

B. Provide all accessory items needed to complete the cabinetwork including coat rods, coat hooks, locks, shelf brackets, drawer guides, handles, hinges, catches and general hardware.

1. Counter tops to solid surface:
2. Provide 3” wire way grommets through top each side of each knee space.
3. Coordinate with the Electric subcontractor to run power and communication work through the casework when applicable.

C. ADA compliant

1. 34” cabinet overall height
2. 4” toe space

1.2. RELATED WORK

A. Specified elsewhere

1. 06 1000 – Rough Carpentry

1.3. QUALITY STANDARDS

A. All work is to be in compliance with Architectural Woodwork Institute (AWI) Quality Standards

1. Custom Grade for assembly, fit, finish, performance, laminate selection and construction methods.

2. PRODUCTS

2.1. CASEWORK - LAMINATE CLAD

A. AWI quality grade: custom grade.

B. Construction: Details shall conform to design. Flush overlay or exposed face frame.

C. Casework doors to be 3/4" plywood, plastic laminated both sides and edged. Interiors may be liner material

D. All shelves shall be laminated over 3/4" thick, 7 ply fir plywood

2.2. PLASTIC LAMINATE

A. Exposed surfaces: to be high pressure Laminate, Formica, Nevamar, Wilson Art or approved equal submitted prior to bidding.

1. Colors to be selected in each room.
2. Tops will be acrylic solid surface.

B. General Purpose 50 (.050") horizontal work surfaces and edges subject to high use, color and pattern to be selected.

C. General Purpose 28 (.028") for vertical and medium use surfaces, color and pattern to be selected.

D. Cabinet liner 20 (.020") for interior surfaces.

1. Includes backs and shelves in open shelving condition.
2. White, off white, gray or white on white patterned.

E. Backer 20 (.020") for backs of doors and any surface not rigidly supported and anchored to resist warp, wind or curling.

F. All surfaces not otherwise anchored against warping shall be backed whether in view or not.

2.3. CASEWORK HARDWARE

A. All cabinet hardware shall be furnished and installed by the casework manufacturer. Hardware to be as follows:

1. Drawer guides: manufacturer's standard roller guide.
2. Shelf standards and brackets: type optional with manufacturer, adjustable as shown on drawings.
3. Hinges: 2-1/2" .083 (3" on 1" or heavier doors). Chrome finish.
4. Catches: Nylon roller type.
5. Pulls: Epco MC427 or equal, 1/2" diameter aluminum X 3" long.
6. Clothes poles: optional with manufacturer, chrome.
7. Clothes hooks: Ives #572 or equal.
8. Locks: Five (5) disc tumbler casework locks.

2.4. TOPS

AWI Custom Grade: custom, solid surface (4') backsplash and side splash at walls.

1. Shall be able to support 250 lbs. at any location, framed or backed as necessary.
2. Solid surface material

a. Corian
b. Wilson Art
c. Maganite

d. Formica
e. Or equal submit prior to bidding for approval.

2.5. CABINET BOX

A. AWI Custom Grade, 3/4" plywood basic construction.

1. Provide bracing and corner hardware as required for rigid sturdy construction.
2. Backs against walls may be less than 3/4", select for service, backed or supported to not present a flimsy or unstable performance.
3. Cabinets to be fully plastic laminate lined.
4. Coordinate adjacent cabinets for alignment and fit.
5. 4” toe space

2.6. DRAWERS

A. Drawers by definition shall have **full height** sides and backs.

1. Full height means drawer face height less ½” side clearance below horizontal box frame drawer fits into.

B. Drawers to be backer laminate lined.

C. Drawer guides

1. BHMA A156.9 type B05091
2. Full extension, side mount, zinc plated steel
3. Heavy duty

a. Full extension
b. not less than 150 pound capacity,
c. soft close style.
d. Easily released for drawer removal.

2.7. WINDOW SILL/STOOL

A. 3/8” or heavier solid surface (Corian or similar)

1. Approximately 1” overhang to actual masonry face
2. Rounded corners.
3. Set with silicone adhesive-sealant

3. EXECUTION

3.1. INSTALLATION

A. Cabinetwork shall be set level and square with surrounds. Provide filler strips and sealant as needed to finish installation.

B. Provide mechanical counter anchors for counter top joints. Joint shall be

tight and uniform. Install with sealant in joint before tightening and clean off immediately.

C. Coordinate with mechanical and electrical trades for installation services.

D. All tops shall be mechanically anchored to base cabinets.

E. All cabinetwork shall be mechanically anchored to floors and walls.

F. Apply resilient base to all cabinets with flooring work.

3.2. Shelving and coat hook and coat rod accessories

A. See drawings sheet A-5.4 for shelving hardware and coat rack and coat hooks. Coordinate with hardware provider for who is providing and installing.

END 06 4116

1. GENERAL

1.1. WORK INCLUDES

A. Foundation Insulation
B. Miscellaneous Insulation.

1.2. ALTERNATE BID WORK INCLUDES

A. Additional area

1.3. UNIT COST WORK INCLUDES

A. None

1.4. RELATED WORK

A. Roof and wall insulation in Pre-Engineered Building package 13 1200

B. Alternate Foam Insulation systems 07 2119

2. PRODUCTS

2.1. MATERIALS

A. Foundation Insulation

1. 24” by full perimeter 2” closed cell Polystyrene such as Styrofoam blue or pink board

B. Miscellaneous Insulation

1. Fiberglass, mineral wool or local Spray foam materials to create fully insulated infiltration tight enclosure.

3. EXECUTION

3.1. INSTALLATION

A. Properly installed to provide continuous insulation barrier in building and foundation in accordance with IECC 2018
B. Insulation to be properly secured to provide long term service without displacement from normal exposure. Openings in structural decking.

END 07 1000

POLYURETHANE FOAM AND COATING DESIGN GUIDELINES

PART 1 - GENERAL

Specification for the application of a seamless sprayed-in-place polyurethane foam system with an intumescent protective coating for use as interior insulated wall and roof system.

1.1 SCOPE OF WORK

A. Furnish all labor, materials, tools and equipment necessary for the application of a polyurethane spray foam/coating roofing system, including accessory items, subject to the general provisions of the contract and in accordance with guidelines and details per this document.
B. **Base Bid** none
C. **Alternate bid #2**: Spray Foam Insulated and coated interior wall system.
D. **Alternate Bid #3:** Spray Foam insulated and coated interior Roof insulation System
E. **Thermal spacer blocks:** Are Required for all metal wall and roof applications, coordinate with the pre- engineered building system installer.

1.2 QUALITY ASSURANCE

A. **Contractor Qualifications:** The proposed contractor shall be c9mpleted by experienced applicators in strict compliance with the manufacturer's instructions by trained personnel.
B. **Manufacturers Qualifications:** Furnish upon request, certification that the material meets the physical properties to meet IECC code requirements, Metal walls and Roof Climate zone 5.
C. **Inspections:** The polyurethane foam and protective coating shall be monitored and inspected during the installation of the material.

1.3 SUBMITTALS

A. Warranty pre-installation notifications are required prior to installation of a warranted system.
B. Provide submittal to Architect and Owner that this Contractor is preapproved to provide a manufacturer warranted roof and wall insulation system.

1.4 PRODUCT DELIVERY, STORAGE, & HANDLING

A. Deliver material in original, unopened packages and containers.
B. Containers are to be labeled with manufacturer's name, product name, description, and identification.
C. Store materials in a dry area above 40ºF and less than 80ºF, and protect from water and direct sunlight.

D. Any materials damaged in handling or storage must not be used.
E. Have available MSDS for each product. Consult MSDS and Product Data Guideline for each product used before beginning work.

1.5 JOB & ENVIRONMENTAL CONDITIONS (CAUTIONS AND WARNINGS)

A. The polyurethane foam and coatings applications shall not proceed during periods of inclement weather. Do not apply the polyurethane foam if the surface temperature of the substrate is less than 5ºF above the dew point
B. Coatings should be protected from abuse until completely cured and installation is complete.
C. Application of polyurethane foam and coatings with spray equipment may require some masking and possible erection of screens to prevent over-spray and drift damage. Protect surfaces of unrelated areas from coatings and over-spray possibility.
D. Application shall proceed to dry, clean surfaces only. In planning work consider environment and weather related conditions such as frost, condensation, humidity, and temperature. Temperature should be above 40ºF, more than 5ºF above the dew point and rising, for best polyurethane foam application results.
E. Means and Methods are the responsibility of the Contractor, the Owner and Architect are not responsible to provide direction, guidance or equipment related to operations, traffic control . lifts, scaffolding or environmental protections.

1.6 SAFETY

A. Implementation of Safety standards, OSHA requirements are Means and Methods sand are the responsibility of the Contractor.
B. Personnel training associated with the materials being used. Protective clothing, eye and face protection, and respiratory protective equipment all Are the responsibility of the Contractor.
C. The Contractor shall provide notification to The Owner and Architect when operations are planned and any safety considerations that may affect their occupancy of the building and grounds.
    - This would include protection of persons and property from overspray, airborne spray or chemicals and any concerns to persons and property as may be necessary.

1.7 WARRANTY

A. warranty that materials provided are free from defects in manufacturing and will replace any material found to be defective.
B. Approved contractor for Coating System Warranty
    - Manufacturers 10 year stability, adhesion and insulation value warranty

PART 2 - PRODUCTS

2.1 GENERAL

A. The components of the multi part spray applied urethane with intumescent coating, closed cell, R nominal 7 per inch.

- **Tiger Foam by Commercial Thermal solutions**
  Foam Products division
  2812 29th SW 29th Court
  Cape Coral Florida, 33914
  Phone **732-927-2090**

- **Johns Manville JM Corebond III**
  PO Box 5108
  Denver Colorado
  800-654-3103
- **Carlisle PremiSEAL**
  P.O. Box 467
  300 Railroad Ave STE 200
  Delano, MN 55328
- Or approved equal generically similar and subject to submittal of information and specifications minimum of 5 days before bidding.

2.2 POLYURETHANE FOAM

A. The polyurethane foam (such as Carlisle PremiSEAL Closed Cell Foam vapor barrior. to be applied shall be a two component spray-in-place system made by combining an isocyanate (A) component with a polyol (B) component and shall have a minimum density of 3.0 pounds per cubic foot.
B. Fire Safety Requirements: See SPI Bulletin AX-119. “MDI-Based Polyurethane Foam Systems: Guidelines for Safe Handling and Disposal.”

2.3 URETHANE SEALANT:

A. To be as approved by the foam and coating manufacturer.
B. One part poly urethane such as BASF Master Seal NP1, Tremco NP1 or similar long life sealant that does not require a primer.

2.4 FINISH COAT: Acrylic or polyurethane

A. Finish coating shall be as directed by the manufacturer, flexible acrylic surface with protective, intumescent rated for smoke and fire protected.

2.5 PRIMERS

A. The use of primer prior to spray polyurethane foam insulation on concrete, metal and other surfaces shall be considered optional and used as each specific project dictates and as recommended by the system manufacturer.

PART 3 - APPLICATION

3.1 POLYURETHANE FOAM APPLICATION

A. Inspection:

a. Prior to application of the foam, the surface shall be inspected by the contractor and/or the manufacturer to insure that the surface is free of loose dirt, oil or other contaminants and that it is stable and secure in all respects.

- Adhesion tests of the foam should be done to determine the potential need of a primer.
- If encountered, Fluted metal surfaces may require surface treatment prior to spraying foam. Flutes may be filled with spray foam or pre-cut board stock insulation or covered with open weave mesh fabric or a mechanically fastened board stock.

b. All surfaces shall present uniform reasonable level surface.
c. This shall be created in the foam application process; the application surfaces may be fluted.

B. Foam Application

a. Conditions - Foam shall not be applied during inclement weather conditions. Surfaces to receive foam shall be clean, dry, and free of frost or dew. Substrate temperature should be 60ºF or higher and more than 5ºF in excess of dew point.
b. Protect surrounds as necessary from airborne foam particle foam over spray or damage due to the application process.
c. Foam Thickness – Comply with 2018 IEEC for metal buildings, R value table or U value table, Climate zone 5.
d. .Minimum lift thickness shall be ¾" and 1"-2" lift thickness is desired. Minimum total foam thickness shall be nominal 4.5" based on R 7.0 per inch. All foam in an area should be applied to finish thickness the same day. Foam should be applied uniformly over the entire surface with a tolerance of plus ¼" of thickness.
e. Foam Surface Texture - Foam surface shall be smooth to "orange peel" texture as defined by SPI-PFCD. Pass line areas may be one degree higher in surface roughness. Roof perimeters shall be planed, filed, etc. as needed to prevent ponding at roof edges.. Any foam "folds" or other irregularities shall be removed and repaired.

C. Coating Application: (Note: Total dry mil thickness minimum)

a. The foam surface shall be free of moisture, frost, dust, debris, oils, tars, grease or other contaminants, which may impair adhesion of the coating to the foam. The surface shall be clean, dry, sound, smooth and free of voids, pinholes or blisters. Any damage or defects to the foam shall be repaired prior to coating application, with foam or caulk (acrylic or urethane caulk).
b. The foam shall be allowed to cure a minimum of 2 hours. Acrylic TOP (White) may be applied the same day as the foam application when possible. If more than 24 hours elapse prior to applying the Acrylic TOP (White) the foam shall be inspected for damage and/or moisture.

D. TOP coat with intumescent coating for fire and smoke protection.

a. Flame Spread 25 smoke developed 25 .

- Select manufacturer recommended coating
- Apply in required mill thickness as required for fl=ire protection rating.

PROTECTION AND CLEAN-UP PROTECTION

A. The surrounds and all components must be protected from all other trades at the job site.

B. All damage to the system must be repaired to comply with manufacturer guidelines prior to final inspection for warranty approval. The cost of all related repairs will be borne by the trades and/or subcontractors responsible for the damages.

CLEAN-UP

A. Site clean-up is the responsibility of the contractor.

B. All debris, containers, materials, equipment, and protection materials must be removed from the premises and properly disposed of. All work and storage areas must be in an undamaged and acceptable condition upon completion of clean-up.

End 07 2119

1. GENERAL

1.1. WORK INCLUDED

A. Contractor shall provide caulking and sealing of joints as shown on Drawings and specified herein, including backup fillers where required.

1.2. RELATED WORK

A. Specified elsewhere:

1. 07 1916 – Moisture Repellent
2. 07 6200 - Sheet Metal Flashing & Trim
3. 08 1113 - Hollow Metal Work

1.3. SUBMITTALS. Submit the Manufacturer's literature, materials description and installation instructions for each compound and filler in accordance with 01340.

1.4. HANDLING & STORAGE

A. When the Contractor chooses a product for a particular use for a sealant or caulk specified, that same product shall be used throughout the project for that specific assignment.

1.5. WARRANTY

A. Sealant Manufacturer: Contractor shall certify per Section 01 7800, as applicable.

1. Material performance - twenty (20) years against shrinkage and hardening - implied and advertised.
2. Loss of bond to substrate - five (5) years - Contractor or Manufacturer's Warranty.

2. PRODUCTS

2.1. MATERIALS

A. Exterior for metal-to-metal, metal-to-glass and for glass-to-glass installations.

1. Sealants shall be one (1) part type - silicone
2. Serviceable life expectancy shall be twenty (20) year minimum in Manufacturer's printed material for applications proposed.
3. Approved products are as follows: (Select proper product from product family).

a. General Electric Silicone Series 1200.
b. Dow Chemical CCS/CWS Silicone Rubber Sealant.

B. Exterior grade for masonry-to-masonry, metal-to-masonry, wood-to-masonry, and glass-to-masonry.

1. Material's serviceable life expectancy shall be twenty (20) year minimum in Manufacturer's printed material for the applications proposed – one (1) part urethane.
2. Approved products are as follows:

a. Sonneborn NP-1
b. Silaflex 1A
c. Vulkem 116
d. Tremco Mono
e. Dow Corning CCS/CWS
f. Select a sealant type appropriately recommended by the manufacturer for the application and as preferred by the installation contract best experience.

C. Interior grade caulk shall be one (1) part, paintable.

1. Chemical make-up shall permit 5% joint movement from 20 deg. F to 110 degrees F and shall be skinning type.
2. Approved products are as follows:

a. DAP Latex Caulk
b. Pecora BC 158
c. Tremco Butyl Sealant

D. On grade horizontal joints, exterior/interior grade sealant shall be one (1) part, self-leveling for concrete contraction/expansion joints.

1. Approved products are as follows:

a. Sonneborn Sonolastic S.L.1
b. Vulkem 45
c. Dow Chemical 880

2. If slope will cause flow, use one (1) part urethane listed above.

2.2. JOINT FILLER / BACKER

A. Joint Filler/Backer, closed-cell polyethylene approved products shall be as follows:

1. Ethafoam by Dow Chemical.
2. Expand-O-Foam by Williams Products, Inc.
3. Filler Foam FF-4 by Progress Unlimited, Inc.
4. Safe-T-Grip Filler Gasket by Structural Specialties Corp.

2.3. JOINT CLEANER. Joint cleaner shall be that cleaner recommended by Sealant Manufacturer for specific joint surface and conditions.

2.4. JOINT PRIMER AND SEALER. Joint primer and sealer shall be those compounds recommended by Sealant Manufacturer for the specific joint surface and conditions.

3. EXECUTION

3.1. PREPARATION

A. Examine all surfaces to receive the parts of the work specified herein. The application or installation of materials constitutes acceptance of the substrate.

B. Clean surfaces and remove protective coatings that may fail in adhesion or interfere with bond of compound so surfaces are free of deleterious substances which might impair the work.

C. Prime surfaces per the Sealant Manufacturer's instructions.

D. Install bond breakers in locations and of type recommended by the Sealant Manufacturer to prevent bond or sealant to surfaces where such bond might impair the performance of the sealant.

3.2. INSTALLATION

A. Install all materials in accordance with Manufacturer's printed instructions. Unless otherwise directed, conform as follows:

1. Compounds shall not be installed at temperatures below 40 deg. F unless the Manufacturer specifically permits the application of his materials at a lower temperature.
2. If job conditions require installation of compounds below the minimum installation temperatures recommended by the Manufacturer, consult the Manufacturer's Representative and establish the minimum provisions required to ensure the satisfactory work.
3. Confine compounds to joint areas shown. Use masking tape to prevent staining of adjoining surfaces, spillage and/or migration of the compound out of joints. Tool surfaces to shape shown or, if none is shown, to a flush or slightly concave surface. Remove excess compound and clean adjoining surfaces as may be required to eliminate any indication of soiling or migration.
4. In joints which are not subject to traffic, apply sealants to a minimum depth of 50% of the normal joint width but not less than 3/8" or more than 1/2" deep.
5. Apply non-elastomeric compounds in exposed joints with the depth of compound not less than the joint width.
6. Use appropriate sealants for all exterior joints and for the interior joints subject to movement, except traffic expansion and contraction joints and for all exterior and interior expansion traffic joints in concrete and tile work.
7. Use paintable sealant for all interior joints at locations to be painted not subject to movement in excess of 5%.

8. Pouring sealants shall be poured over a bond breaker tape joint filler. The joint shall be masked off adequately to assure a clean, flush and finished installation.
9. Sealants and caulks shall be a color selected to blend with adjacent material color.

B. Installations shall be neatly executed, smooth and regular in appearance, no lumps or globs or smears onto adjacent surfaces. Tool when appropriate.

3.3. SEALANT COLOR SELECTION

A. Sealant shall generally match surrounds for color.

1. Coordinate with Architect/Engineer regarding colors to insure approval.
2. Once a Manufacturer's product has been established for a use, that same product shall be used throughout the project for the particular situation and background.

3.4. SEALANT APPLICATION

A. For exterior/building envelope conditions: Select the proper sealant to provide resistance to air or water infiltration at all exterior envelope joints, connections of dissimilar materials:

1. Wall expansion joints
2. Door & windows

a. Bed all thresholds in urethane sealant.

3. Wall penetration
4. Abutting dissimilar materials
5. As needed to control infiltration

a. Water
b. Air
c. Vermin and insects

B. Appearance conditions: Throughout the interior of the construction provide sealants as needed to visually finish all installations.

1. Wall expansion joints
2. Construction joints
3. Abutting dissimilar materials
4. Wall, floor and ceiling penetrations
5. Joints subject to water penetration
6. Irregular joints
7. Unintended gaps, cracks or openings such as at poorly executed electrical device cover plates

C. Kitchen, Restrooms, etc.

1. Use appropriate approved sealants as needed for compliance with regulations and good housekeeping practice.

END 07 9200

1. GENERAL

1.1. WORK INCLUDED

A. The General Contractor shall provide hollow metal doors, frames, sidelights and vision panel frames as shown on the Drawings and specified herein.

1. Contractor shall verify quantities.
2. Contractor shall verify conditions to fit all work
3. Interior doors 5/8" undercut.

B. Schedule of doors and hardware sets at the end of Hardware section 08 7100

1.2. RELATED WORK

A. Specified elsewhere:

1. DIVISION 00 - PROCUREMENT REQUIREMENTS
2. DIVISION 01 - ADMINISTRATIVE REQUIREMENTS

B. See Door Schedule shown on the Drawings.

1.3. SUBMITTALS

A. Submit shop drawings in accord with 01 3300. Show type of door and frame for each opening, full scale sections of all typical members, dimensioned elevations, anchors, reinforcements, and other required components.

1.4. HANDLING AND STORAGE

A. Handle and store doors and frames at the job site in such a manner as to prevent damage. Wrappings or coverings shall be removed upon arrival of doors at the job site.

