

Agenda
Planning and Policy Committee
West Olive Administration Building – Board Room and YouTube
12220 Fillmore Street, West Olive, Michigan 49460
Tuesday, February 6, 2024
9:00 AM

Public Comment

Approval of Agenda

Consent Resolutions:

- I. Approval of the minutes from the [January 9, 2024](#) Planning and Policy Committee Meeting

Agenda and Action Requests:

- I. [Ottawa Sands Lake Loop Construction](#)

To accept the bid from McCormick Sand, Inc, in the amount of \$788,314.25 for construction of the Lake Loop project at Ottawa Sands and forward to the Board of Commissioners for final approval. Furthermore, the Parks Commission requests that the Fiscal Services Department transfers \$150,000 from CP2208 Ottawa Sands Development Phase I {Parks contribution) to CP2302 Ottawa Sands Lake Loop, to fully fund this project with contingency for a total project amount of \$891,844.

2. [Ottawa Sands Day Use Restroom Construction](#)

Suggested Motion:

To approve the bid from Denny's Excavating in the amount of \$510,000 for construction of the day use restroom at Ottawa Sands and forward to the Board of Commissioners for final approval. Furthermore, the Parks Commission requests that the Fiscal Services Department transfers \$100,000 from CP2208 Ottawa Sands Development Phase I (Parks contribution) to CP2301 Ottawa Sands Restroom, to fully fund this project with contingency for a total project amount of \$585,000.

Committee Reports:

- I. [Environmental Health Notice of Intent Presentation](#); Kim Wolters
2. [Farmland Protection Presentation](#); Becky Huttenga

Discussion Items

I. Legislative Update Pertaining to Septic Inspections

Public Comment

Adjournment at Call of the Chairperson

Note: Public Comments on the day's business are to be limited to three (3) minutes.

PLANNING AND POLICY COMMITTEE

Proposed Minutes

DATE: January 9, 2024

TIME: 9:02 a.m.

PLACE: Fillmore Street Complex

PRESENT: Roger Belknap, Roger Bergman, Allison Miedema, Joe Moss, and Sylvia Rhodea. (5)

ABSENT: None. (0)

SUBJECT: PUBLIC COMMENT

1. Sheila Dettloff-Holland Township
2. Karen Obits-Spring Lake Village

SUBJECT: APPROVAL OF AGENDA

PP 24-001 Motion: To approve the agenda of today.
Moved by: Moss

UNANIMOUS

SUBJECT: CONSENT RESOLUTIONS

PP 24-002 Motion: To approve the minutes from the December 5, 2023, Planning and Policy Committee Meeting.
Moved by: Rhodea

UNANIMOUS

SUBJECT: ELECTION OF COMMITTEE VICE CHAIR

PP 24-003 Motion to elect Allison Miedema as Vice Chairperson of the Planning and Policy Committee for 2024
Moved by: Rhodea

Roll Call Vote:

Bergman-Miedema
Miedema-Miedema
Moss-Miedema

Rhodea-Miedema
Belknap-Miedema

Allison Miedema was elected to Vice Chairperson of the Planning and Policy Committee for 2024.

SUBJECT: COUNTY POLICIES POLICY

PP 24-004 Motion: To approve and advance to a first reading before the full Board of Commissioners the revised County Policies for review and comment.

Moved by: Bergman

The motion passed with the following votes: Yeas: Sylvia Rhodea, Joe Moss, Roger Bergman, Allison Miedema, Roger Belknap. (5).

SUBJECT: DISCUSSION ITEMS

1. Road Commission 2024-2028 Strategic Improvement Plan-Brett Laughlin gave a presentation on the Road Commission 2024-2028 Strategic Improvement Plan.

SUBJECT: PUBLIC COMMENT

1. Karen Obits-Spring Lake Village
2. Dena Arner-Holland Township

SUBJECT: ADJOURNMENT

The chairperson called for adjournment at 9:54 a.m.

Action Request

Electronic Submission – Contract # 2184



Committee: PLANNING AND POLICY

Meeting Date: 2/6/2024

Vendor/3rd Party: MCCORMICK SAND, INC.

Requesting Department: PARKS AND RECREATION

Submitted By: CURT TERHAAR

Agenda Item: OTTAWA SANDS LAKE LOOP CONSTRUCTION

Suggested Motion:

To accept the bid from McCormick Sand, Inc, in the amount of \$788,314.25 for construction of the Lake Loop project at Ottawa Sands and forward to the Board of Commissioners for final approval. Furthermore, the Parks Commission requests that the Fiscal Services Department transfers \$150,000 from CP2208 Ottawa Sands Development Phase 1 (Parks contribution) to CP2302 Ottawa Sands Lake Loop, to fully fund this project with contingency for a total project amount of \$891,844.