2. PRODUCTS

2.1. MATERIALS

A. Structural Steel Shapes: ASTM A36-70a.

B. Sheet Steel: ASTM A 366-72, commercial quality, cold rolled, stretcher leveled.

C. Galvanized Steel ASTM A 366-72 .5 oz/square foot per side.

D. Primer: Phosphate treated, gray zinc chromate baked on inside and outside of all sections.

2.2. MANUFACTURERS

A. Acceptable manufacturers of standard 16-gauge doors and frames:

1. Steelcraft - Cincinnati, Ohio
2. The Ceco Corporation - Chicago, Illinois
3. Mesker Door Co., Inc., Huntsville, AL
4. Fenestra Corporation - Erie, Pennsylvania
5. Curries Co., Mason City, IA
6. Amweld Building Products, Garrettsville, OH

2.3. FABRICATION

A. Fabricate hollow metal doors and frames as shown on the Drawings and in accordance with best shop practices. Frames shall be welded rigid, neat in appearance, and free from defects. Field measurements shall be taken as required for coordination with adjoining work.

B. Form exposed surfaces free from warp, wave and buckle, with all corners square, unless otherwise shown. Set each member in proper alignment and relationship to other members with all surfaces straight and in a true plane.

C. Reinforce members and joints with steel plates, bars, rods or angles for rigidity and strength.

D. Conceal all fastenings unless otherwise shown or specified.

E. Provide combination type hollow metal door frames to be used as both door buck and trim, formed to profiles.

F. Unless otherwise shown, fabricate all interior frames of 16 gauge steel primed steel. Exterior frames shall be 14 gauge galvanized and primed.

G. All corners shall be welded and ground smooth exhibiting a neat smooth flush finish.

1. Provide proper returns at all edges.

H. Doors and frames shall be mortised and reinforced for hardware in accordance with the Hardware Manufacturer's instructions and templates. Reinforcing shall be drilled and tapped to receive hinges, locks, strikes, and closers. Cover boxes shall be provided for hardware cutouts. The hinge reinforcements shall be 7-gauge. Angle floor clips have two holes each for 3/8" anchor.

I. Make provisions for installing rubber door mutes on interior door frames. Three (3) for single frames.

J. Provide internal reinforcement for surface mounted hardware in frames to match locations shown or specified for doors.

K. Furnish at least three (3) adjustable metal anchors in each jamb of shapes, sizes and spacing shown or required for anchorage into adjoining wall construction. Fabricate joint anchor of steel no lighter than gauge used for the frame, unless otherwise shown.

L. Floor anchor clips for each jamb shall be not less than 14-gauge steel with two anchor holes and welded to frame. Terminate bottom of frames at the indicated finished concrete floor level.

M. Miter, fit, weld, and grind smooth corners of panel moldings for glass panels to form continuous frames around panels. Furnish removable moldings of minimum 18-gauge steel. Secure removable moldings with not less than No. 6 x 32 Phillips, oval-head countersunk machine screws at 12" o.c.

N. Door shall be as follows:

1. 1-3/4" thick. Typically 7'2" high, see schedule in 08 7100 for widths.
2. 16-gauge face sheets.
   a. **See door schedule for 14-gauge FEMA equivalent door construction**
3. 16-gauge edge channels
   a. **See door schedule for 14-gauge FEMA equivalent door construction**.
4. 1/8" beveled lock side.
5. S.D.I. Type III extra heavy-duty seamless full flush.
6. Foam filled core on exterior doors – honeycomb interior doors
7. Cut out mortise and reinforce for hardware mounting.
8. 7-gauge drilled and tapped hardware.
9. 5/8" undercut all interior doors.
10. Louvers to be heavy gauge sight tight style
11. Glazing in exterior doors to be clear, insulated, laminated glass low 'e'

O. Frames shall be as follows: One (1) new metal frame.

1. Standard 5 ½" X 2" jambs, 2" head.
2. Stops 5/8" deep X 1-15/16"

3. Loose stops for glazed frames shall be 1/2" thick X 1-1/4" wide - screw anchored to frames.

P. Top and bottom edges all doors shall be closed with a continuous recessed channel not less than 16-gauge, extending full width of door and spot welded to both faces. Both vertical edges of doors shall be leveled 1/8" in 2".

Q. Provide clearances for hollow metal doors of 3/32" at jambs and heads, 1/8" at meeting stiles for pairs of doors and 3/8" at bottom where no threshold is required. 3/8" to increase 1/4" where door swings over carpet. Where a threshold is shown, provide 1/8" in 2".

R. In addition to other requirements for hollow metal doors and frames

specified herein, comply with the label requirements of the National Fire Protection Association and applicable local codes. Fabricate doors and frames in accordance with the requirements of the NFPA Standard No. 30 and UL Standard for Safety No. 60 for the class of door opening shown or scheduled.

S. Provide accessories for doors per the Drawings and per Section 08 7100.

T. Exterior Doors and frames to be Galvanized and foam core insulated doors with kerf frame and integral weatherstripping, insulated frames.

2.4. SHOP PAINTING

A. Thoroughly clean all metal surfaces of loose scale, shavings, filings, dirt and other deleterious materials by using wire brushes or other effective means. Remove grease and oil by solvent cleaning.

B. Chemically treat all surfaces with phosphate compound to assure maximum paint adherence. Apply one coat of primer, baked on. Cover all surfaces without runs, smears or bare spots. THOROUGHLY PRIME JAMBS INSIDE AND OUTSIDE.

C. Prime coat inside surfaces of frames.

D. Prime coat inside surface of all removable stops, as well as the frame area covered by such stops.

3. EXECUTION

3.1. PREPARATION

A. Examine job site conditions to receive the work. Installation shall confirm acceptance of job site conditions and preparation.

B. Verify all dimensions of in place and subsequent construction.

3.2. INSTALLATION

A. All items shall be set in their correct locations as shown on details and shall be level, square, plumb and at the proper elevations and in alignment with other work.

B. All interior and exterior joints between glass, framing and mullion members shall be tightly sealed with elastomeric sealant in order to assure a vibration free and watertight installation.

C. All materials shall be screwed in place using backing, masonry plugs or anchor straps as applicable.

D. Where moldings are joined, they shall be accurately cut and fitted to result in a tightly closed joint.

E. After erection, protect exposed portions of framing from damage by grinding and polishing machines, plaster, lime, acid, cement or other harmful compounds.

F. All doors and frames to be primed and receive two (2) coats satin DTM latex paint. See Section 09 9000.

3.3. **Schedule of doors and hardware sets see end of Hardware section 08 7100.**

END 08 1113

1. GENERAL

1.1. WORK INCLUDES

A. Provide Access doors as noted on drawings

1. Mechanical room to under stairs 24 wide x 30” high, sill at 18” above floor.

2. Provide four (4) ceiling access panels 24” x 24” for location to service plumbing and/or HVAC. These will be located in the drywall ceilings, office, Rest room Hallway and/or Break Room as directed on site.

1.2. RELATED WORK

A. Specified elsewhere:

1. 04 2000 - Unit Masonry
2. 09 216 Gypsum Drywall

1.3. QUALITY ASSURANCE

A. Materials shall be installed by persons experienced in installation of this type material.

1. Installation shall comply with manufacturer’s recommendations, binding, warped, crooked or oil canning not acceptable.

1.4. SUBMITTALS

A. Submit the following:

1. Shop Drawings or Manufacturer’s Literature to fully describe installation, details, assembly.

2. Operation and Maintenance materials.

2. PRODUCTS

2.1. MATERIALS

A. Mechanical Room to stair 14 gauge primed steel medium security such as Babcock Davis BMTP3232.

B. Ceiling access doors maybe 16 gauge.

1. Similar products by other manufacturers may be employed, this is a genric specification, see below.

C. Wall mount to CMU – surface frame

D. Thumb turn locking mechanism

2.1. MANUFACTURERS

A. Nystrom, 9300 73rd Avenue North, Minneapolis, MN 55428
PH. 1.800.547.2635

B. Babcock Davis 9300 73rd Avenue North Brooklyn Park MN 55428, Phone 888 412 3726

C. Acudor, info@acudor.com, 973 575 5120 or 800 722 0501

D. Best Access doors available on line

E. Or equal, Bilco, Durared

3. EXECUTION

3.1. INSTALLATION

A. Installation shall follow instruction of manufacturer.
B. Use not less than (4) Jamb fasteners 5/16” x 3” Tapcons or equal surface and (4) into side jambs at least 2” separation

3.1. CLEANING

A. All material to be left in clean condition. smooth operating, adjusted for easy operation.

END 08 3313

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Commercial sectional doors.

B. Electric Operators

C. Remote controls

1.2 RELATED SECTIONS

A. Division 32- Chain Link fence and automatic gates

B. Division 13 Section 13 1200 Pre-engineered buildings.

C. Division 26 - Electrical.

1.3 REFERENCES

A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

C. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

D. ANSI/DASMA 105 – American National Standard Institute Test Method for Thermal Transmittance and Air Infiltration of Garage Doors

E. ASTM A 123 – Standard Specification for Zinc (hot-dipped galvanized) coatings on iron and steel products.

F. ASTM A 229 - Steel wire, oil-tempered for mechanical springs.

G. ASTM E 330 - Structural performance of exterior windows, curtain walls, and doors by uniform static air pressure difference.

H. ASTM E 413 - Classification for Rating Sound Insulation

I. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element.

J. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

K. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

L. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

M. ANSI/DASMA 108 - Standard Method for Testing Sectional Garage Doors, Rolling Doors and Flexible Doors: Determination of Structural Performance Under Uniform Static Air Pressure Difference

N. ANSI/DASMA 102 - Specifications for Sectional Overhead-Type Doors

O. ANSI/DASMA 115 - Standard Method for Testing Sectional Doors, Rolling Doors, and Flexible Doors: Determination of Structural Performance Under Missile Impact and Cyclic Wind Pressure

P. FDA 21 CFR 177.1520 - Olefin polymers

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Performance Standards: Provide test data validating the following:
1. Door Section: Gloss retention, fade resistance, FDA compliance, cold crack performance, load to rebound, dent resistance impact.
2. Drive Train: Spring cycle life, track, hinges, rollers, cable assembly, cable strength.
3. Door Assembly: Thermal performance, deflection, wind load.

D. Shop Drawings:
1. Provide drawings indicating track details, head and jamb conditions, spring shafts, anchorage, accessories, finish colors, patterns and textures, operator mounts and other related information.
2. Regulatory Requirements and Approvals: Provide shop drawings in compliance with local Authority having Jurisdiction (AHJ).

E. Certifications:
1. Submit manufacturer's certificate that products meet or exceed specified requirements.
2. Submit installer qualifications.

F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an authorized installer of door manufacturer who has demonstrated experience on projects of similar size and complexity.

B. Manufacturer Qualifications: Company with a minimum of five-year experience in producing the specified type of doors.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Provide manufacturer’s standard warranty against defects in material and workmanship, as further described with each model in Part 2 of this Section.

B. Warrant the electrical operator and component parts for two (2) years against defects in material and workmanship.

C. Warrants the electrical operator and component parts against defects in material and workmanship for three (3) years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Listing as an acceptable manufacturer may not mean all manufacturers have an identical product to this specification, but they have a generically similar product with minor manufacturing variances.

B. Acceptable Manufacturer, Heavy commercial Thermal sectional doors, 20 gauge galvanized exterior skin, 26/27 gauge galvanized interior skin, factory finished, exterior color to be selected.
1. Raynor, ThermaSeal TM 320, 815-288-1431; Fax: 888-598-4790;
2. Coplay, Model 3722, Contact 800-225-6729
   Overhead Doors, Thermacore 596, Contact 800-929-3667
3. Wayne Dalton, ThermoSpan 200-20, Contact 855-493-3667

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 SECTIONAL THERMAL SANDWICH DOOR

A. Doors
1. Operation
   a) Provide doors designed for electric motor operation, with manual override capability in event of power or operator failure.
2. Jamb Construction
   a) Steel jambs with self-tapping fasteners
3. Structural Performance Requirements
   a) Wind Loads: 15 psf design load/ pass 20 psf test load standards.
4. International Energy Conservation Code (IECC) Requirements:
   a) Air Infiltration – Maximum air leakage of 0.4 cfm/ft2 is required. Testing shall be in accordance with DASMA 105 test procedure.

b) Insulation R-17.5

B. Construction
1. Sections shall be pressure bonded to injected polyurethane foam insulated core. Hinge reinforcement strips shall be 20 gauge galvanized steel, located within section interior. End stiles and reinforcements to be 16 gauge galvanized steel.
2. Material: Steel sandwich construction, 2 inches thick, roll formed from commercial quality, hot-dipped galvanized (G40 exterior) steel complying with ASTM A 653. Exterior skin shall be constructed of 20 gauge steel and interior skin shall be 26/27 gauge steel with embossed stucco texture.
3. Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
   a) Enamel paint finish, color as selected by Architect from Manufacturers standard pallet
   b) Manufacturer's that offer white only, include DTM field finish in color to be selected.
4. Insulation: Expanded polyurethane with an R-value of 17.5.
5. Seals: Interior and exterior skins to be separated by a molded thermal break and weather seal along section joint. Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail. Optional dual-durometer vinyl blade seal on top section to prevent airflow above header/
6. Trussing: Doors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of 1/120th of door width.

C. Windows:
1. Three (3) per door, third section up nominal 5' above floor.
2. Size: 24 inches by 12 inches.
   a) Insulated, thermal sealed two panes of 1/8 inch thick tempered clear glass.

D. Track:
1. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weather seal.
2. Configuration Type: Normal Headroom.
3. Track Size: 3 inches
4. Jamb Type: Steel.
   a) Mounting: Floor-to-shaft angles. 13 gauge (2.2 mm) minimum continuous angles from floor, past header, up to door shaft. Angle Size: 3-1/2 x 5 inches (89 x 127 mm) on 3-inch track.
   b) Finish: Galvanized

E. Counterbalance:
1. Counterbalance System: Provided with aircraft-type, galvanized steel lifting cables with minimum safety factor of 5. Torsion Springs consisting of heavy-duty oil-tempered wire torsion springs on a continuous ball-bearing cross-header shaft.
   a) Spring Cycle Requirements: High cycle: 75,000 cycles.

F. Hardware:
1. Hinges and Brackets: Fabricated from galvanized steel
2. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
3. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.

a) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
b) For angle mounted doors provide angle clip-on seal.

4. Furnish door system with locks: Exterior lock with five-pin tumbler cylinder, night latch and steel bar engaging track.
5. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

G. Limited Warranty:
1. Warrant the door sections against defects in material and workmanship, and deterioration due to rust-through and/or delamination of the insulation from the steel skins for ten years from date of delivery to the original purchaser.
2. Window components are warranted against defects in material and workmanship for one year from date of substantial completion.
3. All hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of substantial completion.
4. All additional Limited Warranties in accordance with manufacturer's full standard literature and advertised features.

2.3 ELECTRIC OPERATORS

A. Center overhead lift, 3/4 hp or larger as recommended by the door manufacturer's printed recommendation,
1. Operator to be heavy duty high cycle design, chain operation with soft stop feature such as Overhead Door RHX.
a) Electrical Requirements: 208v 3 phase.
b) Duty Cycle: 30 cycles/hour or 300 cycles/day.
c) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, mid stop and lock bar sensor capability.
a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
b) Custom wiring.

d) Entrapment protection:
a) NEMA 4X Monitored photo electric eyes mounted on jambs.

e) Soft stop function up and down.

2. Remote operators
a) Three button remote operators, provide two per door
b) Coordinate remotes with gate operator, such that each truck can have operator operate both the gate and the respective stall overhead door.
c) Remotes are to be permanently labeled to match the stall identification.

2.4 DOOR IDENTIFICATION

A. Each Overhead door shall have permanent identification signage provided:
1. Above the door head. 12" x 12" 1/8" aluminum sign Black on reflective white above the door head, Upper case letters A starting at South East door.

2. Center of the door, third section down 10” letter, stenciled on in DTM, urethane sign paint, or applied exterior rated vinyl number.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared. Verify that site conditions are acceptable for installation of doors, operators, controls and accessories. Ensure that openings are square, flush and plumb.

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.

3.3 INSTALLATION

A. General: Install door, track and operating equipment complete with all necessary accessories and hardware according to shop drawings, manufacturer's instructions.

B. Lubricate bearings and sliding parts, and adjust doors for proper operation, balance, clearance and similar requirements.

3.4 PROTECTION

A. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove and legally dispose of construction debris from project site.

B. Remove temporary coverings and protection of adjacent work areas. Repair or replace installed products damaged prior to or during installation.

C. Lubricate bearings and sliding parts, assure weather tight fit around door perimeter and adjust doors for proper operation, balance, clearance and similar requirements. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

1. GENERAL

1.1. WORK INCLUDED

A. Furnish and install aluminum architectural thermal break windows complete with hardware and related components as shown on the drawings and specified in this section.

1. Type: Fixed FEMA ISS 500 rated windows
2. Commercial grade awning operable window.
3. Comply with 2018 IEC / Climate Zone 5.

1.2. RELATED WORK

A. Specified elsewhere:

1. Division 1 – Administrative Requirements

1.3. TESTING

A. Test Units

1. Air, water and structural test unit sizes and configuration shall conform to AAMA / WDMA / CSA 101 / I.S. 2 / A449 AW Performance grade AW 70.
2. Thermal and infiltration test unit sizes shall be 4'-0" X 6'-0". Test unit shall consist of a single typical vent.

B. Test Procedures and Performance

1. FEMA storm Shelter window (Break Room)

a. Window assembly shall be FEMA 3561 ICC 500 compliant assembly
   1) Framing
   2) Anchor system
   3) Glazing, polycarbonate and tempered.
b. Anchorage system to be compliant as tested, into CMU or provide a hot dip galvanized steel mounting frame anchored to masonry as required to meet anchorage requirements.

2. Exterior windows, Office

a. Sight lines to be similar to FEMA window.
b. Thermal Aluminum
c. May be set into pre-engineered building envelope with wider sill inside and trimmed to closeor in CMU with exterior closures and weather tight surrounds and sill flashing.

3. Air Infiltration Test

   a. With window sash and ventilators closed and locked, test unit in accord with ASTM E 283 at static air pressure difference of 6.24 psf.
   b. Air infiltration shall not exceed .10 cfm per foot of perimeter crack length.
   c. Comply also with 2012 IEC.

4. Water Resistance Test

   a. With window sash and ventilators closed and locked, test unit in accord with ASTM E331 at static air pressure difference of 12 psf.
   b. There shall be no uncontrolled or accumulated water leakage to the interior.

5. Uniform Load Structural Test

   a. With window sash and ventilators closed and locked, test unit in accord with ASTM E330 at a static air pressure difference of 70 psf positive pressure and 70 psf negative pressure.

   b. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanism, not any other damage which would cause the window to be inoperable.

6. Condensation Resistance Test (CRF)

   a. With window sash and ventilators closed and locked, test unit in accord; with AAMA 1502.7.
   b. Condensation Resistance Factor (CRF) shall be not less than 48 Frame / 76 Glass.

7. Thermal Transmittance Test (Conductive U-value)

   a. With window sash and ventilators closed and locked, test unit in accord with AAMA 1503.1.
   b. Conductive thermal transmittance (U-value) shall be not more than .38 BTU/hrs/sf/degrees F. fixed; 0.45 operable.

1.4. QUALITY ASSURANCE

A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in 1.3.

B. Test reports shall be accompanied by the window manufacturer's letter of certification stating that the tested window meets or exceeds the referenced criteria for an appropriate ANSI/AAMA 101-88 window type.

1.5. SUBMITTALS

A. Contractor shall submit Shop Drawings, finish samples, assembly samples, test reports and warranties.

1. A small sample window assembly showing hardware and basic construction or detailed submittal information
2. Test reports documenting compliance with performance requirements.
3. Installation instructions and anchorage for FEMA compliant installation.

1.6. DELIVERY, STORAGE AND HANDLING

A. All materials shall be carefully handled upon receipt at the project site. Do not stack directly on floor, provide wood or cardboard shims, stack or store in a manner to avoid abrasion, warping or winding of the assembly. Keep covered.

B. Replace materials damaged in storage or shipment with new materials.

1.7. WARRANTIES

A. The responsible Contractor shall assume full responsibility and warrant for one (1) year after Substantial Completion, the satisfactory performance of the total window installation which includes that of the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc. as it relates to air, water and structural adequacy as called for in the Specifications and approved Shop Drawings.

B. Insulating glass units shall be guaranteed for ten (10) years minimum against failure of seal or clouding.

1. Verify glazing condition and supply safety glass, heat strengthened glass, or tempered glass where needed for safety glazing cut and to comply with glass manufacturer's recommendations for stress, wind and solar/shade exposure.

C. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at his expense during the warranty period.

2. PRODUCTS

2.1. MATERIALS

A. The intent is to match the profile of existing window systems on the north classroom wing of the building

1. FEMA
    a. Storm Defend 361-2008
    b. Kawneer – submit equivalent as available
    c. Winco FEMA ICC 500-2014
    d. Approved equal submitted prior to bidding for Architect review.
2. Not storm rated. Similar sight line to FEMA

    a. Kawneer
    b. Winco
    c. Efco
    d. Graham
    e. Manko
    f. Or equal

B. Finish

1. Natural anodized, verify final selection.

C. Sill Starter

1. Wide style to allow window set back approximately 3” from face

D. Glass and glazing

1. FEMA compliant, insulating, polycarbonate and tempered as tested for FEMA window(s)
2. Thermal insulated gray glass low ‘E’ tempered glass or laminated glass.
3. Insulating seal 10 year warranty.

E. Sealants, interior and exterior, shall be a one-part polyurethane color to be selected. Use rope where appropriate to conditions.

2.2. FABRICATION

A. General

1. Mechanical fasteners, welded components and hardware items shall not bridge thermal barriers. Thermal barriers shall align at all frame and sash corners.
2. Depth of frame and sash shall be less than three and one-quarter inches (3¼”) actual.

B. Frame

1. Frame components shall be mortised and tendoned. Other means of mechanical fastening, i.e., screws shall not be permitted.
2. Frame/sash design shall include integral drip, self-flashing.
3. At each location, provide a shop fabricated sill flashing and perimeter closure flashing to seal water and infiltration tight to the

opening in the pre-engineered building surrounds.

C. Sash

1. No operable sash on this project.

D. Screens

1. No screens on this project

E. Glazing

1. Water and infiltration tight gasketed assembly.

F. Sealants: One (1) part urethane or silicone appropriate for metal to masonry or metal to metal as occurs.

1. Prime as/if recommended.
2. Joint shape and backer bars as recommended by sealant manufacturer.

3. EXECUTION

3.1. INSPECTION

A. Job Conditions

1. Verify dimensions clean tolerances, plumb and level. Provide a solid anchoring surface in accord with Manufacturer's recommendation.
2. Windows are placed in the safe room CMU walls, set back from the pre-engineered building envelope system.
   a. Provide closure flashing all around
   b. Seal infiltration tight
   c. Provide a sill to drain water away to exterior of pre-engineered wall system

B. Plumb and align window faces in a single plane for each wall plane and erect windows and materials square and true adequately anchored to maintain position permanently when subjected to normal thermal and building movement and specified window loads.

C. Adjust windows for proper operation after installation.

1. Check for open adequate weeps.
2. Check for points that might allow water into framing or wall below window.

D. Furnish and apply sealants with backer rope to provide a weathertight installation at all joints and intersections and at opening perimeters. Carefully follow sealant manufacturer's requirements and recommendations. Wipe off excess material and leave all exposed

surfaces and joints clean and smooth.

1. Use exterior grade, for inside and outside joints, color to match window system.
2. Properly seal at sill and sill ends.
3. Installation and window assembly to be infiltration tight.

3.2. ADJUSTING AND CLEANING

A. After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, etc. Protection from this point shall be responsibility of General Contractor.

END 08 5113

1. GENERAL

1.1. WORK INCLUDED

A. General Contractor shall provide adequate and suitable hardware and accessories.

1. At all new doors without exception.

B. Schedule of doors and hardware sets at the end of this section.

1.2. RELATED WORK

A. Specified in other Sections:

1. DIVISION 01 – ADMINISTRATIVE REQUIREMENTS
2. 08 1113 - Hollow Metal Work

1.3. REFERENCES

A. Codes

1. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People
2. NFPA 80 - Fire Doors and Windows
3. AWI - Architectural Woodwork Institute - Quality Standards
4. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures
5. NFPA 252 - Fire Tests of Door Assemblies.
6. UL 10B - Fire Tests of Door Assemblies
7. UL 305 - Panic exit hardware
8. IBC 2015 or current.

1.4. WARRANTY

A. 100% Labor and Materials - one (1) year warranty to Owner under provisions of 01740. Warranty shall cover latch sets and door closures.

B. Extended Warranty: Parts, replacement, rebuilding, shop labor - excludes field labor to install.

1. Latch/locksets - five (5) years
2. Exit devices - five (5) years
3. Closers - five (5) years or as manufacturer advertised if longer
4. Geared hinges - lifetime

2. PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

A. Hinges:

1. Interior Application:

a. Heavy Weight, ANSI A8111, or ANSI A5111, 4-1/2" x 4-1/2" plated steel or brushed stainless steel,

1) Hagar
2) Lawrence
3) Stanley
4) AASA Abloy
5) IR/Ingersoll Rand

b. Please note, it is believed all the existing doors have 4½" x 4½" hinges, but the vendor/contractor shall verify that there are no odd doors requiring special hinges.

c. Please note, general inspection found the existing hinges to be ANSI screw pattern, but this must be verified by the vendor/contractor for any special orders or field preparation which may be needed.

2. As noted applications and exterior

a. Continuous geared hinges heavy duty full mortise at new locations, verify conditions for full, half or surface at existing locations. ANSI/BHMA A156-26-1996

1) Roton
2) Precision
3) Hagar
4) Pemko
5) Select
6) McKinney
7) Stanley

B. Latchsets/Locksets: 2-3/4" backset

1. Schlage, Corbin, Sargent, Best or equal
2. Extra heavy-duty commercial grade, cylindrical ANSI A156.2, Series 4000, grade 1, vandal resistant lever (break away).

a. All keyed locks, to match existing keyway and keying system as directed by Owner Yale 6 pin.

1) Key
2) Master key

C. Dead Locks

1. Match locksets keying

a. See schedule for desired function

b. Grade 1 Extra Heavy Duty

D. Cylinders: All new hardware to be keyed to Owner's keying system to provide building keying coordinated with existing, master keying, match existing, grand master keying and individual keying as directed in conference with Owner prior to delivery.

1. Verify with owner prior to ordering, keyway is Yale YF - 6 pin

E. Closers:

1. Normal closers – LCN 4040XP

a. Fully adjustable closing and backcheck and applicable accessories.
b. No hold open only where specifically noted in Schedule
c. Thumb or hex key (hand) turn operated hold-open arm all other locations.
d. Adjustable delay action at all closers.
e. 10 year warranty on leaking and cylinder failure
f. Norton or Corbin equivalent heavy duty acceptable

1) Sex bolt mounting
2) Provide cover
3) Parallel mount where practical

F. Door Stops (Use wall stops wherever possible):

1. Wall Stops (mounted to mate pull, handle or knob device):

a. Hiawatha: R1326 ½ BL
b. Ives: #401
c. Glynn Johnson: #WB50MX
d. Rockwood 400/403

2. Floor Stops (add spacers as applicable to door undercut)

a. Hiawatha: #1330A and #1330AE x AL.
b. Yale: #846RP and 847RP
c. Russwin: #207, #207 ½ and #209
d. Ives: #436 or #438.

G. Kick Plates:

1. Plated finish to match hardware
2. 0.060" (16 gauge) plated steel, Brass, or Stainless steel as appropriate, plated after fabrication.
3. Bevel 3 sides,
4. B3S
5. Countersunk oval head screws at 8" maximum uniform spacing
6. Oval head matching philpis head screws
7. Size, 2" less than door width x 8.

H. Door Bolts (with matching top and bottom strike): See Hardware Schedule also.

1. Ives SB360 or equal: Top and bottom, UL rated for inactive leaf.

a. Strike, most appropriate heavy duty for application condition encountered.

I. Thresholds: select for conditions, ADA style typical5" or greater with no slip grooves.

J. Door Holder/stop, Glynn Johnson GJ81 Series, select for door width as appropriate.

2.2. FINISH

A. Match existing, verify, US 26D / US32

1. All Steel and brass Hardware plated US26D
2. Anodize to match aluminum hardware, US28 BHMA 628
3. Closers may be painted or plastic covers.
4. Stainless steel hardware US32D BHMA 630

2.3. KEYING

A. Door Locks: New cylinders keyed differently, keyed alike, master keyed, and grand master keyed. Match existing building keying and master keying as directed by Owner.

1. Verify on site.
2. Yale verify existing keyway (6) pin.

B. All cylinders shall be keyed and master keyed compatible with the existing building hardware system. Supply keys in the following quantities:

1. two (2) keys per cylinder.
2. key as directed in conference with the owner.
3. Master keys match existing.

2.3. WEATHERSTRIPPING

A. Jamb and head on exterior doors to be integral into frmae silicone bulb style

B. Sill to be Door bottom strip such as National Guard 100VA.

3. EXECUTION

3.1. EXAMINATION

A. Always verify site conditions and dimensions.

B. Verify that doors and frames are ready to receive work and dimensions are in accord with documents, shop drawings and manufacturer's instructions, as applicable.

C. The Specifications and Drawings indicate hardware intent.

1. Door hardware omitted from the Schedule shall be fitted with hardware in accord with a similar door installation at no additional cost to the Owner.

3.2. INSTALLATION

A. Install hardware in accordance with manufacturer's instructions.

B. Use templates provided by hardware item manufacturer.

C. Mounting heights for hardware from finished floor to center line of hardware item, follow BMHA standards for all hardware mounting and mortises.

1. Locksets: 40"
2. Push/Pull: 40"
3. Dead Locks: 40" (70” height on safe room hallway doors.)
4. Exit Devices: 40"

3.3. FIELD QUALITY CONTROL. Hardware Consultant shall inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.4. ADJUSTING

A. Adjust work for proper fit and finish and alignments of the work

B. Adjust hardware for smooth operation.

1. No scraping or rubbing
2. No warp
3. Smooth closure of all doors, engaging upon closing but without slamming.

3.5. PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Division 00 and 01

3.6. HARDWARE COORDINATION

A. Details of each opening to be verified on site by the hardware and frame supplier.

1. In all cases the intent is fully functional opening with complete set

of hardware, commensurate with the remainder of the work.

2. Every new opening provided in the work that shows a door swing on the plans is intended to have a door, frame and hardware.

    a. Locks or latches
    b. Hinges
    c. Kickplates normally occupant used doors
    d. Wall bumpers anytime a wall can be hit by the swinging door or latchset
    e. Closers or some door control, stop or holder
    f. Always extra heavy duty commercial grade
    g. Make allowance for such intent in the bidding or clarify by 5 days prior to bid date.

3. Hollow metal frames are specified as 5 ½" typical throat, but may be adjusted more or less at the contractor's discretion to improve the installation detail or cover more existing unfinished existing construction to minimize trim work and repairs as may be needed to finish the work.

    a. Walls less than 6" CMU may use narrow frames
    b. Walls greater than 8" may use deeper frames particularity if a cut in opening existing wall and it will simplify repairs.

B. See floor plan to determine handing of hardware and frames and sidelights.

C. Security controlled hardware.

3.7. **SCHEDULE OF HARDWARE** sets follows

Set A: Typical Exterior application **Openings 100a/100k/100l/100u** 3'-0"x7'-2" galvanized, foam insulated door 16 gauge, half glass style, Galvanized frame with integral weather strip, foam fill frame or fill with fiberglass

1. ANSI F109 Entrance turn button Yale 6 pin core
2. Hinge- continuous geared hinge
3. Closer, adjustable no hold open
4. Door holder cushion stop GJ81
5. Kickplate
6. Glazing to be ¾" or 1" insulated, low 'e', argon filled, laminated glazing 10 year seal guarantee, nominal 24" x 30"

Set B: Safe room exterior south corridor entrance, **Opening 105a**, Fema equivalent construction, 3'-0"x7'-2" galvanized,14 gauge door, foam insulated, 4" x 24" 3/8" Lexan (polycarbonate) vision panel,14 gauge galvanized frame with integral weather strip, foam fill frame or fill with fiberglass.

1. ANSI F109 Entrance turn button Yale 6 pin core
2. Hinge- continuous geared hinge
3. Closer, adjustable no hold open
4. Door holder cushion stop GJ 81
5. Kickplate

6. dead locks at 20” and 70” for safe room use only during storms
7. Signage: “deadlocks for safe room use only”

Set C: Safe room interior north corridor entrance, **Opening 105b**, FEMA equivalent construction, 4’-0”x7’-2”, Hollow Metal construction, 14 gauge door,4” x 24“ 3/8” Lexan (polycarbonate) vision panel 14 gauge frame., 180 operation with hold open

1. ANSI F109 Entrance turn button Yale 6 pin core
2. Hinge- continuous geared hinge
3. Closer, adjustable no hold open
4. Door holder cushion stop GJ 81
5. Kickplate
6. dead locks at 20” and 70” for safe room use only during storms

Set D: Toilet Room doors **Openings 103/104** Hollow metal construction, 3’0”x7’2” flush

1. Latchset ANSI F76 Privacy
2. Three (3) hinges ANSI A8111/A5111
3. Closer with hold-open
4. Kick plate
5. Wall bumper

Set E: Office door **opening 102**, 3’0”x7’2” flush hollow metal with 4” x 24” vision panel, ¼” laminated glazing.

1. ANSI F109 Entrance turn button Yale 6 pin core
2. Three (3) hinges ANSI A8111/A5111
3. Closer with hold open
4. Kick plate
5. Wall bumper

Set F: Break Room **Opening 106**, 4’0” x 7’0” FEMA equivalent construction, 4’-0”x7’-2”, Hollow Metal construction, 14 gauge door,4” x 24“ 3/8” Lexan (polycarbonate) vision panel 14 gauge frame.

flush hollow metal with 4” x 24” vision panel, ¼” laminated glazing.

1. Latchset ANSI F75, Passage
2. Geared hinge
3. Closer with hold open, 135 degree swing to hold open.
4. Kick plate
5. dead locks at 20” and 70” for safe room use only during storms

END 08 7100

1. GENERAL

1.1. DESCRIPTION

A. Work Included:

1. Contractor shall provide mirrors, glass and interior glazing as shown on the Drawings and specified herein.
2. Glazing for manufactured items such as aluminum windows, mirrors and doors included in the respective specification.
3. Coordinate glazing as required, some glazed items are manufactured with glazing factory installed such as windows.
4. FEMA windows, polycarbonate, as assembled in tested assembly.
5. See door schedule for laminated galzing and/or polycoarboanate on interior doors
6. See hardware schedule for shop exterior doors half glass, nominal 24” x 30”, ¾” or 1” insulated laminated, clear, low ‘e’, argon filled 10 year seal warranty,

1.2. RELATED WORK

A. Specified elsewhere

1. DIVISION 00 - BIDDING & CONTRACT REQUIREMENTS
2. DIVISION 01 - ADMINISTRATIVE REQUIREMENTS
3. 07 9200 - Sealants & Caulks
4. 08 5113 Aluminum Windows
5. 08 1140 - Aluminum Doors & Storefront Framing
6. 10 2800 – Toilet and Bath Accessories

1.3. QUALITY ASSURANCE

A. Glass shall conform to Federal Specifications DD-G-451-C.

B. Unless otherwise shown, conform to details and procedures of the "Glazing Manual" (Flat Glass Marketing Association).

C. All glazing materials shall comply with State and Federal recommendations.

D. Glazing for code regulated locations shall meet code requirements

1. Fire rated openings, appropriate ceramic glass or glass rated for that purpose
2. Doors and adjacent to doors, comply with safety glazing act
3. All exterior glazing to include laminated glass in the assembly

E. Comply with glass manufacturer's recommendations for annealed, heat treated or tempered depending on exposure conditions, edge shading, sun, etc.

1. Always assume irregular sun/shade of exterior glass to be applicable

1.4. SUBMITTALS

A. Submit the following Manufacturer's Literature, including materials description and installation instructions for glazing inserts and glazing sealants,

1. Glass technical information
2. Energy performance for exterior glazing

2. PRODUCTS

2.1. MATERIALS

A. Float Glass: "Clear Float" (PPG Industries), "Parallel-O-Float" (Libby-Owens-Ford Company), or "Starlux Float" (ASG Industries, Inc.) thickness as shown on the drawings; tempered or laminated in doors and adjacent lights and where shown. Annealed heat strengthened or tempered as recommended by manufacturer solar/shade/thermal conditions.

1. Laminated to have .060" inter layer
2. Laminated glass to be used where allowed for improved interior security.

B. Tempered Glass: Comply with requirements of Consumer Products Safety Commission Regulation for Safety Glazing Materials 16 2FR 1201 Catalog I & II and GTA Specification G4-3-16. Minimum thickness shall be 3/16".

1. Use when noted
2. Not intended to be used in doors or room to corridor glazing, those locations are all to be laminated unless noted tempered or fire lite.

C. Mirrors

1. See toilet Accessories section for manufactured mirror assemblies.

D. Wire Glass: None intended on this project.

E. Glazing Compound - Exterior Glazing - One Part Acrylic Compound: "Mono" (Tremco Manufacturing Company), "60+ Unacrylic" (Pecora Chemical Corporation) or DAP '1020' (DAP, Inc.).

F. Glazing Compound - Interior Glazing - Oleoresinous, Nonoxidizing, Nonhardening, Soft Knife Consistency Channel Glazing Compound: "Tremglaze" (Tremco Manufacturing Co.), "M251" (Pecora Chemical Corporation), or "Flexiglaze '1231' Glazing Compound" (DAP, Inc.).

G. Glazing Tape - Polyisobutylene/butyl: "Tremco 440 Tape" (Tremco Manufacturing Company), "G-66" or "BB-50" (Pecora Chemical

Corporation) or "Butyl Rubber Tape" (DAP, Inc.).

H. Setting Blocks: Neoprene Blocks, 70 to 90 Type A durometer hardness. Spacers: Neoprene blocks, 40 to 50 Type A durometer hardness, three inches (3") long, self-adhesive on one face only.

I. Laminated glass to meet ASTM C 1036-85 and ANSI 297.1-1984 and Consumer Product Safety Commission 16 CFR 1201, 1/4" minimum 0.060" interlayer.

1. Use as noted throughout plans
2. Exterior doors, insulated units.

J. Glazing stops: Coordinate with glazing thickness, stops shall fully cover to face of door. Sand, no splintering.

3. EXECUTION

3.1. PREPARATION

A. Examine all surfaces to receive the parts of the work specified herein. Verify all dimensions of in-place and subsequent construction. Application or installation of materials shall constitute acceptance of the related construction.

3.2. INSTALLATION

A. Employ only experienced glazers who have had previous experience with the materials and systems being applied. Use the tools and equipment recommended by the Glass Manufacturer.

B. Measure all openings and cut glass accurately to fit each opening. Provide a minimum edge clearance and bite on the glass as specified by FGMA. Tempered glass and wire glass shall not be seamed, nipped or abraded at the job site.

C. Maintain a minimum temperature of 40 degrees F during glazing unless the Manufacturer of glazing materials specifically agrees to application of his materials at lower temperatures.

D. Clean glazing stops and rabbets to receive glazing materials of all obstructions and deleterious substances that might impair the work. Remove protective coatings that might fail in adhesion or interfere with bond of sealants. Comply with the Manufacturer's instructions for final wiping of surfaces immediately before application of primer and glazing compounds or tapes. Wipe metal surfaces with approved cleaning solvent.

E. Prime surfaces to receive glazing compounds in accordance with the Manufacturer's recommendations, using recommended primers.

F. Inspect each piece of glass immediately before installation. Do not install pieces with impact damage at edges, scratches, or abrasion of faces, or

any other evidence of damage.

G. Locate setting blocks at the quarter points of sill but no closer than 6" to corner of glass. Use blocks of proper size to support the glass in accordance with Manufacturer's recommendations.

H. Provide spacers for all glass to separate glass from stops, except where continuous gaskets or tape are required. Locate spacers 36" o.c. maximum inside and out, with a minimum of two (2) spacers per edge of glass. Provide thickness equal to the sealant or compound thickness shown. Provide width, as required for minimum of 3/8" bite on glass, at all four edges.

I. Set glass in a manner that produces greatest possible degree of uniformity in appearance. Face all glass, which has dissimilar faces, with matching faces in the same direction. Set all glass with bow (if any) to exterior.

J. Glazing materials from different sources shall not be used in the same joint system unless the Manufacturer of each material has stated IN WRITING that his material is fully compatible with the other material.

K. Use masking tape or other suitable protection to limit coverage of glazing materials to the surfaces intended for sealants.

L. Butt or lap ends of sealant tape in accordance with Manufacturer's recommendations.

M. Tool exposed surfaces of glazing materials to provide a slight wash away from the glass. Install exposed tapes and gaskets with a slight protrusion above stops in the final compressed condition.

N. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by Manufacturers.

3.3. CURING, PROTECTION & CLEANING

A. Cure sealants in accordance with the Manufacturer's instructions to attain maximum durability and adhesions to glass and framing as soon as possible.

B. Protect glass from breakage immediately upon installation. Use streamers or ribbons suitably attached to framing and held free of the glass. Warning markings shall not be applied directly to the glass.

C. Remove and replace glass which is broken, cracked, chipped or damaged in any way and from any source, including weather, vandalism and accidents during the construction period.

D. Maintain glass in a reasonably clean condition during construction so that it will not become stained and will not contribute to deterioration of glazing materials.

E. Wash and polish glass on both faces, not more than four days prior to date of substantial completion. Comply with instructions and recommendations of the Glass Manufacturer and Glazing Materials Manufacturer for cleaning in each case.

3.4. MIRROR SCHEDULE – See Section 10 2800.

END 08 8000

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid:

1. All new gypsum wallboard and any accessories as needed to complete the work as shown on the drawings and specified herein.

a. Hard ceilings Break area, hallway and office

1.2. QUALITY ASSURANCE

A. Gypsum wallboard construction shall comply with all laws, ordinances, rules, regulations and orders of public authorities having jurisdiction over this part of the work.

1. Formaldehyde free.

B. All materials shall be from a single manufacturer unless others are approved by the Architect/Engineer, to insure total unit responsibility. Installer shall be acceptable to the Manufacturer of the wallboard materials. All gypsum board installed shall be 5/8" fire rated (Type X), except 2-hr. rated separation wall shown on the Drawings, constructed of 1/2" fire rated (Type X).