Summary of Request:

In accordance with the approved park master plan and planned as part of the first phase of recreational improvements at Ottawa Sands, this project will construct a day-use parking area and 1.6 mile long paved trail around the park lake along with other amenities. In conjunction with the proposed day-use restroom building to be constructed in the same area, these projects will provide fully accessible facilities for park visitors of all physical abilities. The proposed contract amount is well below the project estimate and confirmed budget of \$991,900.

Financial Information:

Total Cost: \$788,314.25

General Fund Cost: \$0.00

Included in Budget: Yes

If not included in Budget, recommended funding source:

Action is Related to an Activity Which Is: Non-Mandated

Action is Related to Strategic Plan:

Goal 2: To Contribute to the Long-Term Economic, Social and Environmental Health of the County.

Administration:

Recommended by County Administrator:

1/30/2024 10:54:17 AM

Committee/Governing/Advisory Board Approval Date: 2/6/2024



OTTAWA COUNTY CONTRACT FOR OTTAWA SANDS LAKE LOOP PROJECT

This CONTRACT is made and hereby effective on the 16th day of January, 2024 by and between the County of Ottawa, a municipality in the State of Michigan, (hereinafter, the "County") acting by and through its duly elected Board of Commissioners, (hereinafter the "Board"), and McCormick Sand Inc (hereinafter, "Contractor"), with a principal place of business at 5430 Russell Rd, Twin Lake, MI 49457.

IT IS HEREBY AGREED AS FOLLOWS:

1. **Scope of Work:** Contractor agrees to provide the "Services" which as detailed in Exhibit A. It shall be the responsibility of the Contractor to employ and assign to the project adequate personnel and equipment required to undertake and complete the work in a diligent, timely and orderly manner.
2. **Compensation:** In consideration for the services to be performed by the Contractor, the County agrees to pay Contractor the compensation set forth on Exhibit B. Payment to the Contractor for services will be under the County's terms of Net 30.
3. **Contract Documents:** The following documents are the entire Contract between the Contractor and the County. The Contract includes the following documents listed below, which are incorporated herein by reference and are deemed to be part of this Contract as if set forth in full:
 - a) This Contract (including attached exhibits)
 - b) All Provisions required by law to be inserted in this contract whether actually inserted or not.
4. **Performance**
 - a) Contractor shall perform the work as required by and in accordance with the schedule of time requirements set forth in Exhibit A.
 - b) Failure to complete services as required shall constitute breach of this Contract.
 - c) Contractor shall have five (5) calendar days to cure a breach of this Contract (the "Cure Period"). Failure to cure a breach of this Contract within said Cure Period shall allow the County to, without further notice to the Contractor, declare this Contract terminated and proceed with the replacement of the Contractor and the County shall be entitled to all remedies available to it at law or in equity.
5. **Terms of Contract:** The Contract shall commence when signed by both parties and unless terminated earlier in accordance with the terms of this Contract, this Contract period will cover a period from project kick-off to project completion of stated objectives, Exhibit A.

This Contract may be terminated prior to completion of the Services at the option of the County, upon delivery of written notice by the terminating party to the other party.

6. Expenses: Contractor shall be responsible for all the Contractor's expenses incurred while performing services under this Contract. This includes license fees, fuel and fleet maintenance, insurance premiums, telephone and all salary/payroll expenses, and other compensation paid to employees or contract personnel that the Contractor hires to complete the work under this Contract.
7. Employees: The Contractor and all Contractor' employees, while on County premises, shall carry proper identification. Examples of proper identification are State issued Driver's License or State issued Identification Card.

The Contractor shall employ only United States citizens, legal residents, or legal resident aliens. Upon request of the County, the Contractor shall provide copies of, or access to, work/payroll records and necessary documents to verify status of employees.

The Contractor will be supplied with a phone number to contact in case of an emergency. Access to designated restricted areas is forbidden to Contractor's employees. Restricted area will be designated by the authorized County representative.

8. Materials: Contractor will furnish all materials, equipment and supplies used to provide the services required by this Contract.
9. Background Checks: (as required by the Facility) Contractor employees are subject to background checks to ensure, at a minimum, that no employee has a felony or domestic violence or other bar-able conviction(s). The background checks for Contractor employees will be conducted by the County prior to the commencement of any on-site work.
10. Compliance with Laws, Ordinances, and Regulations and Procurement of Permits:
 - a) This Contract is governed by the laws of the State of Michigan.
 - b) The Contractor shall at all times comply with all local, state, and federal laws, rules, and regulations applicable to this Contract and the work to be done herewith.
 - c) The Contractor shall obtain, and pay thereof, all permits required by any agency or authority having jurisdiction over the work. The Contractor shall provide a copy of any permit to the County within 3 business days of the County's request.
11. Exclusive Contract: This Contract, including exhibits attached hereto, a County Purchase Order, if applicable, is the entire Contract between Contractor and the County for the services as detailed in Exhibit A.