1.3. PRODUCT DELIVERY, STORAGE & HANDLING

A. Acceptance at site:

1. All materials shall be delivered to the job in their original, unopened containers or bundles; stored in a place providing protection from damage and exposure to the elements.
2. Damaged or otherwise unsuitable material, when so ascertained, shall be immediately removed from the job site.

B. Protection prior to installation:

1. Since the Owner will be occupying the building, storage of materials will be difficult. Coordinate deliveries to match use.
2. Protection must be provided by General Contractor against moisture, impact, etc.

1.4. SUBMITTALS. Submit product data for review.

2. PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

A. Gypsum wallboard, joint compound, etc.

1. U.S. Gypsum
2. Gold Bond
3. Georgia Pacific
4. Celotex

B. Adhesive

1. Contech PL200
2. DAP 4000
3. Miracle Adhesives Corp. DSA-20
4. Ohio Sealants Inc., Formula 38

2.2. MATERIALS

A. Gypsum Drywall: All material to be 4' X 8’ (or larger) X 5/8" thick UL rated.

B. Tape, Joint Compounds, Screws, Corner Edge Guards, etc.: Shall be manufactured by the manufacturer of the gypsum wall board or shall be manufactured to be compatible with all other system components.

1. Paint ready.

C. Joint compound for exterior applications or moisture sensitive areas to be curing type compound.

1. Durabond 60 or 90
2. Sudden Bond 60 or 90
3. Or equal

D. Trim items

1. Corner beads flush taping style, galvanized.
2. Expansion joints, flush taping style, galvanized or PVC.
3. Edge beads, taping style, galvanized, selected for condition.

2.3. DRYWALL SUSPENSION SYSTEM

A. Select concealed suspension system as preferred by the Drywall applicator.

1. USG
2. Armstrong
3. Conwed
4. Certainteed
5. Or Equal

2.4. ACCESSORY MATERIALS

A. Screws: Type W and GWB; sized to suit thickness.

1. Galvanized, coated or no corrosive for exterior or moist applications.
2. Bugle head
3. #6 or larger only

B. Corner Reinforcements, Casing Beads and Metal Trim: fabricated from 26-gauge galvanized sheet steel with perforated flanges, designed to receive joint compound.

C. Joint Treatment Materials: ASTM C475-64 (1975).

D. Concrete nails: One-inch (1") long plus adhesive.

3. EXECUTION

3.1. PREPARATION. Insure that studs are aligned and adequately braced so that resulting installation will be smooth and straight. Attachment shall be by screws ONLY, with spacing of screws per manufacturer's recommendations or these specifications whichever is more demanding.

3.2. INSTALLATION

A. Single or Double Layer Systems; Gypsum Panel Erection-Direct Attachment to metal studs, metal furring channels and/or concealed grid system as applicable:

1. Place panels horizontally at right angles to framing, offset joints.

a. Position all ends centered on vertical framing members.
b. Use maximum practical lengths to minimize end joints.
c. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses.
d. Place end joints on opposite sides of partitions on different studs.
e. When necessary, cut ends, edges and cutouts within the field of the panel in a workmanlike manner.

2. Screw fasteners in panel field first, work toward ends and edges.

a. Hold panel in place with firm contact and install screw fasteners at least 3/8" in from ends and edges.
b. Apply panels with power driven screws.
c. Attach gypsum panels to framing supports with 1-1/4" Type W screws at 8" o.c.

3. Finish

a. Level 2 above ceilings
b. Level 4 above 10’
c. Level 5 below 10’ and for the wall screens to be constructed.

B. Wall systems shall employ 5/8" thick, Type X gypsum board unless noted otherwise.

1. Expansion joints neatly spaced at about 50’ centers on long applications, select location for most efficient use and best performance
2. Add expansion joints at site or during warranty where drywall cracking is anticipated or occurs due to installation conditions, structural framing, etc.

C. Accessories:

1. Square edge corner beads shall be installed on all exterior corners and at dissimilar materials, attached with suitable fasteners spaced 9" o.c. on both sides up to 60" above floor and shall be in single lengths unless corner exceeds standard stock lengths. Dimple set allowed only above 60".
2. Square edge metal trim shall be installed at all extruded edges and corners of wallboard, attached with suitable fasteners, spaced 9" o.c. and shall be in single full lengths unless application length exceeds standard stock lengths.
3. Wallboard screws shall be applied with an electric driver. Screws shall be secured not less than 3/8" from ends and edges of wallboard for a uniform dimple not over 1/32" deep.

D. Joint treatment compounds shall be mixed according to the Manufacturer's directions and applied as follows:

1. Tape fill and smooth all joints, corners for finishing.
2. Bed tape and corner beads properly in joint compound.
3. Joints concealed from sight shall be fire taped - smoothing shall not be required.
4. Apply joint sealants as appropriate at edge beads to dissimilar materials and expansion beads.

3.3. FINISHING. All exposed gypsum board installation shall receive finish coating per finish schedule.

A. See Section 09 9000 - Finish Coatings.

3.4. CLEAN UP. Remove all sanding dust and any excess or spilled material from all surfaces.

END 09 2116

1. GENERAL

1.1. WORK INCLUDED

A. Base Bid

1. Provide in accord with Room Finish Plans.

a. Break Room
b. Hallway
c. Rest Rooms
d. Office

2. General surface preparation that follows carpet removal, scrape/remove old adhesives, fill and level minor defects and all cracks.

a. Leveling skim coat and alkali barrier over full surface *if needed* to level.
b. Crack preparation as recommended by the skim coat and/or resilient flooring manufacturer.

1.2. RELATED WORK

A. Specified elsewhere

1. DIVISION 01 – ADMINISTRATIVE REQUIREMENTS
2. DIVISION 03 -- CONCRETE

1.3. QUALITY ASSURANCE

A. Materials shall be installed by persons experienced in the installation of this type of material. All work shall be first class. Tightly butt together materials without seepage through joints, without chips, cracks or blemishes of any type.

1. Install one (1) sample room for inspection prior to proceeding with the work. The inspection observations shall establish the minimum standard of workmanship for the job.
2. Tile and base joints shall be tight, no measurable/visible space between pieces and generally aligned within 1/64th" at tile intersections, edges and corners and splices.

B. All material installed in a single room shall be of the same manufacturing run to assure the color continuity.

C. Installation shall comply with manufacturer's recommendations.

D. Flooring Subcontractor to fully inspect surfaces for level, cleanliness, suitability of surface to receive flooring

1. Apply one (1) coat acrylic sealer to floor prior to installation of flooring.
2. Do not proceed unless surface is ready and properly prepared.
3. Do not tile over dust grit, raised paint spills or any other irregularities.

E. Contractor shall perform moisture vapor test on floors on grade prior to starting work, at least two (2) locations.

1.4. SUBMITTALS

A. Submit the following in accordance with 01 3300 Submittal Procedures.

1. Manufacturer's Literature: Material description and installation and maintenance instructions.
2. Samples: Full size tile through range of color.

1.5. COLOR SELECTIONS

A. Rubber Floor Tile: Up to two (2) colors shall be allowed in the Base Bid work.

B. Resilient Base: Up to two (2) resilient base colors may be allowed in the Base Bid.

1. One (1) color per room, no pattern or border work

1.6. OWNER'S MAINTENANCE MATERIAL

A. Provide maintenance materials to the Owner.

1. Floor tile: Provide 2% of the floor area covered for each selection, but not less than twenty (20) sq ft.
2. Resilient base: Provide 2% of the lineal footage and pre-molded corners but not less than twenty (20) lineal feet and five (5) outside corners of each color.

2. PRODUCTS

2.1. MATERIALS

Rubber flooring materials. Nominal 1/8" thick, 24" X 24” marbleized or speckled in standard available colors.

1. Flexco, Free Flex,
2. Johnsonite, Minerality or Eco Natural Cork tones
3. Roppe, Envir
4. Afco, American Beauty tile AT-715

D. Adhesives:

1. Adhesives shall be water and alkali resistant, complying with recommendations of resilient flooring manufacturer as applicable to substrate. Adhesive shall contain no asbestos.
2. Manufacturer's recommended adhesive, not less than:

    a. Rated to 8 lbs. moisture vapor and 11-pH.
    b. Neutralize and/or seal floor as needed for the selected adhesive system such that combined installed result can accommodate 8 lbs. vapor.
    c. Products such as Henry 420, 430, 622, or 640 High moisture adhesives appropriate to the installation conditions and approved by the flooring manufacturer for use with their product.

E. Skim coat: Rapid set, skim coat material as appropriate for conditions encountered when leveling is required. Base bid.

1. Product Manufacturers

    a. Ardex
    b. Mapei
    c. DryTek
    d. Select product suitable to discovered conditions.

2. Quick set, fast dry, feather edge or up to 1/8" no shrink, latex or similar modified for adhesion.
3. Installation to be level and without trowel marks, delimitation or surface defect.
4. Material to provide good bonding surface and alkali protection for new adhesives.

F. Rubber Base: 1/8" gauge, coved, preformed corners, four inches (4") high unless otherwise shown; color shall be selected from the full range of available standard colors.

1. Flexco
2. Afco
3. Johnsonite
4. Roppe
5. Or equal

G. Vinyl Edge/transition Strips: 1½ " wide for tile

1. Afco
2. Johnsonite
3. Roppe
4. Or equal

2. EXECUTION

3.1 PREPARATION

A. No flooring shall be installed until the Installer has ascertained that the chemical cleaning treatment on substrates do not interfere with the successful application of the flooring materials. If additional prior cleaning is deemed necessary, same shall be provided by this contractor before proceeding.

B. Before installing resilient flooring, fill all cracks and holes and level depressions and skim coat with cement base surface preparation system.

1. Check for flush fit at drain and cleanout rims, grind if necessary.

1.2. INSTALLATION

A. Install sample room for inspection prior to proceeding with the work.

B. Firmly adhere tile and resilient base to floor or walls and cabinet bases respectively.

1. Inspect surfaces prior to installation of floors and base. Do not apply to rough, dirty or unprepared surfaces.
2. Corners shall be pre-formed.
3. Cope inside base corners. Scribe bases accurately to abutting surfaces.
4. Apply adhesive uniformly on the back surface of the base with a notched trowel, single or double ribbon of adhesive not acceptable.
5. Miter fit to stair treads, risers, and cope to nosing.

C. Remove excessive adhesive in accord with the Flooring Manufacturer's instructions.

3.3 CLEANING & SEALING

A. Not less than four (4) days after flooring installation clean the resilient flooring and base.

1. Re-clean as needed prior to turn over to Owner.
2. Strip seal and wax will be by Owner at a later time.

END 09 6500

1. GENERAL

1.1. DESCRIPTION

A. Work Included: Contractor shall provide all painting, decorating and preservative coating work as set forth on the Drawings, in these Specifications and as necessary for the completion of any alternate(s) which may be introduced by Addendum and accepted. All new equipment and surfaces not receiving a specified finish shall be painted. See Drawings and drawing notes.

1. Include surface prep, prime and painting of ductwork, conduit and structure in areas with painted and exposed ceilings
2. Painting of sprinkler piping and mains is optional but be consistent.
3. Paint other pipping as encountered.
4. Dry erase urethane paint on projection board north wall of cafeteria

B. Work Not Included: Copper, bronze, chromium plate nickel, stainless steel, lead and bright non-corroding metal surfaces shall not be painted unless specifically noted.

C. Color Selections:

1. New areas rooms walls anticipate base color and one accent wall color.
2. Accent colors will vary throughout the building
    a. Some accent colors require additional coats to cover
    b. Please review Section 3 below – Workmanship for clarification of a coat of paint and resulting appearance.
3. Door frames and metal work will be different color than wall work
4. Match existing surrounds except for new doors, frames and trim.
5. Limited areas, cafeteria include allowance for multi color on walls including straight line vertical or horizontal color cuts.

D. Flame Spread - All paint finishes shall meet the following flame spread requirements:

1. Class a (1) on non-combustible surfaces.
2. Shall not increase flame spread on other surfaces

E. Floor sealing, limited areas are sealed concrete floors. Specification and products are listed in section 03 3000 Concrete.

1.2. RELATED REQUIREMENTS

A. Specified elsewhere

1. DIVISION 00 - Procurement Requirements
2. DIVISION 01 - Administrative Requirements
3. DIVISION 03 - Concrete
4. DIVISION 04 - Masonry
5. DIVISION 06 – Wood, Plastics & Composites
6. DIVISION 07 - Thermal & Moisture Protection
7. DIVISION 08 - Doors & Windows
8. DIVISION 09 - Finishes

1.3. QUALITY ASSURANCE

A. Supplier shall verify appropriateness of paint systems/surface preparation and modify as approved by Architect to properly achieve finished result.

B. Materials shall be as specified and shall be delivered to the job in unopened, labeled containers.

C. Applicators shall be skilled in the application system employed.

D. Application: No thinning of materials will be allowed, except as specifically recommended by the Paint Manufacturer's written data to facilitate application.

E. Special Requirements: The written instructions of the Paint Manufacturer shall be carefully adhered to for all surface preparation, priming, application techniques, environmental conditions and drying conditions.

F. The surface temperature shall be 50 degrees F. minimum, dry, free of dust, dirt or any bond-breaking substance prior to the paint application.

G. Protect all surrounding surfaces from paint and the painting operations. CLEAN UP ALL PAINT SPATTER OR OVERSPRAY.

H. Factory-primed surfaces shall be properly prepared to receive field coatings. Repair chips and nicks in factory primer before proceeding.

I. Provide all surface preparation, treatments, and all primers needed to comply with the Paint Manufacturer's recommendations. The Contractor shall seek the Paint Manufacturer recommendations and shall be responsible for compatibility of the specified coatings and receiving surface preparation.

J. Wherein these Specifications require successive coats of finishing materials, the A/E shall be notified of completion of each coating application prior to application of a successive coating. Failure to notify the Architect for on site observation of each coating prior to a successive coating application shall disallow acceptance of the successive coating.

1.4. SUBMITTALS

A. Submittals only required on paint / systems employed on this project, see 3. EXECUTION, for this project.

2. PRODUCTS

2.1. DESCRIPTION

A. It is the intent to use each Manufacturer's premium grade commercial finishes. Adjust selections accordingly. VOC compliance required.

B. Ferrous metals

1. Sherwin Williams base specification B66-600 series

a. One (1) coat Pro-Cryl Industrial primer, or DTM acrylic Primer
b. Two (2) coats DTM High Performance 100% acrylic.
c. Verify exterior rated system for exterior or wet location application conditions.

2. Acceptable equivalent commercial paint subject to A/E concurrence that system is of similar chemical make-up and performance by:

a. PPG
b. Benjamin Moore
c. Valspar
d. Subsidiaries of the above manufacturers with commercial product line.

C. Galvanized or Aluminum when specified to be painted.

1. Clean surface as specified by the manufacturer.
2. Select appropriate zinc chromate or zinc dust primer
3. Finish as above for ferrous metals
4. Underside of roof decks and structural systems may be dry fog system, and may be in any selected color including flat back or charcoal color.

D. CMU / Concrete Block Filler:

1. Sherwin Williams base specification B66-600 series

a. One (1) coat Loxon filler - Primer
b. Two (2) coats DTM High Performance 100% acrylic, satin sheen.
c. Verify additional coats as may be need for uniform coverage on the substrate and base material

2. Acceptable equivalent commercial paint subject to A/E concurrence that system is of similar chemical make-up and performance by:

   a. PPG
   b. Benjamin Moore
   c. Valspar
   d. Subsidiaries of the above manufacturers with commercial product line.

E. Gyp Board / Drywall surfaces

1. Sherwin Williams base specification B66-600 series

   a. One (1) coat Pro-Mar 200 Industrial primer
   b. Two (2) coats DTM High Performance 100% acrylic.
   c. Verify additional coats as may be need for uniform coverage on the substrate and base material

2. Acceptable equivalent commercial paint subject to A/E concurrence that system is of similar chemical make-up and performance by:

   a. PPG
   b. Benjamin Moore
   c. Valspar
   d. Subsidiaries of the above manufacturers with commercial product line.

3. EXECUTION

3.1. SURFACE CONDITIONS

A. Inspect all surfaces for defects prior to starting finishing operations and notify the appropriate persons to make suitable repair and corrections. Be responsible for all rework of finish systems made necessary by application to improperly prepared surfaces.

B. As painting operations proceed, inspect for chips, abrasions, pitch strikes, sap, knots, cracks and hot spots. All defects that are evident shall be repaired and repainted.

C. Touch up marred or worn factory primers before painting. Wash down metal with mineral spirits or approved cleaner to assure bond.

D. PROVIDE PRIMERS IN ALL LOCATIONS APPROPRIATE FOR MATERIAL BASE AND MATERIAL EXPOSURE.

E. Protect all surrounding work from damage.

F. Sand surfaces that are not smooth prior to applying succeeding coats.

G. Primer paint applied on ferrous materials, specified in Section 05500, shall be in accordance with list above but superseded by the manufacturer's recommendation for surface preparation for finish coatings.

H. Exterior gypsum shall be primed and two (2) coats 2.1.D.

3.2. WORKMANSHIP

A. Quality workmanship is required. Only skilled mechanics shall be employed to ensure the very best workmanship. Materials to be applied by craftsmen shall be applied only by those familiar with the specific products involved.

B. Each coat called for shall be applied to achieve 100% coverage of the surface and materials shall be applied as recommended by the Paint Manufacturer.

C. One coat shall be considered to completely cover the material being finished such that the surface, including all voids and indentations such as in wood or concrete block, no longer retains the color of the surface material but only that of the finish applied. The cover achieved will be subject to the approval of the Architect/Engineer in all cases.

D. For finishes similar in color to the material or for finishes with little or no pigments, such as varnish, the coats shall be of adequate thickness to meet the approved requirements assuming that the surface and finish were of complementary colors. The cover achieved will be subject to the approval of the Architect/Engineer in all cases.

E. In the process of painting surfaces, caution shall be used to avoid discontinuity in the finish surface texture or appearance such as at lap joints, corners, etc.

F. All materials shall be applied under 100 F.C. illumination. Materials shall be uniformly spread without runs or sags.

G. All coating called for shall be applied in back of all fixtures, cabinets and tackboards before said items are secure in place.

3.3. STORAGE

A. Flammable materials shall not be stored inside of the building, except single one-quart cans of each paint color may be kept in an approved location for touch up work at the end of the job.

B. Flammable materials storage should be kept to a minimum of currently-in-use materials only. Overnight storage shall not be allowed in the building.

3.4. APPLICATION

A. Application rates that are specified in these Specifications shall be considered as minimum rates but shall not supersede the coverage requirements specified herein or the recommendations of the Paint Manufacturer.

B. It is the intent that all finish coating systems specified (excluding primer only) present a finished uniform appearance, free of lap marks, color variation, sheen variation and irregularities. Provide additional coats as needed to accomplish this finish intent.

C. Application shall be per the following schedule except that, in no case, shall materials be applied over a base preparation not in accordance with the Paint Manufacturer's specifications. See Drawing Notes and Room Finish Schedule for finishing directions.

D. See section 2 above of these specifications for products and applications Interior and Exterior Steel and Metal Work

E. Additional finish systems shall be as described on the Drawings or elsewhere in the specifications.

F. In general, all applications and product selections are to be consistent with good quality long life commercial finishing standards.

END 09 9000

1. GENERAL

1.1. WORK INCLUDED

A. General signage, see Schedule, this Section.

1.1. SUBMITTALS

A. Shop Drawings: Show letter style and stroke for typical numbers and names in full size. Furnish a complete listing of all signs.

B. Samples: Typical number and name screened on acrylic plastic in colors selected.

1.2. DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store material at the job site as directed. Packaged material shall be in original containers with seals unbroken and labels intact until time of use. All damaged or otherwise unsuitable materials when so ascertained shall be immediately removed for the job site.

2. PRODUCTS

2.1. PLASTIC SIGNS

1. Standard would be Kroy Signature ADA tactile, raised letter or engraved letter, with raised braille. Kroy Sign Systems, 7575 E. Redfield Rd., Ste. 113, Scottsdale, AZ 85260, Midwest Regional Sales, 480-619-6080, beyer@kroysignsystems.com
2. Similar products are typically available at local sign shops, brand is not critical.

B. Plastic

1. 1/8" minimum thickness.
2. Multi color laminated
3. Colors to be selected.
4 Comply with ADA regulations for sign requirements.

A. Letter style to be Helvetica Medium, engraved to expose core color, one inch (1") high stroke.

1. Larger letters where noted.
2. Optional letters may be raised in contrasting color.

B. Type of Panels

1. Mount with double faced tape or adhesive as recommended by the manufacturer; message panels proportional size to message.

2. Install with double face adhesive strips **and** screws or small drive pins at masonry walls.

C. Braille - Comply with ADA.

1. All signs.

2.2. SIGN SCHEDULE

A. Room signage, coordinate locations with A/E, approximately 8” x 8”

1. Two (2) “Rest Room”
2. One (1) “Break Room”
3. One (1) “Office”

B. Exterior signage

1. All Overhead doors to have two signs

a. One 10” letter, 12”x12” x1/8” aluminum centered above the door head, white reflective with black letter.
b. One stenciled 8” on to the door, centered third section from the top.
c. Owner direction to be determined for numbered or lettered doors labels.

C. Safe room signage

1. Provide 6 small engraved plastic signs for mounting each side of safe room doors

High and low dead locks
for storm
safe room use only

2. Mount with stainless steel screws, not just adhesive.

3. EXECUTION

3.1. APPLICATION

A. Examine all surfaces to receive the signs. Application or installation of signs constitutes acceptance of the existing conditions.

B. Position wall signs in its designated location.

1. On wall adjacent to door latch jamb, top at 5'-0". Place immediately under side lights where they occur.
2. Verify prior to mounting, some may need to be located at hinge jamb.
3. Complete all finishes prior to mounting the signs.

C. Prepare surfaces and apply signs in accord with the manufacturer's recommendations.

1. Set with level.

3.2. When signs are thoroughly set, clean substrates of adhesive spots, temporary lines and centering, etc., prior to acceptance by Owner.

END 10 1423

1. GENERAL

1.1. WORK INCLUDED

A. Wash Bay Curtain, track and suspension system.

1.1. SUBMITTALS

A. Shop Drawings: Show curtain, materials, suspension system and weights.

B. Samples: fabric samples for color selection

1.2. DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store material at the job site as directed. Packaged material shall be in original containers with seals unbroken and labels intact until time of use. All damaged or otherwise unsuitable materials when so ascertained shall be immediately removed for the job site.

2. PRODUCTS

2.1. Wash Bay Curtain

A. Manufacturers:

1. AKON Curtains: Fernandina Beach FL 32034, ph 989 414 1209 Fax 888 501 5865 email Scott Fullerton
2. Goff's Curtains: 700 Hickory Street Pewaukee WI 53072, Info @goffemterprises.com, 800 234 0337
3. AmCraft Manufacturing Inc: 58 Lively Blvd, Elk Grove Village IL 60007 847 310 7286
4. Or Equal

B. Description

1. 12' high curtain, three (3) section, nominal from east wall 47' straight, curve track then return to north wall 18' straight, 65' total curtain. manually operable with track mounted at 14' clear.
2. Solid colored fabric to floor, then 4' x 4' translucent vinyl with 2' fabric 6' repeat, 4' solid color to hangers. 12' overall vertical.
3. Hold at 2" off floor.

a. 

4. Construction in three sections that can be easily managed by one person
5. Velcro adjacent section connections.
6. Chain weight bottom hem to resist blowing if doors are open.
7. Nominal 18’ along west and 48’ along south x 12’
8. Heavy duty galvanized track suspended and diagonal suspended to resist sway.

9.  
Threaded rod mount continuous track with sweep curve corner.
10. Heavy duty roller assemblies connected through reinforced grommet holes at nominal 12” spacing .
11. Track at 14’ provide adjustable rod roller to curtain.

C. Solid color fabric

1. PVC coated Polyester, Class A flame spread.

a.

Material	22 oz
Material Weight	22oz/ yd²
Roll Width	61”
Roll Length	100 Yards
Net Weight	233 lbs
Base Fabric Fiber	Polyester
Thickness	.024”
Yarn (Denier)	1300x1300 D
Fabric Count (threads)	18x17 sq. in
Weight of Fabric	6.04 oz/yd²
Type of Coating	E-PVC

b.

Roll Dimensions		22 oz	
		English	ASTM
Tensile Strength	Warp	640 lbs/ in²	D5035
	Weft	595 lbs/ in²"	
Tear Strength	Warp	100 lbs	D2261
	Weft	85 lbs	
Adhesion Strength		17.5 lb/ in²	D2724
Temperature Resistance		-20° ~ +150° F	
UV		For Exterior Applications	

2. Vison panels 20 oz translucent vinyl.
3. Fire treated, to meet class A or equivalent flame spread and smoke developed standards.

3. EXECUTION

3.1. Installation

A. Follow manufacturer's recommendations for hanging and adjusting

1. Coordinate track and hanger trolleys with lighting, fire protection piping and HVAC equipment.
2. Brace/hang track to resist sway when pulling curtain or if bumped into.

B. Verify smooth operation and demonstrate to user.

END 10 1423

1. GENERAL

1.1. DESCRIPTION

A. Contractor shall furnish and install as listed:

1. All handicap accessible grab bars by Contractor
2. Soap dispensers
3. Toilet paper dispensers
4. Paper towel dispensers,
5. Mirrors at lavatories

1.2. SUBMITTALS

A. Submit the following in accordance with 01 3300:

1. Manufacturer's Literature: Materials description and installation instructions for products.

2. PRODUCTS

2.1. COMPONENT BY APPROVED MANUFACTURERS

A. Stainless Steel Grab Bars

1. Manufacturers

a. G.M. Ketcham Inc., 30 Commercial St., Freeport, NY 11520, Phone 516/379-3500, FAX 516/379-3187 Series C534SS.
b. Miami-Carey, Monroe, OH, Series GB5100.
c. Bobrick Washroom Equipment, Inc., Northway 10 Industrial Park, Clifton Park, NY 12065-1399, Phone 518/877-7444 FAX 518/877-5029, Series B-490.
d. Bradley Corporation, P O BOX 309, W142 N901 Fountain Blvd., Menomonee Falls, WI 53051, Phone 414/354-0100 FAX 414/354-8327, Series 837.
e. ASI 441 Saw Mill River Road, Yonkers, NY 10701, Phone 914/476-9000

2. Product quality shall require that the bars be 1-1/2" o.c., stainless steel, material thickness minimum 18 gauge with side of the bar.

3. Each set includes one at 42" and one at 36" (two at 42" in narrow stalls) or one (1) 48" X 36" corner style, see Plans.

B. Mirrors - provide one (1) at each lavatory or lavatory station.

1. Glass mirrors - 1/4" laminated glass, frames welded, stainless steel with concealed fasteners.

2. 24” W X 36” H.

a. Bobrick B-165 Series – welded corners
b. McKinney 160 Series
c. Bradley 780
d. Epco #136
e. ASI 0600 A – special laminated glass
f. Or equal
g. Two (2) required

C. Soap Dispensers - provide one (1) for each restroom lavatory, the service sink and the break room sink.

1. Spartan Lite’N Foamy #975600 in black if available.
2. https://www.spartanchemical.com/products/product/975600/#packaging-variations
3. Four (4) required.

D. Toilet Paper Dispensers

1. Large roll type,
2. Renown dispenser
3. www.gorenown.com

E. Hand Towel Dispensers - provide at each lavatory andand in break room and at service sink.

1. Large roll type, 7” or 9”
2. Gorgia Pacific paddle type manual dispenser
3. Model #54338A
4. Four (4) required

3. EXECUTION

3.1. INSTALLATION OF ACCESSORIES

A. Make installations in accordance with the drawings.

B. Attachment of accessories in compliance with 0155 - Anchorage & Fastenings.

C. Mounting heights and location: (Always verify with A/E at site)

END 10 2800

1. GENERAL

1.1. DESCRIPTION

A. Provide all fire extinguishers and cabinets as scheduled and shown on the Drawings.

1. Six Required 4A/10BC
2. Garage area four (4)
3. Break Room one (1)
4. Mezzanine one (1)

B. Provide location sticker at 12’ for extinguishers in the garage area.

1.2. QUALITY CONTROL

A. All extinguishers shall be UL rated and installed at proper height according to NFPA.

2. PRODUCTS

2.1. CABINETS not applicable

2.2. BRACKETS

A. Provide manufacturer's standard wall brackets for all wall hung extinguishers.

2.3. EXTINGUISHER

A. Extinguishers unless noted shall be UL rated, 4A/10BC UL rated, 10-lb. dry chemical except where noted otherwise.
B. All extinguishers shall bear an in service or inspection date within one (1) month of substantial completion.

2.4. LOCATION STICKER

A. Nominal 24” 

3. EXECUTION

3.1. INSTALLATION

A. Install all extinguishers according to NFPA height recommendations which are top of extinguisher below 5' for 40 lbs. or less total weight extinguishers, for over 40 lbs., not more than 4' off floor.

1. Generally, cabinets to be installed with top at 56",
2. Bracket mounted extinguishers, install bracket at 50" with metal expansion anchors, no nylon or plastic.

B. Stickers to be carefully adhered to clean surface.

END 10 4400

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pre-engineered building and components including the following:

1. Structural steel frame, secondary framing, and miscellaneous framing.

a. Base bid includes expandable end wall, see plans
b. Base bid and alternate 1 includes a sidewall beam at 15' to support batting cage support cables, see information on plans.

2. Roof covering system including exterior roof panels, panel attachments, sealants, mastics, trim and flashings.
3. Exterior panels including wall, liner and soffit panels.
4. Insulation and insulation support system.
5. Manufactured roof insulation system.
6. Special trim required at wall penetrations at CMU safe room.

B. Alternate work.

1. Spray Foam insulation system. Meet
2. Foam sandwich panels systems walls and roof.

C. Wall accessories including the following:

1. Louvers.
2. Wall openings.

D. Roof accessories including the following:

1. Eave gutters.
2. Rake trim.
3. Infiltration compliance.

E. Schedule of construction

1. Delivery shall be expedited to the extent possible, desired enclosure prior to winter 2022 is desired.

F. See 13 1200 2.7 for shop finish on structural steel

1.2 RELATED SECTIONS

A. Section 03 3000 - Cast-in-Place Concrete.
B. Section 04 2000 – Unit MAsonry
C. All HVAC trades

1.3 REFERENCES

A. FM Global:

1. FMRC Standard 4471 - Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.

B. Metal Building Manufacturers Association (MBMA):

1. MBMA Metal Building Systems Manual.
2. Seismic Design Guide for Metal Building Systems.

C. North American Insulation Manufacturers Association (NAIMA):

1. NAIMA 202 - Standard For Flexible Fiber Glass Insulation to be Laminated for Use in Metal Buildings.

D. Underwriters Laboratories (UL):

1. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies.
2. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.4 DEFINITIONS

A. Building Width: Measured from outside to outside of Concrete foundation. Allow for recessed flashing in 8” raised concrete perimeter curb foundation.

B. Building Length: Measured from outside to outside of end wall girts. Typically edge to edge of concrete

C. Building Line: Outside face of steel/girt.

D. Building Eave Height: Measured from the top of the eave member at the outside of the sidewall girt line to the bottom of the sidewall column base plate or to finished floor if columns are on grout or recessed below finished floor.

E. Bay Spacing: Measured from centerline to centerline of primary frames for interior bays and from centerline of the first interior frame to outside of end wall girts for end bays.

F. Roof Pitch: The ratio of the vertical rise to the horizontal run (i.e. 1:12 = 1 inch of rise for every foot of horizontal dimension).

1.5 SYSTEM DESCRIPTION

A. General:

1. Provide metal building frame, metal wall panels, metal roof panels, accessories and miscellaneous materials for a complete enclosure including supports for building components specified in other sections.
2. Design structural systems according to professionally recognized methods and standards and legally adopted building codes.
3. Design under supervision of professional engineer licensed in the jurisdiction of the Project.

B. Design Requirements:

1. Bay size: 35 nominal
2. Roof pitch: 1:12
3. Building location zip code: 61764
4. Roof Live Load: not less than 25 psf including snow load
5. Ground Snow Load for design: 20 psf
6. Collateral Loads: 12 psf (Collateral load available to resist uplift 2 psf)
7. Wall collateral loading: See plans for any equipment detailed to hang on walls

a. Overhead door assemblies
b. counter balance torsion springs
c. concentrated door wind load transfer thru track.

8. Rainfall intensity per hour 4”
9. Seismic Loads: Calculate in accordance with applicable code, IBC 2018
10. Seismic Loading:

    a. Importance Factor, $I_e = 2$
    b. Seismic Site Class C Importance 1.0
    c. $S_{ds} = 0.111$ ($S_s = 13.9\%$)
    d. $S_{d1} = 0.091$ ($S_1 = 8.0\%$)
    e. Seismic Response Coefficient, $C_s = 0.046$
    f. Seismic Design Category B
    g. Design Coefficients and Factors for Seismic Force-Resisting Systems
        - Resisting System – Ordinary precast concrete shear wall (Bearing Walls)
            1. Response Coefficient, R = 3
            2. Deflection Amplification Factor, $C_d = 3$
            3. System Overstrength Factor, $\Omega_o = 2.5$
    h. Component Design per ASCE 7-10
    i. Seismic Base Shear = W x C_s

11. Dead loads, including the weight of all indicated permanent construction:

    a. Elements required for support of lights and light battens, hanging fixtures, mechanical equipment, piping, ceiling hanger wires, and all other items required to provide a complete building and not specifically indicated on the drawings.
    b. These items are including in the overall collateral loading allowance for the primary frames, but locally my require special attention for Purlins to be a

12. Wind Loads:

    a. Roof Wind Load: Calculate in accordance with applicable code:
    b. 120 mph
    c. Exposure C,
    d. Importance Factor I.0.

13. SSR Roof System tested and certified to meet Underwriters Laboratories UL 90 wind uplift rating.
14. Panel fastening meeting uplift requirements based on tested fastener values with appropriate Safety Factors.
15. Purlin strength with SSR roof panel determined and tested in accordance with AISI procedures.

C. Performance Requirements:

1. System to withstand gravity and lateral loads in compliance with contract documents.
2. Refer to contract drawings for additional concentrated loads to pre-engineered building hanger beams and support jacks.
3. Allowable Deflections: L/180 system.
4. Metal wall panels (interior and exterior) shall not to be used as shear elements.
5. Construct assembly to permit movement of components without buckling, failure of

joint seals, undue stress on fasteners or other detrimental effects, due to environmental conditions.

6. Design and fabricate wall and roof systems free of abnormal distortion or defects detrimental to appearance or performance.

1.6 SUBMITTALS

A. Design Data: Provide detailed design criteria and calculations prepared by a licensed structural engineer.

B. Certification: Manufacturer certification that the building conforms to the contract documents and manufacturer's standard design procedures.

C. Shop Drawings: Show building layout, primary and secondary framing member sizes and locations, cross-sections, and product and connection details.

1. Anchor Bolt Installation Drawings: Layouts with minimum bolt diameters if different than detailed.
2. Base Plate Size.
3. Maximum Foundation design Loads, vertical, horizontal, uplift.

D. Product Data: Information on manufactured products to be incorporated into the project.

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Not less than 5 years experience in the actual production of specified products.

1. Member of the Metal Building Manufacturer's Association (MBMA).
2. Primary manufacturer of frames, secondary steel, roof and wall sheeting, and trim.

B. Installer Qualifications - Firm experienced in application or installation of systems similar in complexity to those required for this project, plus the following:

1. Acceptable to or licensed by manufacturer.
2. 3 years experience with systems.
3. Successfully completed not less than 5 comparable scale projects using this system.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Properly protected to prevent damage to finished components.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.10 WARRANTY

A. Manufacturer shall warranty installed system for the periods described herein, starting from

Date of Substantial Completion against all the conditions indicated below. When notified in writing from Owner, manufacturer/installer shall, promptly and without inconvenience and cost to Owner, correct said deficiencies.

1. No Dollar Limit (NDL) Material and Workmanship Warranty: Warranty Period: 5 years.
2. Wall System Standard Weathertight Warranty: Warranty Period: 10 years.
3. SSR Weathertight Endorsement: Warranty Period: 20 years.
4. No Dollar Limit (NDL) Weathertight Endorsement: Warranty Period: 20 years.
5. Structural NDL Endorsement: Warranty Period: 20 years.
6. Finish Warranty:

    a. Finish coating shall not peel, blister, chip, crack or check in finish, and shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D 4214.
    b. Finish coating shall not change color or fade in excess of 5 NBS units as determined by ASTM D 2244.

        1) Panel finish: 20 years.

7. Performance Warranty: Furnish written warranty, stating sheet metal roofing system and flashing (flashing under premium warranty only) under this Section will be maintained in watertight condition and defects resulting from the following items will be corrected without cost to Owner for a period of 20 years.

    a. Faulty workmanship.
    b. Defective materials including sealants and fasteners.
    c. Water infiltration.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Member MBMA
B. Substitutions: Not permitted.
C. Roof Panels: "SSR" Standing Seam Roof Panels; 16” to 24 inches wide net coverage, with 3 inches high major ribs formed at the panel side laps, formed for field seaming using motorized operated seaming machine.

    1. Side joints: Factory applied sealant.
    2. Material (Painted): AZ50 Galvalume coated steel.
    3. Material (Unpainted): Acrylic coated AZ55 Galvalume steel unpainted.

2.2 EXTERIOR PANELS

A. Wall Panels: Panel Rib System; Nominal 36 inch wide net coverage, with 1-3/16 inch high major ribs at 12 inches on center with (2) minor ribs spaced between the major ribs. Select from systems available from manufacturer.

    1. Material (Painted): AZ50 Galvalume coated steel.
    2. Paint system Hylar, Kynar or similar fluorocarbon finish.
    3. Side laps: Two fully overlapping major ribs secured together with Stainless Steel capped 1/4 inch diameter color-matched carbon steel fasteners.
    4. Length: Continuous from sill to eave up to 43 feet in length.
    5. End laps, where required: 4 inches wide, located at a support member.
    6. Crimp panels at the base to achieve no gaps against the foundation greater than 1/16 inch and notch to match roof panel configuration at the eave.

7. Cut panels square at each end.
8. Cut panels square at each end; provide base trim at sill and closure plugs.

B. Liner Panels: LPR-36; 36 inch wide net coverage, with 1-3/16 inch high major ribs with minor ribs spaced between the major ribs. Not required in the foam sandwich panel alternate.

1. Material: AZ50 Galvalume coated steel.
2. Thickness: 26 gage, Cool Cotton White, SMP Silicone-Modified Polyester finish.
3. Length: Continuous from sill to eave up to 43 feet in length.
4. Side laps: Two fully overlapping major ribs secured together with 1/4 inch diameter Stainless Steel capped color-matched carbon steel fasteners.
5. Provide partial height wall liner panels, refer to drawings.

2.3 INSULATION

A. Manufacturer’s standard insulation systems complying with code flame spread and smoke developed requirements

1. See alternates for spray foam insulation

B. Or Laminated Fiberglass: Owens-Corning Fiberglas, NAIMA 202, "Certified R" metal building insulation.

1. TIMA Insignia and Insulation Thickness: Ink-jet printed on fiberglass.

C. Back-Fill Insulation: Owens-Corning Fiberglas unfaced "Metal Building Insulation Plus".

D. Insulation:

1. Meet 2018 IEEC, Climate Zone 5
2. Roof R-19 + R-11 L.S. or equal
3. Wall R-13 + R-13 ci or equal

E. Roof and Wall Insulation Facing: R-3035 HD (FSK-HD) (Silver).

1. 0.0003-inch-thick, aluminum foil laminated to 30-pound Kraft paper, reinforced with glass-fiber scrim, in unpainted (Aluminum).
2. Adhere facing to Owens-Corning Fiberglas "Certified R", NAIMA 202, fiberglass blanket.
3. Assembly of Insulation Blanket and Facing:

a. Flame Spread Rating: Less than 25.
b. UL Label: Submit as specified in Submittals article of this section.
c. Facing Perm Rating: 0.02.

F. Roof and Wall Insulation Facing: WMP-F or GymGuard

1. 0.0015-inch-thick, UV-stabilized, white polypropylene film laminated to 0.0003-inch-thick aluminum foil or metalized polypropylene film, reinforced with glass-fiber scrim, in white.
2. Adhere facing to Owens-Corning Fiberglas "Certified R", NAIMA 202, fiberglass blanket.
3. Assembly of Insulation Blanket and Facing:

a. Flame Spread Rating: Less than 25.
b. UL Label

c. Perm Rating: 0.02.

2.4 INSULATION SUPPORT SYSTEM

A. Insulation Support System.

B. Description:

1. Compatible with roof system.
2. As appropriate for insulation system
3. Mesh Type

C. Fasteners and Attachment Hardware:

1. Connections to Eave and Gable Members:

a. 1/8-inch-diameter wire clips looped through 20-gauge steel V-straps.
b. Steel V-Straps: Fasten to framing with self-drilling screws.

2. Mesh-to-Mesh Edge Connections:

a. Lace #36 nylon cord through edges of pieces of mesh being connected.
b. Edge Connections: Plastic cable ties.

D. Fire-Hazard Classification:

1. UL Fire-Hazard Classification Ratings, UL 723:

a. Flame Spread: 3 or less.
b. Smoke Developed: Less than 10.

E. Eave Gutters: Roll-formed 26 gage steel sheet, with gutter straps, fasteners and joint sealant; manufacturer's standard color.

1. Downspouts: 26 gage 4 inches by 5 inches in 10 foot lengths, with downspout elbows and downspout straps; same color as wall panels unless specified otherwise.
2. Coordinate with on site storm water collection system.

2.5 MATERIALS

A. Structural Steel Plate, Bar, Sheet, and Strip for Use in Bolted and Welded Constructions: ASTM A 572/A 572M, A 529/A 529M, A 1011 or A 36/A 36M Modified 50, with minimum yield strength of 55,000 psi (380 MPa).

B. Galvanized Structural Steel Material for Use in Roll Formed or Press Broken Secondary Structural Members: ASTM A 563, with minimum yield strength of 60,000 psi (410 MPa).

C. Galvanized Steel Sheet for Roll Formed or Press Broken Roof and Wall Coverings, Trim and Flashing: ASTM A 653/A 653M, with minimum yield strength of 50,000 psi (345 MPa).

D. Galvalume Steel Sheet Used in Roll Formed or Press Broken Roof Covering: Aluminum-zinc alloy-coated steel sheet, ASTM A 792/A 792M, with minimum yield strength of 50,000 psi (345 MPa); nominal coating weight of 0.5 oz per sq ft both sides, equivalent to an approximate coating thickness of 0.0018 inch both sides.

E. Hot Rolled Steel Shapes: W, M and S shapes, angles, rods, channels and other shapes; ASTM A 500, ASTM A 572/A 572M or ASTM A 36/A 36M as applicable; with minimum yield

strengths required for the design.

F. Structural Bolts and Nuts Used with Primary Framing: High strength, ASTM A 325 bolts and ASTM A563 Grade C nuts.

G. Bolts and Nuts Used with Secondary Framing Members: High Strength ASTM A 325 Bolts and ASTM A 563 Grade C nuts.

H. Panel Fasteners:

1. For Galvalume and KXL finished roof and wall panels: Stainless Steel-capped carbon steel fasteners with integral sealing washer.
2. Color of exposed fastener heads to match the roof or wall panel finish.
3. Concealed Fasteners: Self-drilling type, of size as required.
4. Provide fasteners in quantities and location as required by the manufacturer.

I. Flashing and Trim: Match material, finish, and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weather tightness and a finished appearance.

J. Sealants, Mastics and Closures: Manufacturer's standard type.

1. Provide at roof panel end laps, side laps, rake, eave, transitions and accessories as required to provide a weather resistant roof system; use tape mastic or gun grade sealant at side laps and end laps.
2. Provide at wall panel rakes, eaves, transitions and accessories.
3. Closures: Formed to match panel profiles; closed cell elastic material, manufacturer's standard color.
4. Tape mastic: Pre-formed butyl rubber-based, non-hardening, non-corrosive to metal; white or light gray.
5. Gun grade sealant: Non-skinning synthetic Elastomeric based material; gray or bronze.

2.6 FABRICATION

A. Fabrication: Fabricate according to manufacturer's standard practice.

1. Fabricate structural members made of welded plate sections by jointing the flanges and webs by continuous automatic submerged arc welding process.
2. Welding operators and processes: Qualified in accordance with AWS D1.1.
3. Field connections: Prepare members for bolted field connection by making punched, drilled, or reamed holes in the shop.

B. Component Identification: Mark all fabricated parts, either individually or by lot or group, using an identification marking corresponding to the marking shown on the shop drawings, using a method that remains visible after shop painting.

2.7 FINISH

A. Schedule of Finishes: To Be Selected

B. Shop Coat: Manufacturer's standard rust inhibitive primer paint;

1. Shop coat to be Light Gray or off white, if Red Oxide, then columns shall be field painted two (2) COATS DTM off white as selected.

2. Finish all structural steel members using one coat of manufacturer's standard shop coat, after cleaning of oil, dirt, loose scale and foreign matter.

C. Color: Interior Finish liner: Off White 0.5 mil minimum dry film thickness wash coat.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper and or timely completion.

1. Verify foundations are properly installed, to correct dimensions and within acceptable tolerances.
2. Verify location of covered or built-in work.
3. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Framing Erection: Erect framing in compliance with AIS Specification and the latest edition of the MBMA metal building systems manual.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as required by manufacturer.

3.3 ERECTION OF FRAME

A. Install in accordance with manufacturer's instructions.

1. Do not erect frames without complete installation of tie beams and anchorages.
2. Set column base plates with non-shrink grout to full plate bearing.
3. Do not field cut or alter structural members without written approval.
4. After erection, prime welds, abrasions, and surfaces not primed with primer used in shop painting.

3.4 INSTALLATION

A. Install in compliance with manufacturer's instructions and approved submittals.

1. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
2. Fasten cladding system to structural supports, aligned level and plumb.
3. Locate end laps over supports. End lap panels according to manufacturer's recommendations. Place side laps over adjacent panel and mechanically seam or stitch fastener per erection guidelines.
4. Provide expansion joints where indicated.
5. Use concealed fasteners.
6. Install sealant and gaskets to prevent weather penetration.
7. Install system free of rattles, noise due to thermal movement, and wind whistles.
8. Install door frames, service doors, overhead doors, window and glass, and gutter system in compliance with manufacturer's instructions.
9. Seal wall and roof accessories watertight and weather tight with sealant in compliance with building manufacturer's standard procedures.
10. Rigidly support and secure gutters and downspouts. Joint lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Tolerances:

1. Framing Members: 1/4 inch from level; 1/8 inch from plumb.
2. Racking: 1/8 inch from true position. Provide shoring to maintain position prior to cladding installation.

C. Infiltration
1. Assembly shall be infiltration tight against water and air movement
2. Wall to doors
3. Wall to roof
4. Wall to base flashing
5. Base flashing to metal panel and foundation
6. Wall and roof to penetrations.
7. All building components as assembled.

3.5 FIELD QUALITY CONTROL

A. Testing by Contractor:

1. Roof installation inspection by roof manufacturer's representative; as required as part of warranty provision.

B. Testing by Contractor, Independent Certified Inspector

1. High Strength Bolted Connections: Specification for Structural Joints Using ASTM A 325 or A 490 Bolts, with minimum testing of bolted connections per the arbitration inspection procedure.
2. Welded Connections: AWS. Visual inspection of 100 percent of welds. Ultrasonic inspection of 50 percent of full and partial penetration welds. A rejection rate greater than 5 percent will increase the inspection to 100 percent.
3. General Testing: For materials and installed tolerances.
4. Provide certified inspector report to Owner.

END 13120

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. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Fastener systems.
5. Equipment supports.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers.
2. Metal framing systems.
3. Equipment supports.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of trapeze hangers.
2. Include design calculations for designing trapeze hangers.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.5 QUALITY ASSURANCE

A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

B. Pipe Welding Qualifications: Qualify procedures and operators according to 2015 ASME Boiler and Pressure Vessel Code, Section IX.

2. PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design trapeze pipe hangers and equipment supports.

B. Structural Performance: Hangers and supports for fire-suppression piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

C. NFPA Compliance: Comply with NFPA 13.

D. UL Compliance: Comply with UL 203.

2.2 METAL PIPE HANGERS AND SUPPORTS

E. Carbon-Steel Pipe Hangers and Supports:

1. Description: Factory-fabricated components, NFPA approved, UL listed, or FM approved for fire-suppression piping support.
2. Galvanized Metallic Coatings: Pregalvanized or hot-dip galvanized.
3. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

F. Copper Pipe and Tube Hangers:

1. Description: Copper-coated-steel, factory-fabricated components, NFPA approved, UL listed, or FM approved for fire-suppression piping support.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.3 TRAPEZE PIPE HANGERS

G. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with NFPA-approved, UL-listed, or FM-approved carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 METAL FRAMING SYSTEMS

H. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. ABB, Electrification Business.
   b. Cooper B-line; brand of Eaton, Electrical Sector.
   c. Flex-Strut Inc.
   d. G-Strut.
   e. Haydon Corporation.
   f. Unistrut; Atkore International.
   g. Wesanco, Inc.

2. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
3. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.
4. Channels: Continuous slotted carbon-steel channel with inturned lips.
5. Channel Width: Selected for applicable load criteria.
6. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
7. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
8. Metallic Coating: Hot-dip galvanized.
9. Paint Coating: Green epoxy, acrylic, or urethane.

I. Non-MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Anvil International/Smith-Cooper International; Tailwind Capital, LLC.
   b. CADDY; brand of nVent Electrical plc.
   c. Carpenter & Paterson, Inc.
   d. Empire Industries, Inc.
   e. PHD Manufacturing, Inc.

2. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
3. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.
4. Channels: Continuous slotted carbon-steel channel with inturned lips.
5. Channel Width: Select for applicable load criteria.
6. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
7. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

8. Metallic Coating: Hot-dip galvanized.
9. Paint Coating: Green epoxy, acrylic, or urethane.

2.5 FASTENER SYSTEMS

J. Powder-Actuated Fasteners: NFPA-approved, UL-listed, or FM-approved threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Hilti, Inc.
b. ITW Ramset/Red Head; Illinois Tool Works, Inc.
c. MKT Fastening, LLC.
d. Simpson Strong-Tie Co., Inc.

K. Mechanical-Expansion Anchors: NFPA-approved, UL-listed, or FM-approved, insert-wedge-type anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Cooper B-line; brand of Eaton, Electrical Sector.
b. Empire Industries, Inc.
c. Hilti, Inc.
d. ITW Ramset/Red Head; Illinois Tool Works, Inc.
e. MKT Fastening, LLC.

2. Indoor Applications: Zinc-coated or Stainless steel.
3. Outdoor Applications: Stainless steel.

2.6 EQUIPMENT SUPPORTS

L. Description: NFPA-approved, UL-listed, or FM-approved, welded, shop- or field-fabricated equipment support, made from structural-carbon-steel shapes.

2.7 MATERIALS

M. Aluminum: ASTM B221.

N. Carbon Steel: ASTM A1011/A1011M.

O. Structural Steel: ASTM A36/A36M, carbon-steel plates, shapes, and bars; black and galvanized.

P. Stainless Steel: ASTM A240/A240M.

Q. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout, suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

3. EXECUTION

3.1 APPLICATION

R. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.

S. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 INSTALLATION OF HANGERS AND SUPPORTS

T. Metal Pipe-Hanger Installation: Comply with installation requirements of approvals and listings. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

U. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A36/A36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

V. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal strut systems.

W. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual. Install in accordance with approvals and listings.

2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions. Install in accordance with approvals and listings.

X. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

Y. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

Z. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

AA. Install lateral bracing with pipe hangers and supports to prevent swaying.

BB. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

CC. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

DD. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

EE. Insulated Piping:

1. Attach clamps and spacers to piping.

    a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
4. Shield Dimensions for Pipe: Not less than the following:

    a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    b. NPS 4: 12 inches long and 0.06 inch thick.
    c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
    d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
    e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.

5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.

3.3 INSTALLATION OF EQUIPMENT SUPPORTS

FF. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

GG. Grouting: Place grout under supports for equipment and make bearing surface smooth.

HH. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

II. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

JJ. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

KK. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections, so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

LL. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

MM. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

NN. Touchup:

1. Clean field welds and abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

a. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

2. Cleaning and touchup painting of field welds, bolted connections, and abraded, shop-painted areas on miscellaneous metal are specified in Section 099600 "High-Performance Coatings."

OO. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.7 HANGER AND SUPPORT SCHEDULE

PP. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

QQ. Comply with NFPA requirements for pipe-hanger selections and applications that are not specified in piping system Sections.

RR. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.

SS. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

TT. Use carbon-steel pipe hangers and supports and attachments for general service applications.

UU. Use stainless-steel pipe hangers and stainless-steel or corrosion-resistant attachments for hostile environment applications.

VV. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.

WW. Horizontal-Piping Hangers and Supports: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Steel Pipe Clamps (MSS Type 4): For suspension of NPS 1/2 to NPS 24 if little or no insulation is required.
3. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
4. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
5. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
6. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.

7. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
8. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
9. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.

XX. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

YY. Hanger-Rod Attachments: Comply with NFPA requirements.

ZZ. Building Attachments: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. C-Clamps (MSS Type 23): For structural shapes.
3. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.

AAA. Saddles and Shields: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.

BBB. Comply with NFPA requirements for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

CCC. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

DDD. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END 21 0529

Section 21 1100 - Facility Fire-Suppression Water-Service Piping

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. Section includes fire-suppression water-service piping and related components outside the building and service entrance piping through floor into the building and the following:

1. Pipes, fittings, and specialties.
2. Fire-suppression specialty valves.
3. Protective enclosures.
4. Alarm devices.

B. Utility-furnished products include water meters that are furnished to the site, ready for installation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
2. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

B. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying the water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with FM Global's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

E. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-suppression water-service piping.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping 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.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Fire-Suppression Water-Service Piping: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Owner's written permission.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON PIPE AND FITTINGS

A. Grooved-Joint, Ductile-Iron Pipe: AWWA C151, with cut, rounded-grooved ends.

B. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end.

C. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end.

D. Grooved-End, Ductile-Iron Pipe Appurtenances:

1. Grooved-End, Ductile-Iron Fittings: ASTM A47/A47M, malleable-iron castings or ASTM A536, ductile-iron castings with dimensions matching pipe.
2. Grooved-End, Ductile-Iron-Piping Couplings: AWWA C606, for ductile-iron-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

E. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

1. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

F. Push-on-Joint, Ductile-Iron Fittings: AWWA C153, ductile-iron compact pattern.

1. Gaskets: AWWA C111, rubber.

G. Flanges: ASME B16.1, Class 125, cast iron.

2.2 SPECIAL PIPE FITTINGS

A. Ductile-Iron Flexible Expansion Joints:

1. Description: Compound, ductile-iron fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two

gasketed ball-joint sections and one or more gasketed sleeve sections. Assemble components for offset and expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
2. Pressure Rating: 250 psig minimum.

B. Ductile-Iron Deflection Fittings:

1. Description: Compound, ductile-iron coupling fitting with sleeve and one or two flexing sections for up to 15-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
2. Pressure Rating: 250 psig minimum.

2.3 ENCASEMENT FOR PIPING

A. Standard: ASTM A674 or AWWA C105.

B. Material: Linear low-density PE film of 0.008-inch minimum thickness or high-density, cross-laminated PE film of 0.004-inch minimum thickness.

C. Form: Sheet or tube.

D. Color: Black or natural.

2.4 JOINING MATERIALS

A. Gaskets for Ferrous Piping and Copper-Alloy Tubing: ASME B16.21, asbestos free.

B. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series.

C. Bonding Adhesive for Fiberglass Piping: As recommended by fiberglass piping manufacturer.

2.5 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

B. Tubular-Sleeve Pipe Couplings:

1. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners, and with ends of same sizes as piping to be joined.
2. Standard: AWWA C219.
3. Center-Sleeve Material: Manufacturer's standard.
4. Gasket Material: Natural or synthetic rubber.
5. Pressure Rating: 150 psig minimum.
6. Metal Component Finish: Corrosion-resistant coating or material.

2.6 WATER METERS

A. Water meters are furnished by utility company.

B. Displacement-Type Water Meters:

1. Description: With bronze main case.
2. Standard: AWWA C700.
3. Registration: Flow in gallons.

C. Turbine-Type Water Meters:

1. Standard: AWWA C701.
2. Registration: Flow in gallons.

D. Compound-Type Water Meters:

1. Standard: AWWA C702.
2. Registration: Flow in gallons.

E. Remote Registration System:

1. Description: Utility company's standard; direct-reading type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
2. Standard: AWWA C706.
3. Registration: Flow in gallons.

F. Remote Registration System:

1. Description: Utility company's standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
2. Standard: AWWA C707.
3. Registration: Flow in gallons.
4. Data-Acquisition Units: Comply with utility company's requirements for type and quantity.
5. Visible Display Units: Comply with utility company's requirements for type and quantity.

2.7 BACKFLOW PREVENTERS

A. Reduced-Pressure-Detector, Fire-Protection Backflow Preventer Assemblies:

1. Standards: ASSE 1047 and UL's "Fire Protection Equipment Directory" listing or FM Global's "Approval Guide."
2. See plumbing fixture schedule.

B. Backflow Preventer Test Kits:

1. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.8 WATER METER BOXES

A. Description: Cast-iron body and cover for disc-type water meter, with lettering "WATER METER" on cover; and with slotted, open-bottom base section of length to fit over service piping.

1. Option: Base section may be cast-iron, PVC, clay, or other pipe.

B. Description: Cast-iron body and double cover for disc-type water meter, with lettering "WATER METER" on top cover; and with separate inner cover; air space between covers; and slotted, open-bottom base section of length to fit over service piping.

C. Description: Polymer-concrete body and cover for disc-type water meter, with lettering "WATER" on cover; and with slotted, open-bottom base section of length to fit over service piping. Include vertical and lateral design loadings of 15,000 lb minimum over 10 by 10 inches square.

2.9 CONCRETE VAULTS

A. Description: Precast, reinforced-concrete vault, designed for A-16 load designation according to ASTM C857, and made according to ASTM C858.

B. Ladder: ASTM A36/A36M, steel ladder; or PE-encased steel steps.

C. Manhole: ASTM A48/A48M, Class No. 35A minimum tensile strength, gray-iron traffic frame and cover.

1. Dimension: 24-inch minimum diameter unless otherwise indicated.

D. Manhole: ASTM A536, Grade 60-40-18, ductile-iron traffic frame and cover.

1. Dimension: 24-inch minimum diameter unless otherwise indicated.

E. Drain: ASME A112.6.3, cast-iron floor drain with outlet of size indicated. Include body anchor flange, light-duty cast-iron grate, bottom outlet, and integral or field-installed bronze ball or clapper-type backwater valve.

2.10 ALARM DEVICES

A. General: UL 753 and FM Global’s “Approval Guide” listing of types and sizes to mate and match piping and equipment.

B. Water-Flow Indicators: Vane-type water-flow detector, rated for 250-psig working pressure; designed for horizontal or vertical installation; with two single-pole, double-throw circuit switches to provide isolated alarm and auxiliary contacts, 7 A, 125-V ac

and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal when cover is removed.

C. Supervisory Switches: Single pole, double throw; designed to signal valve in other than fully open position.

D. Pressure Switches: Single pole, double throw; designed to signal increase in pressure.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Comply with excavating, trenching, and backfilling requirements in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. Water-Main Connection: Arrange with water utility company for tap of size and in location indicated in water main.

B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.

C. Make connections larger than NPS 2 with tapping machine according to the following:

1. Install tapping sleeve and tapping valve according to MSS SP-60.
2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.

D. Make connections NPS 2 and smaller with drilling machine according to the following:

1. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company's standards.
2. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
3. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
4. Install corporation valves into service-saddle assemblies.
5. Install manifold for multiple taps in water main.
6. Install curb valve in water-service piping with head pointing up and with service box.

E. Comply with NFPA 24 for fire-service-main piping materials and installation.

F. Install copper tube and fittings according to CDA's "Copper Tube Handbook."

1. Install encasement for tubing according to ASTM A674 or AWWA C105.

G. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.

1. Install encasement for piping according to ASTM A674 or AWWA C105.

H. Install PE pipe according to ASTM D2774 and ASTM F645.

I. Install PVC, AWWA pipe according to ASTM F645 and AWWA M23.

J. Install fiberglass AWWA pipe according to AWWA M45.

K. Bury piping with depth of cover over top at least [**30 inches**], with top at least [**12 inches**] below level of maximum frost penetration, and according to the following:

1. Under Driveways: With at least [**36 inches**] of cover over top.
2. Under Railroad Tracks: With at least [**48 inches**] of cover over top.
3. In Loose Gravelly Soil and Rock: With at least [**12 inches**] of additional cover.

L. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.

M. Extend fire-suppression water-service piping and connect to water-supply source and building fire-suppression water-service piping systems at locations and pipe sizes indicated.

1. Terminate fire-suppression water-service piping within the building at the [**floor slab**] [**wall**] until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building's fire-suppression water-service piping systems when those systems are installed.

N. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

O. Comply with requirements for fire-suppression water-service piping inside the building in the following Sections:

1. Section 211200 "Fire-Suppression Standpipes"
2. Section 211313 "Wet-Pipe Sprinkler Systems
3. Section 211316 "Dry-Pipe Sprinkler Systems"

P. Comply with requirements in Section 221116 "Domestic Water Piping" for potable-water piping inside the building.

Q. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

R. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

3.3 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure rating same as or higher than systems pressure rating for aboveground applications unless otherwise indicated.

B. Install unions adjacent to each valve in tubing NPS 2 and smaller.

C. Install flanges, flange adaptors, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.

D. Ream ends of tubes and remove burrs.

E. Remove scale, slag, dirt, and debris from outside and inside of pipes, tubes, and fittings before assembly.

F. Copper-Tubing, Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.

G. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.

H. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.

I. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts.

J. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with bolts according to ASME B31.9.

K. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D2657.

L. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D2774 or ASTM D3139.

M. Fiberglass Piping Bonded Joints: Use adhesive and procedure recommended by piping manufacturer.

N. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.

O. Do not use flanges or unions for underground piping.

3.4 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:

1. Concrete thrust blocks.
2. Locking mechanical joints.
3. Set-screw mechanical retainer glands.
4. Bolted flanged joints.
5. Heat-fused joints.
6. Pipe clamps and tie rods.

B. Install anchorages for tees, plugs, and caps, bends, crosses, valves, and hydrant branches in fire-suppression water-service piping according to NFPA 24 and the following:

1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
3. Bonded-Joint Fiberglass, Water-Service Piping: According to AWWA M45.

C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.5 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.

C. UL-Listed or FM Global-Approved Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.

D. UL-Listed or FM Global-Approved Valves Other Than Gate Valves: Comply with NFPA 24.

E. MSS Valves: Install as component of connected piping system.

F. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

G. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves.[**Install full-size valved bypass.**]

H. Support valves and piping, not direct buried, on concrete piers. Comply with requirements for concrete piers in Section 033000 "Cast-in-Place Concrete."

3.6 DETECTOR CHECK VALVE INSTALLATION

A. Install in vault or aboveground.

B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.

C. Support detector check valves and piping on concrete piers. Comply with requirements for concrete piers in Section 033000 "Cast-in-Place Concrete."

3.7 WATER METER INSTALLATION

A. Install water meters, piping, and specialties according to utility company's written instructions.

B. Water Meters: Install [**displacement**] [**turbine**]-type water meters NPS 2 and smaller in meter boxes with shutoff valves on water meter inlets. Include valves on water meter outlets, and include valved bypass around meters unless prohibited by authorities having jurisdiction.

C. Water Meters: Install [**compound**] [**turbine**]-type water meters NPS 3 and larger in meter vaults. Include shutoff valves on water meter inlets and outlets, and include valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

D. Water Meters: Install detector-type water meters in meter vault according to AWWA M6. Include shutoff valves on water meter inlets and outlets, and include full-size valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

E. Support water meters and piping NPS 3 and larger on concrete piers. Comply with requirements for concrete piers in Section 033000 "Cast-in-Place Concrete."

3.8 ROUGHING-IN FOR WATER METERS

A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

3.9 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.

C. Do not install bypass piping around backflow preventers.

D. Support NPS 2-1/2 and larger backflow preventers and piping on concrete piers. Comply with requirements for concrete piers in Section 033000 "Cast-in-Place Concrete."

3.10 WATER METER BOX INSTALLATION

A. Install water meter boxes in paved areas flush with surface.

B. Install water meter boxes in grass or earth areas with top 2 inches above surface.

3.11 CONCRETE VAULT INSTALLATION

A. Install precast concrete vaults according to ASTM C891.

3.12 PROTECTIVE ENCLOSURE INSTALLATION

A. Install concrete base level and with top approximately 2 inches above grade.

B. Install protective enclosure over valves and equipment.

C. Anchor protective enclosure to concrete base.

3.13 FIRE-DEPARTMENT CONNECTION INSTALLATION

A. Install ball drip valves at each check valve for fire-department connection to mains.

B. Install protective pipe bollards [**on two sides of**] [**on three sides of**] each freestanding fire-department connection. Pipe bollards are specified in Section 055000 "Metal Fabrications."

3.14 ALARM DEVICE INSTALLATION

A. General: Comply with NFPA 24 for devices and methods of valve supervision. Underground valves with valve box do not require supervision.

B. Supervisory Switches: Supervise valves in open position.

1. Valves: Grind away portion of exposed valve stem. Bolt switch, with plunger in stem depression, to OS&Y gate-valve yoke.
2. Indicator Posts: Drill and thread hole in upper-barrel section at target plate. Install switch, with toggle against target plate, on barrel of indicator post.

C. Locking and Sealing: Secure unsupervised valves as follows:

1. Valves: Install chain and padlock on open OS&Y gate valve.
2. Post Indicators: Install padlock on wrench on indicator post.

D. Pressure Switches: Drill and thread hole in exposed barrel of fire hydrant. Install switch.

E. Water-Flow Indicators: Install in water-service piping in vault. Select indicator with saddle and vane matching pipe size. Drill hole in pipe, insert vane, and bolt saddle to pipe.

F. Connect alarm devices to building's fire-alarm system. Wiring and fire-alarm devices are specified in [**Section 284621.11 "Addressable Fire-Alarm Systems."**] [**Section 284621.13 "Conventional Fire-Alarm Systems."**]

3.15 CONNECTIONS

A. Connect fire-suppression water-service piping to [utility water main] [existing water main]. Use [tapping sleeve and tapping valve] [service clamp and corporation valve].

B. Connect fire-suppression water-service piping to interior fire-suppression piping.

C. Connect waste piping from concrete vault drains to [sanitary sewerage system. Comply with requirements in Section 221313 "Facility Sanitary Sewers" for connection to sanitary sewer] [storm-drainage system. Comply with requirements in Section 334100 "Storm Utility Drainage Piping" for connection to storm sewer].

3.16 FIELD QUALITY CONTROL

A. Use test procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described below.

B. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

C. Hydrostatic Tests: Test at not less than one-and-one-half times the working pressure for two hours.

1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to zero psig. Slowly increase again to test pressure and hold for one more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

D. Prepare test and inspection reports.

3.17 IDENTIFICATION

A. Install continuous underground[**detectable**] warning tape during backfilling of trench for underground fire-suppression water-service piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Section 312000 "Earth Moving."

B. Permanently attach equipment nameplate or marker indicating plastic fire-suppression water-service piping or fire-suppression water-service piping with electrically insulated fittings, on main electrical meter panel. Comply with requirements for identifying devices in Section 220553 "Identification for Plumbing Piping and Equipment."

3.18 CLEANING

A. Clean[**and disinfect**] fire-suppression water-service piping as follows:

1. Purge new piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. Use purging[**and disinfecting**] procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:

    a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow it to stand for 24 hours.
    b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow it to stand for three hours.
    c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
    d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports of purging[**and disinfecting**] activities.

3.19 PIPING SCHEDULE

A. Underground fire-suppression water-service piping [**NPS 2 and smaller**] shall be one of the following:

1. [**Hard**] [**Soft**] copper tube, [**ASTM B88, Type K**] [**ASTM B88, Type L**]; [**wrought-copper, solder-joint fittings; and brazed**] [**copper, pressure-seal fittings; and pressure-sealed**] joints.
2. NPS 2 PE, [**Class 150**] [**Class 200**], fire-service pipe; molded PE fittings; and heat-fusion joints.

B. Underground fire-suppression water-service piping NPS 3 shall be one of the following:

1. [**Hard**] [**Soft**] copper tube, [**ASTM B88, Type K**] [**ASTM B88, Type L**]; [**wrought-copper, solder-joint fittings; and brazed**] [**copper, pressure-seal fittings; and pressure-sealed**] joints.

2. Grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.
3. Mechanical-joint, ductile-iron pipe; mechanical-joint, [**ductile- or gray-iron, standard-pattern**] [**or**] [**ductile-iron, compact-pattern**] fittings; glands, gaskets, and bolts; and gasketed joints.
4. Push-on-joint, ductile-iron pipe; push-on-joint, ductile-iron compact-pattern fittings; and gasketed joints.
5. PE, [**Class 150**] [**Class 200**], fire-service pipe; molded PE fittings; and heat-fusion joints.

C. Underground fire-suppression water-service piping NPS 4 shall be one of the following:

1. [**Hard**] [**Soft**] copper tube, [**ASTM B88, Type K**] [**ASTM B88, Type L**]; [**wrought-copper, solder-joint fittings; and brazed**] [**copper, pressure-seal fittings; and pressure-sealed**] joints.
2. Grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.
3. Mechanical-joint, ductile-iron pipe; mechanical-joint, [**ductile- or gray-iron, standard-pattern**] [**or**] [**ductile-iron, compact-pattern**] fittings; glands, gaskets, and bolts; and gasketed joints.
4. Push-on-joint, ductile-iron pipe; push-on-joint, ductile-iron compact-pattern fittings; and gasketed joints.
5. PE, [**Class 150**] [**Class 200**], fire-service pipe; molded PE fittings; and heat-fusion joints.
6. PVC, [**Class 150**] [**Class 200**] pipe listed for fire-protection service; PVC fittings of same class as pipe; and gasketed joints.
7. Fiberglass, RTRP, [**Class 150**] [**Class 200**]; RTRF; and bonded joints.

D. Underground fire-suppression water-service piping [**NPS 6 to NPS 12**] shall be one of the following:

1. Grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.
2. Mechanical-joint, ductile-iron pipe; mechanical-joint, [**ductile- or gray-iron, standard-pattern**] [**or**] [**ductile-iron, compact-pattern**] fittings; glands, gaskets, and bolts; and gasketed joints.
3. Push-on-joint, ductile-iron pipe; push-on-joint, ductile-iron compact-pattern fittings; and gasketed joints.
4. PE, [**Class 150**] [**Class 200**], fire-service pipe; molded PE fittings; and heat-fusion joints.
5. PVC, [**Class 150**] [**Class 200**] pipe listed for fire-protection service; PVC fittings of same class as pipe; and gasketed joints.
6. Fiberglass, RTRP, [**Class 150**] [**Class 200**]; RTRF; and bonded joints.

E. [Aboveground] [and] [vault] fire-suppression water-service piping [**NPS 2** and smaller] shall be hard copper tube, [**ASTM B88, Type K**] [**ASTM B88, Type L**]; [wrought- or cast-copper-alloy, solder-joint fittings; and brazed] [copper, pressure-seal fittings; and pressure-sealed] joints.

F. [**Aboveground**] [**and**] [**vault**] fire-suppression water-service piping [**NPS 3 and NPS 4**] shall be one of the following:

1. Hard copper tube, [**ASTM B88, Type K**] [**ASTM B88, Type L**]; [**wrought-copper, solder-joint fittings; and brazed**] [**copper, pressure-seal fittings; and pressure-sealed**] joints.
2. Grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.

G. [**Aboveground**] [**and**] [**vault**] fire-suppression water-service piping [**NPS 5 to NPS 12**] shall be grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.

H. Underslab fire-suppression water-service piping [**NPS 2** and smaller] shall be [hard] [soft] copper tube, [**ASTM B88, Type K**] [**ASTM B88, Type L**]; [wrought-copper, solder-joint fittings; and brazed] [copper, pressure-seal fittings; and pressure-sealed] joints.

I. Underslab fire-suppression water-service piping [**NPS 3 and NPS 4**] shall be one of the following:

1. [**Hard**] [**Soft**] copper tube, [**ASTM B88, Type K**] [**ASTM B88, Type L**]; [**wrought-copper, solder-joint fittings; and brazed**] [**copper, pressure-seal fittings; and pressure-sealed**] joints.
2. Grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.
3. Mechanical-joint, ductile-iron pipe; mechanical-joint, [**ductile- or gray-iron, standard-pattern**] [**or**] [**ductile-iron, compact-pattern**] fittings; glands, gaskets, and bolts; and restrained, gasketed joints.
4. Push-on-joint, ductile-iron pipe; push-on-joint, ductile-iron compact-pattern fittings; and restrained, gasketed joints.

J. Underslab fire-suppression water-service piping [**NPS 6 to NPS 12**] shall be one of the following:

1. Grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.
2. Mechanical-joint, ductile-iron pipe; mechanical-joint, [**ductile- or gray-iron, standard-pattern**] [**or**] [**ductile-iron, compact-pattern**] fittings; glands, gaskets, and bolts; and restrained, gasketed joints.
3. Push-on-joint, ductile-iron pipe; push-on-joint, ductile-iron compact-pattern fittings; and restrained, gasketed joints.

3.20 VALVE SCHEDULE

A. Underground fire-suppression water-service shutoff valves NPS 2 and smaller shall be corporation valves or curb valves with ends compatible with piping.

B. Meter box fire-suppression water-service shutoff valves NPS 2 and smaller shall be meter valves.

C. Vault fire-suppression water-service shutoff valves NPS 2 and smaller shall be [**Class 125, MSS, bronze, nonrising stem**] [**or**] [**UL-listed or FM Global-approved, OS&Y, bronze,**] gate valves.

D. Underground fire-suppression water-service shutoff valves NPS 3 and larger shall be one of the following:

1. 200-psig, AWWA, iron, nonrising-stem, [**metal**] [**resilient**]-seated gate valves.
2. 250-psig, AWWA, iron, nonrising-stem, resilient-seated gate valves.
3. [**175-psig**] [**250-psig**], UL-listed or FM Global-approved, iron, nonrising-stem gate valves.

E. Indicator-post underground fire-suppression water-service valves NPS 3 and larger shall be [**175-psig**] [**250-psig**], UL-listed or FM Global-approved, iron, nonrising-stem gate valves with indicator-post flange.

F. Standard-pressure, [**aboveground**] [**and**] [**vault**] fire-suppression water-service shutoff valves NPS 3 and larger shall be one of the following:

1. 200-psig, AWWA, iron, OS&Y, [**metal**] [**resilient**]-seated gate valves.
2. 250-psig, AWWA, iron, OS&Y, resilient-seated gate valves.
3. [**175-psig**] [**250-psig**], UL-listed or FM Global-approved, iron, OS&Y gate valves.
4. [**AWWA**] [**or**] [**UL-listed or FM Global-approved**] butterfly valves.

G. Fire-suppression water-service check valves NPS 3 and larger shall be one of the following:

1. [**AWWA**] [**or**] [**UL-listed or FM Global-approved**] check valves.
2. UL-listed or FM Global-approved detector check valves.

END 21 1100

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe and fittings.
2. Specialty valves.
3. Air vent.
4. Sprinkler piping specialties.
5. Sprinklers.
6. Alarm devices.
7. Manual control stations.
8. Control panels.
9. Pressure gauges.

1.2 DEFINITIONS

A. High-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure higher than standard 175 psig, but not higher than 300 psig.

B. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175-psig maximum.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For wet-pipe sprinkler systems.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring.

C. Delegated Design Submittal: For wet-pipe sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Sprinkler systems, or BIM model, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved.

B. Qualification Data: For qualified Installer and professional engineer.

C. Design Data:

1. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.

D. Welding certificates.

E. Field Test Reports:

1. Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
2. Fire-hydrant flow test report.

F. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wet-pipe sprinkler systems and specialties to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

B. Welding Qualifications: Qualify procedures and operators according to 2010 ASME Boiler and Pressure Vessel Code.

1.8 FIELD CONDITIONS

A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of sprinkler service.
2. Do not proceed with interruption of sprinkler service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with NFPA 13.

C. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.

D. High-Pressure Piping System Component: Listed for 250-psig minimum working pressure.

E. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design wet-pipe sprinkler systems.

1. Available fire-hydrant flow test records indicate the following conditions:

a. Date: <**Insert test date**>.
b. Time: <**Insert time**> [**a.m.**] [**p.m.**]
c. Performed by: <**Insert operator's name**> of <**Insert firm**>.
d. Location of Residual Fire Hydrant R: <**Insert location**>.
e. Location of Flow Fire Hydrant F: <**Insert location**>.
f. Static Pressure at Residual Fire Hydrant R: <**Insert psig**>.
g. Measured Flow at Flow Fire Hydrant F: <**Insert gpm**>.
h. Residual Pressure at Residual Fire Hydrant R: <**Insert psig**>.

2. Sprinkler system design shall be approved by authorities having jurisdiction.

    a. Margin of Safety for Available Water Flow and Pressure: [**10**] [**20**] percent, including losses through water-service piping, valves, and backflow preventers.
    b. Sprinkler Occupancy Hazard Classifications:

        1) Automobile Parking Areas: [**Ordinary Hazard, Group 1**].
        2) Building Service Areas: [**Ordinary Hazard, Group 1**].
        3) Churches: [**Light Hazard**].
        4) Electrical Equipment Rooms: [**Ordinary Hazard, Group 1**].
        5) Dry Cleaners: [**Ordinary Hazard, Group 2**].
        6) Elevator Machine Room and Hoistway: [**Ordinary Hazard, Group 1**].
        7) General Storage Areas: [**Ordinary Hazard, Group 1**].
        8) Laundries: [**Ordinary Hazard, Group 1**].
        9) Libraries except Stack Areas: [**Light Hazard**].
        10) Library Stack Areas: [**Ordinary Hazard, Group 2**].
        11) Machine Shops: [**Ordinary Hazard, Group 2**].
        12) Mechanical Equipment Rooms: [**Ordinary Hazard, Group 1**].
        13) Office and Public Areas: [**Light Hazard**].
        14) Plastics Processing Areas: [**Extra Hazard, Group 2**].
        15) Printing Plants: [**Extra Hazard, Group 1**].
        16) Repair Garages: [**Ordinary Hazard, Group 2**].
        17) Residential Living Areas: [**Light Hazard**].
        18) Restaurant Service Areas: [**Ordinary Hazard, Group 1**].
        19) Solvent Cleaning Areas: [**Extra Hazard, Group 2**].
        20) Upholstering Plants: [**Extra Hazard, Group 1**].

3. Minimum Density for Automatic-Sprinkler Piping Design:

    a. Residential (Dwelling) Occupancy: [**0.05 gpm over 400-sq. ft.**] area.
    b. Light-Hazard Occupancy: [**0.10 gpm over 1500-sq. ft.**] area.
    c. Ordinary-Hazard, Group 1 Occupancy: [**0.15 gpm over 1500-sq. ft.**] area.
    d. Ordinary-Hazard, Group 2 Occupancy: [**0.20 gpm over 1500-sq. ft.**] area.
    e. Extra-Hazard, Group 1 Occupancy: [**0.30 gpm over 2500-sq. ft.**] area.
    f. Extra-Hazard, Group 2 Occupancy: [**0.40 gpm over 2500-sq. ft.**] area.
    g. Special Occupancy Hazard: As determined by authorities having jurisdiction.

4. Minimum Density for Deluge-Sprinkler Piping Design:

    a. Ordinary-Hazard, Group 1 Occupancy: [**0.15 gpm**] over entire area.
    b. Ordinary-Hazard, Group 2 Occupancy: [**0.20 gpm**] over entire area.
    c. Extra-Hazard, Group 1 Occupancy: [**0.30 gpm**] over entire area.
    d. Extra-Hazard, Group 2 Occupancy: [**0.40 gpm**] over entire area.
    e. Special Occupancy Hazard: As determined by authorities having jurisdiction.

5. Maximum protection area per sprinkler according to UL listing.
6. Maximum Protection Area per Sprinkler:

a. Residential Areas: [**400 sq. ft.**].
b. Office Spaces: [**120 sq. ft.**] [**225 sq. ft.**].
c. Storage Areas: [**130 sq. ft.**].
d. Mechanical Equipment Rooms: [**130 sq. ft.**].
e. Electrical Equipment Rooms: [**130 sq. ft.**].
f. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.

F. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13 and ASCE/SEI 7. See Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."

2.2 STEEL PIPE AND FITTINGS

A. Standard-Weight, [**Galvanized-**] [**and**] [**Black-**]Steel Pipe: ASTM A53/A53M, [**Type E**], [**Grade B**]. Pipe ends may be factory or field formed to match joining method.

B. Schedule 30, [**Galvanized-**] [**and**] [**Black-**]Steel Pipe: ASTM A135/A135M; ASTM A795/A795M, [**Type E**]; or ASME B36.10M wrought steel, with wall thickness not less than Schedule 30 and not more than Schedule 40. Pipe ends may be factory or field formed to match joining method.

C. Thinwall [**Galvanized-**] [**and**] [**Black-**]Steel Pipe: ASTM A135/A135M or ASTM A795/A795M, threadable, with wall thickness less than Schedule 30 and equal to or greater than Schedule 10. Pipe ends may be factory or field formed to match joining method.

D. Schedule 10, Black-Steel Pipe: ASTM A135/A135M or ASTM A795/A795M, Schedule 10 in NPS 5 and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10, plain end.

E. Nonstandard OD, Thinwall Black-Steel Pipe: ASTM A135/A135M or ASTM A795/A795M thinwall with plain ends and wall thickness less than Schedule 10.

F. Hybrid Black-Steel Pipe: ASTM A135/A135M or ASTM A795/A795M lightwall, with wall thickness less than Schedule 10 and greater than Schedule 5.

G. Schedule 5 Steel Pipe: ASTM A135/A135M or ASTM A795/A795M lightwall with plain ends.

H. [**Galvanized-**] [**and**] [**Black-**]Steel Pipe Nipples: ASTM A733, made of ASTM A53/A53M, standard-weight, seamless steel pipe with threaded ends.

I. [**Galvanized-**] [**and**] [**Uncoated-**]Steel Couplings: ASTM A865/A865M, threaded.

J. [**Galvanized**] [**and**] [**Uncoated**], Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.

K. Malleable- or Ductile-Iron Unions: UL 860.

L. Cast-Iron Flanges: ASME 16.1, Class 125.

M. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.

1. Pipe-Flange Gasket Materials: [**AWWA C110, rubber, flat face, 1/8 inch thick**] [**ASME B16.21, nonmetallic and asbestos free**] [**or**] [**EPDM rubber gasket**].

a. Class 125 and Class 250, Cast-Iron, Flat-Face Flanges: Full-face gaskets.
b. Class 150 and Class 300, Ductile-Iron or -Steel, Raised-Face Flanges: Ring-type gaskets.

2. Metal, Pipe-Flange Bolts and Nuts: Carbon steel unless otherwise indicated.

N. Steel Welding Fittings: ASTM A234/A234M and ASME B16.9.

1. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

O. Grooved-Joint, Steel-Pipe Appurtenances:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Anvil International/Smith-Cooper International; Tailwind Capital, LLC.
b. CPS Products, Inc.
c. National Fittings, Inc.
d. Shurjoint; a part of Aalberts Integrated piping Systems.
e. Smith-Cooper International.
f. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
g. Victaulic Company.

2. Pressure Rating: [**175-psig**] [**250-psig**] [**300-psig**] minimum.
3. [**Galvanized**] [**Painted**] [**Uncoated**] Grooved-End Fittings for Steel Piping: ASTM A47/A47M, malleable-iron casting or ASTM A536, ductile-iron casting, with dimensions matching steel pipe.
4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

P. Steel Pressure-Seal Fittings: UL 213, FM Global-approved, 175-psig pressure rating with steel housing, rubber O-rings, and pipe stop; for use with fitting manufacturers' pressure-seal tools.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Victaulic Company.
b. Viega LLC.

2.3 SPECIALTY VALVES

A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."

B. Pressure Rating:

1. Standard-Pressure Piping Specialty Valves: 175-psig minimum.
2. High-Pressure Piping Specialty Valves: 250-psig minimum.

C. Body Material: Cast or ductile iron.

D. Size: Same as connected piping.

E. End Connections: Flanged or grooved.

F. Alarm Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Globe Fire Sprinkler Corporation.
b. Reliable Automatic Sprinkler Co., Inc. (The).
c. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
d. Venus Fire Protection Ltd.
e. Victaulic Company.
f. Viking Group Inc.

2. Standard: UL 193.
3. Design: For horizontal or vertical installation.
4. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gauges,[**retarding chamber,**] and fill-line attachment with strainer.
5. Drip cup assembly pipe drain [**without valves and separate from main drain piping**] [**with check valve to main drain piping.**]
6. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Deluge Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. BERMAD Control Valves.
b. CLA-VAL.
c. Globe Fire Sprinkler Corporation.
d. Kidde; Carrier Global Corporation.
e. OCV Control Valves.
f. Reliable Automatic Sprinkler Co., Inc. (The).

g. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
h. Venus Fire Protection Ltd.
i. Victaulic Company.
j. Viking Group Inc.

2. Standard: UL 260.
3. Design: Hydraulically operated, differential-pressure type.
4. Include trim sets for alarm-test bypass, drain, electrical water-flow alarm switch, pressure gauges, drip cup assembly piped without valves and separate from main drain line, and fill-line attachment with strainer.
5. Wet, Pilot-Line Trim Set: Include gauge to read diaphragm-chamber pressure and manual control station for manual operation of deluge valve, and connection for actuation device.

H. Automatic (Ball Drip) Drain Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Reliable Automatic Sprinkler Co., Inc. (The).
b. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.

2. Standard: UL 1726.
3. Pressure Rating: 175-psig minimum.
4. Type: Automatic draining, ball check.
5. Size: NPS 3/4.
6. End Connections: Threaded.

2.4 AIR VENT

A. Manual Air Vent/Valve:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. National Fittings, Inc.
b. Shurjoint; a part of Aalberts Integrated piping Systems.
c. Victaulic Company.

2. Description: Ball valve that requires human intervention to vent air.
3. Body: Forged brass.
4. Ends: Threaded.
5. Minimize Size: 1/2 inch.
6. Minimum Water Working Pressure Rating: 300 psig.

B. Automatic Air Vent:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. AGF Manufacturing, Inc.
    b. CLA-VAL.
    c. Engineered Corrosion Solutions.
    d. Metraflex Company (The).
    e. Val-Matic Valve & Manufacturing Corp.

2. Description: Automatic air vent that automatically vents trapped air without human intervention.
3. Standard: UL listed or FM Global approved for use in wet-pipe fire sprinkler systems.
4. Vents oxygen continuously from system.
5. Float valve to prevent water discharge.
6. Minimum Water Working Pressure Rating: 175 psig.

C. Automatic Air Vent Assembly:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Engineered Corrosion Solutions.
    b. Potter Electric Signal Company, LLC.
    c. South-Tek Systems, LLC.

2. Description: Automatic [**dual**]air vent assembly that automatically vents trapped air without human intervention, including Y-strainer and ball valve in a pre-piped assembly.
3. Standard: UL listed or FM Global approved for use in wet-pipe fire sprinkler system.
4. Vents oxygen continuously from system.
5. Float valve to prevent water discharge.
6. Minimum Water Working Pressure Rating: 175 psig.

2.5 SPRINKLER PIPING SPECIALTIES

A. Branch Outlet Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Anvil International/Smith-Cooper International; Tailwind Capital, LLC.
    b. National Fittings, Inc.
    c. Shurjoint; a part of Aalberts Integrated piping Systems.
    d. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.

e. Victaulic Company.

2. Standard: UL 213.
3. Pressure Rating: 175-psig minimum.
4. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
5. Type: Mechanical-tee and -cross fittings.
6. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
7. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
8. Branch Outlets: Grooved, plain-end pipe, or threaded.

B. Flow Detection and Test Assemblies:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. AGF Manufacturing, Inc.
   b. Reliable Automatic Sprinkler Co., Inc. (The).
   c. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
   d. Victaulic Company.

2. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
3. Pressure Rating: 175-psig minimum.
4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded or grooved.

C. Branch Line Testers:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. AGF Manufacturing, Inc.
   b. Elkhart Brass Mfg. Co., Inc.
   c. Fire-End & Croker Corporation.
   d. Potter Electric Signal Company, LLC.
   e. Potter Roemer LLC; a Division of Morris Group International.

2. Standard: UL 199.
3. Pressure Rating: 175 psig.
4. Body Material: Brass.
5. Size: Same as connected piping.
6. Inlet: Threaded.
7. Drain Outlet: Threaded and capped.
8. Branch Outlet: Threaded, for sprinkler.

D. Sprinkler Inspector's Test Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. AGF Manufacturing, Inc.
    b. Triple R Specialty.
    c. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
    d. Victaulic Company.
    e. Viking Group Inc.

2. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
3. Pressure Rating: 175-psig minimum.
4. Body Material: Cast- or ductile-iron housing with sight glass.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.

E. Adjustable Drop Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Aegis Technologies, Inc.
    b. CECA, LLC.
    c. CPS Products, Inc.
    d. Merit Manufacturing.

2. Standard: UL 1474.
3. Pressure Rating: 250-psig minimum.
4. Body Material: Steel pipe with EPDM-rubber O-ring seals.
5. Size: Same as connected piping.
6. Length: Adjustable.
7. Inlet and Outlet: Threaded.

F. Flexible Sprinkler Hose Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. ALEUM USA.
    b. FlexHead Industries, Inc.
    c. Gateway Tubing, Inc.
    d. Victaulic Company.

2. Standard: UL 1474.

3. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
4. Pressure Rating: 175-psig minimum.
5. Size: Same as connected piping, for sprinkler.

2.6 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Globe Fire Sprinkler Corporation.
2. Reliable Automatic Sprinkler Co., Inc. (The).
3. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
4. Venus Fire Protection Ltd.
5. Victaulic Company.
6. Viking Group Inc.

B. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."

C. Pressure Rating for Residential Sprinklers: 175-psig maximum.

D. Pressure Rating for Automatic Sprinklers: 175-psig minimum.

E. Pressure Rating for High-Pressure Automatic Sprinklers: 250-psig minimum.

F. Automatic Sprinklers with Heat-Responsive Element:

1. Early-Suppression, Fast-Response Applications: UL 1767.
2. Nonresidential Applications: UL 199.
3. Residential Applications: UL 1626.
4. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

G. Open Sprinklers with Heat-Responsive Element Removed: UL 199.

1. Nominal Orifice:

a. 1/2 inch, with discharge coefficient K between [**5.3 and 5.8**].
b. 17/32 inch with discharge coefficient K between [**7.4 and 8.2**].

H. Sprinkler Finishes: [**Chrome plated**] [**bronze**] [**and**] [**painted**].

I. Special Coatings: [Wax] [lead] [and] [corrosion-resistant paint].

J. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: [**Chrome-plated steel, one piece, flat**] [**Chrome-plated steel, two piece, with 1-inch vertical adjustment**] [**Plastic, white finish, one piece, flat**].
2. Sidewall Mounting: [**Chrome-plated steel**] [**Plastic, white finish**], one piece, flat.

K. Sprinkler Guards:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Reliable Automatic Sprinkler Co., Inc. (The).
    b. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
    c. Victaulic Company.
    d. Viking Group Inc.

2. Standard: UL 199.
3. Type: Wire cage with fastening device for attaching to sprinkler.

2.7 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Water-Motor-Operated Alarm:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Globe Fire Sprinkler Corporation.
    b. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
    c. Victaulic Company.
    d. Viking Group Inc.

2. Standard: UL 753.
3. Type: Mechanically operated, with Pelton wheel.
4. Alarm Gong: Cast aluminum with red-enamel factory finish.
5. Size: 8-1/2-inches diameter.
6. Components: Shaft length, bearings, and sleeve to suit wall construction.
7. Inlet: NPS 3/4.
8. Outlet: NPS 1 drain connection.

C. Electrically Operated Notification Appliances:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Fire-Lite Alarms; Honeywell International, Inc.
b. Notifier; Honeywell International, Inc.
c. Potter Electric Signal Company, LLC.

2. Electric Bell:

a. Standard: UL 464.
b. Type: Vibrating, metal alarm bell.
c. Size: [**6-inch minimum-**] [**8-inch minimum-**] [**10-inch**] diameter.
d. Voltage: [**120 V ac, 60 Hz, 1 phase**] [**24 V dc**].
e. Finish: Red-enamel or polyester powder-coat factory finish, suitable for outdoor use with approved and listed weatherproof backbox.

3. Strobe/Horn:

a. Standard: UL 464.
b. Tone: Selectable, steady, Temporal-3 (T-3) in accordance with ISO 8201 and ANSI/ASA S3.41, 2400 Hz, electromechanical, broadband.
c. Voltage: 120 V ac, 60 Hz.
d. Effective Intensity: 110 cd.
e. Finish: Red, suitable for outdoor use with approved and listed weatherproof backbox. White letters on housing identifying device as for "Fire."
f. Sign, Integrated: Mount between backbox and strobe/horn with text visible on both sides, above and below strobe/horn. Housing to be shaped to cover surface-mounted weatherproof backbox. Sign is to consist of white lettering on red plastic identifying it as a "Sprinkler Fire Alarm" and instructing viewers to call 911, police, or fire department.

D. Water-Flow Indicators:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. ADT Security Services, Inc.
b. ITT McDonnell & Miller.
c. Potter Electric Signal Company, LLC.
d. System Sensor.
e. Viking Group Inc.
f. Watts Water Technologies; a Watts company.

2. Standard: UL 346.
3. Water-Flow Detector: Electrically supervised.
4. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
5. Type: Paddle operated.
6. Pressure Rating: 250 psig.
7. Design Installation: Horizontal or vertical.

E. Pressure Switches:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Barksdale, Inc.
    b. Detroit Switch, Inc.
    c. Potter Electric Signal Company, LLC.
    d. System Sensor.
    e. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
    f. United Electric Controls Co.
    g. Viking Group Inc.

2. Standard: UL 346.
3. Type: Electrically supervised water-flow switch with retard feature.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design Operation: Rising pressure signals water flow.

F. Valve Supervisory Switches:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Fire-Lite Alarms; Honeywell International, Inc.
    b. Potter Electric Signal Company, LLC.
    c. System Sensor.

2. Standard: UL 346.
3. Type: Electrically supervised.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design: Signals that controlled valve is in other than fully open position.
6. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.8 MANUAL CONTROL STATIONS

A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide" for hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve.

B. Include metal enclosure labeled "MANUAL CONTROL STATION," with operating instructions and cover held closed by breakable strut to prevent accidental opening.

2.9 CONTROL PANELS

A. Description: Single-area, two-area, or single-area cross-zoned control panel as indicated, including NEMA ICS 6, Type 1 enclosure, detector, alarm, and solenoid-valve circuitry for operation of deluge valves.

1. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide" when used with thermal detectors and Class A detector circuit wiring.
2. Electrical characteristics are 120-V ac, 60 Hz, with 24-V dc rechargeable batteries.
3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Manual Control Stations, Electric Operation: Metal enclosure, labeled "MANUAL CONTROL STATION," with operating instructions and cover held closed by breakable strut to prevent accidental opening.

C. Manual Control Stations, Hydraulic Operation: With union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure labeled "MANUAL CONTROL STATION," with operating instructions and cover held closed by breakable strut to prevent accidental opening.

D. Panels Components:

1. Power supply.
2. Battery charger.
3. Standby batteries.
4. Field-wiring terminal strip.
5. Electrically supervised solenoid valves and polarized fire-alarm bell.
6. Lamp test facility.
7. Single-pole, double-throw auxiliary alarm contacts.
8. Rectifier.

2.10 PRESSURE GAUGES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. AGF Manufacturing, Inc.
2. AMETEK, Inc.
3. Ashcroft Inc.
4. Brecco Corporation.
5. WIKA Instrument Corporation.

B. Standard: UL 393.

C. Dial Size: 3-1/2- to 4-1/2-inch diameter.

D. Pressure Gauge Range: 0- to 250-psig minimum.

E. Label: Include "WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.2 WATER-SUPPLY CONNECTIONS

A. Connect sprinkler piping to building's interior water-distribution piping. Comply with requirements for interior piping in Section 221116 "Domestic Water Piping."

B. Install shutoff valve, backflow preventer, pressure gauge, drain, and other accessories indicated at connection to water-distribution piping. Comply with requirements for backflow preventers in Section 331415 "Site Water Distribution Piping."

C. Install shutoff valve, check valve, pressure gauge, and drain at connection to water supply.

3.3 INSTALLATION OF PIPING

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated on approved working plans.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
2. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

B. Piping Standard: Comply with NFPA 13 requirements for installation of sprinkler piping.

C. Install seismic restraints on piping. Comply with NFPA 13 requirements for seismic-restraint device materials and installation.

D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

E. Install unions adjacent to each valve in pipes NPS 2 and smaller.

F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.

G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.

H. Install sprinkler piping with drains for complete system drainage.

I. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

J. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.

K. Install alarm devices in piping systems.

L. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13. In seismic-rated areas, refer to Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."

M. Install pressure gauges on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gauges with connection not less than NPS 1/4 and with soft-metal seated globe valve, arranged for draining pipe between gauge and valve. Install gauges to permit removal and install where they are not subject to freezing.

N. Pressurize and check preaction sprinkler system piping and [**air-pressure maintenance devices**] [**air compressors**].

O. Fill sprinkler system piping with water.

P. Install electric heating cables and pipe insulation on sprinkler piping in areas subject to freezing. Comply with requirements for heating cables in Section 210533 "Heat Tracing for Fire-Suppression Piping" and for piping insulation in Section 210700 "Fire-Suppression Systems Insulation."

Q. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

R. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

S. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210518 "Escutcheons for Fire-Suppression Piping."

3.4 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

B. Install unions adjacent to each valve in pipes NPS 2 and smaller.

C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.

D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.

G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

H. Twist-Locked Joints: Insert plain end of steel pipe into plain-end-pipe fitting. Rotate retainer lugs one-quarter turn or tighten retainer pin.

I. Steel-Piping, Pressure-Sealed Joints: Join [**lightwall**] [**and**] [**Schedule 5**] steel pipe and steel pressure-seal fittings with tools recommended by fitting manufacturer.

J. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.

1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.

K. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.

L. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.

M. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.

N. Copper-Tubing Grooved Joints: Roll rounded-edge groove in end of tube according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.

O. Copper-Tubing, Pressure-Sealed Joints: Join copper tube and copper pressure-seal fittings with tools recommended by fitting manufacturer.

P. Extruded-Tee Connections: Form tee in copper tube according to ASTM F2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.

Q. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

R. Plastic-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
2. CPVC Piping: Join according to ASTM D2846/D2846M Appendix.

3.5 INSTALLATION OF COVER SYSTEM FOR SPRINKLER PIPING

A. Install cover system, brackets, and cover components for sprinkler piping according to manufacturer's "Installation Manual" and NFPA 13 or NFPA 13R for supports.

3.6 INSTALLATION OF VALVES AND SPECIALTIES

A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.

D. Specialty Valves:

1. Install valves in vertical position for proper direction of flow, in main supply to system.
2. Install alarm valves with bypass check valve and retarding chamber drain-line connection.
3. Install deluge valves in vertical position, in proper direction of flow, and in main supply to deluge system. Install trim sets for drain, priming level, alarm connections, ball drip valves, pressure gauges, priming chamber attachment, and fill-line attachment.

E. Air Vent:

1. Provide at least one air vent at high point in each wet-pipe sprinkler system in accordance with NFPA 13 requirements. Connect vent into top of fire sprinkler piping.
2. Provide dielectric union for dissimilar metals, ball valve, and strainer upstream of automatic air vent.
3. [**Pipe from outlet of air vent to drain.**]

3.7 INSTALLATION OF SPRINKLERS

A. Install sprinklers in suspended ceilings in center of[**narrow dimension of**] acoustical ceiling panels.

B. Install dry-type sprinklers with water supply from heated space. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing.

C. Install sprinklers into flexible, sprinkler hose fittings, and install hose into bracket on ceiling grid.

3.8 IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.9 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Energize circuits to electrical equipment and devices.
5. Coordinate with fire-alarm tests. Operate as required.
6. Coordinate with fire-pump tests. Operate as required.
7. Verify that equipment hose threads are same as local fire department equipment.

B. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.10 CLEANING

A. Clean dirt and debris from sprinklers.

B. Only sprinklers with their original factory finish are acceptable. Remove and replace any sprinklers that are painted or have any other finish than their original factory finish.

3.11 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain [**specialty valves**] [**and**] [**pressure-maintenance pumps**].

3.12 PIPING SCHEDULE

A. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with [threaded ends, cast-iron threaded fittings, and threaded] [grooved ends, grooved-end fittings, grooved-end-pipe couplings, and grooved] joints.

B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.

C. Copper-tube, extruded-tee connections may be used for tee branches in copper tubing instead of specified copper fittings. Branch-connection joints must be brazed.

D. CPVC pipe, [**Schedule 40**] [**Schedule 80**] CPVC fittings, and solvent-cemented joints may be used for light-hazard and residential occupancies.

E. Standard-pressure, wet-pipe sprinkler system, [**NPS 2 and smaller**], shall be[**one of**] the following:

1. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
3. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with plain ends; uncoated, plain-end-pipe fittings; and twist-locked joints.
4. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with plain ends; galvanized, plain-end-pipe fittings; and twist-locked joints.
5. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with [**cut-**] [**or**] [**roll-**]grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
6. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
7. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with plain ends; steel welding fittings; and welded joints.

8. [**Thinwall**] [**Schedule 10**] [**nonstandard OD, thinwall**] [**or**] [**hybrid**] black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
9. [**Thinwall**] [**Schedule 10**] [**or**] [**hybrid**] black-steel pipe with plain ends; uncoated, plain-end-pipe fittings; and twist-locked joints.
10. [**Thinwall**] [**Schedule 10**] [**nonstandard OD, thinwall**] [**or**] [**hybrid**] black-steel pipe with plain ends; welding fittings; and welded joints.
11. Schedule 5 steel pipe; steel pressure-seal fittings; and pressure-sealed joints.
12. [**Type L**] [**Type M**], hard copper tube with plain ends; [**cast-**] [**or**] [**wrought-**]copper, solder-joint fittings; and brazed joints.
13. [**Type L**] [**Type M**], hard copper tube with plain ends; copper pressure-seal fittings; and pressure-sealed joints.
14. NPS 2, [**Type L**] [**Type M**], hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.

F. Standard-pressure, wet-pipe sprinkler system, [**NPS 2-1/2 to NPS 4**], shall be[**one of**] the following:

1. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
3. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with [**cut-**] [**or**] [**roll-**]grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
4. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
5. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with plain ends; steel welding fittings; and welded joints.
6. [**Thinwall**] [**Schedule 10**] [**nonstandard OD, thinwall**] [**or**] [**hybrid**] black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
7. [**Thinwall**] [**Schedule 10**] [**nonstandard OD, thinwall**] [**or**] [**hybrid**] black-steel pipe with plain ends; welding fittings; and welded joints.
8. [**Type L**] [**Type M**], hard copper tube with plain ends; [**cast-**] [**or**] [**wrought-**]copper, solder-joint fittings; and brazed joints.
9. [**Type L**] [**Type M**], hard copper tube with plain ends; copper pressure-seal fittings; and pressure-sealed joints.
10. [**Type L**] [**Type M**], hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.

G. Standard-pressure, wet-pipe sprinkler system, [**NPS 5 and larger**], shall be one of the following:

1. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.

3. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with [**cut-**] [**or**] [**roll-**]grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
4. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
5. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with plain ends; steel welding fittings; and welded joints.
6. [**Thinwall**] [**Schedule 10**] [**or**] [**hybrid**] black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
7. [**Thinwall**] [**Schedule 10**] [**or**] [**hybrid**] black-steel pipe with plain ends; welding fittings; and welded joints.
8. [**Type L**] [**Type M**], hard copper tube with plain ends; [**cast-**] [**or**] [**wrought-**]copper, solder-joint fittings; and brazed joints.
9. [**Type L**] [**Type M**], hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.

H. High-pressure, wet-pipe sprinkler system, [**NPS 4 and smaller**], shall be one of the following:

1. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
2. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
3. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with plain ends; steel welding fittings; and welded joints.
4. [**Thinwall**] [**Schedule 10**] [**or**] [**hybrid**] black-steel pipe with plain ends; welding fittings; and welded joints.

I. High-pressure, wet-pipe sprinkler system, [**NPS 5 and larger**], shall be one of the following:

1. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
2. [**Standard-weight**] [**or**] [**Schedule 30**], galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
3. [**Standard-weight**] [**or**] [**Schedule 30**], black-steel pipe with plain ends; steel welding fittings; and welded joints.
4. [**Thinwall**] [**Schedule 10**] [**or**] [**hybrid**] black-steel pipe with plain ends; welding fittings; and welded joints.

3.13 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Rooms without Ceilings: Upright sprinklers.

2. Rooms with Suspended Ceilings: [**Pendent sprinklers**] [**Recessed sprinklers**] [**Flush sprinklers**] [**Concealed sprinklers**] [**Pendent, recessed, flush, and concealed sprinklers as indicated**].
3. Wall Mounting: Sidewall sprinklers.
4. Spaces Subject to Freezing: [**Upright sprinklers**] [**Pendent, dry sprinklers**] [**Sidewall, dry sprinklers**] [**Upright, pendent, dry sprinklers; and sidewall, dry sprinklers as indicated**].
5. Deluge-Sprinkler Systems: Upright and pendent, open sprinklers.
6. Special Applications: [**Extended-coverage, flow-control, and quick-response sprinklers where indicated**] [**Attic sprinklers**] [**Combustible concealed space sprinklers**] [**Institutional space sprinklers**].

B. Provide sprinkler types in subparagraphs below with finishes indicated.

1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
2. Flush Sprinklers: Bright chrome, with painted white escutcheon.
3. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.
4. Residential Sprinklers: Dull chrome.
5. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

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