12. **Modifying the Contract:** This Contract may be modified only by a writing signed by both parties.
13. **Record Keeping:** The Contractor shall keep all records related to this Contract for the term of the Contract and 3 years thereafter.
14. **Dispute:** In the event of any conflicts or discrepancies in the wording of any terms, provisions and conditions contained in this Contract, describing Contractor's obligations and responsibilities hereunder, said conflicts and discrepancies shall be resolved by first applying the interpretation of this Contract and its exhibits, attachments, and addendums, then the mutually agreed Contractor's planning documents that affirm the details of the Services to be provided. Any contract or modification of this Contract shall be written and signed by both parties and will supersede any previous written understandings.

Should any disputes arise with respect to this Contract, Contractor and County agree to act immediately to resolve any such disputes. Pending resolution of such dispute or difference and without prejudice to their rights, both the Contractor and the County shall continue to respect all their obligations and to perform all their duties under this Contract.

15. **Jurisdiction and Venue:** The parties' consent to the exercise of general personal jurisdiction over it by the Ottawa County Circuit Court. Any action on a controversy that arises under or in association with this Contract shall be brought in the State of Michigan, which both parties agree is a reasonably convenient place for trial of the action. The parties both agree that their consent in accordance with this Section is not obtained by misrepresentation, duress, the abuse of economic power, or other unconscionable means.
16. **Indemnification:** Contractor agrees to indemnify, defend, and hold harmless the County and its officials, officers, employees, volunteers, and agents from and against any and all liability arising out of or in any way related to Contractor's performance of services under this Contract, including, but not limited to, any and all liability resulting from or arising out of intentional, reckless, or negligent acts or omissions of the Contractor, its employees, agents or subcontractors.
17. **Insurance:** Contractor agrees to provide proof of the following insurance coverages, as more fully set forth in Exhibit C, entitled Vendor Insurance Requirements: Workers' Compensation; Employers' Liability; Commercial General Liability; Umbrella/Excess Liability; and, if applicable, Automobile, Professional Liability, and Privacy and Security Liability (Cyber Security). Coverage limits are to be statutory and, if no statute applies, are to be at least \$1,000,000 per occurrence or claim and \$2,000,000 aggregate. These coverages shall protect the Contractor and the County and their respective representatives against any and all claims arising out of or related in any way to the work performed or the products provided.
18. **Relationship of Parties:** The Contractor is an independent contractor and is not an agent or employee of the County for any purpose including, but not limited to, the

ability to bind the County and all labor or employee related matters such as tax withholding/reporting, employee wages or benefits, or workers compensation. This Contract is not intended to create any joint venture or partnership of any kind. The provisions of this Contract are for the benefit of the parties hereto, and not for the benefit of any other person or legal entity.

19. Subcontracts: Contractor may not assign or subcontract any rights or obligations under this contract without the County's prior written approval.
20. Governmental Immunity: The County does not waive its governmental immunity by entering into this Contract, and fully retains all immunities and defenses provided by law with respect to any action based upon or occurring as a result of this Contract.
21. Safety: The Contractor shall at all times observe and comply with all federal, state, local and County facility laws, ordinances, rules, and regulations that may in any manner affect the safety and the conduct of the work. The Contractor shall indemnify and hold the County harmless against any claim or liability arising from the violation of any such provisions.
22. Absence of Waiver: The failure of either party to insist on the performance of any of the terms and conditions of this Contract, or the waiver of any breach of such terms and conditions, shall not be construed as thereafter waiving such terms and conditions, which shall continue and remain in full force and effect as if such forbearance or waiver had occurred.
23. Notices:
 - a) All notices and other communications for the parties may be served, mailed, or delivered at the following addresses:

If to the Contractor: McCormick Sand Inc.
Attn: David VanderMolen
5430 Russell Rd
Twin Lake, MI 49457
Email: david@mccormicksand.com

If to Ottawa County: Ottawa County Parks and Recreation Commission
Attn: Curt TerHaar
12220 Fillmore St. Room 267
West Olive, MI 49460
Email: cterhaar@miottawa.org

24. **Partial Invalidity:** The partial invalidity of any portion of this Contract shall not be deemed to affect the validity of any other provision. In the event that any provision of this Contract is held to be invalid, the parties agree that the remaining provisions shall be deemed to be in full force and effect as if they had been executed by both parties subsequent to the expunction of the invalid provision.
25. **Attorney Review:** The parties represent that they have carefully read this Contract and have had the opportunity to review it with an attorney. The parties affirmatively state that they understand the contents of this Contract and sign it as their free act and deed.
26. **No Third-Party Benefit:** The provisions of this Contract are for the benefit of the parties hereto, and not for the benefit of any other person or legal entity.
27. **Availability of Funds:** Each payment obligation of the County is conditioned upon the availability of government funds appropriated or allocated for the payment of this obligation. If funds are not allocated and available for continuance of the services performed herein, either party may terminate this Contract at the end of the period for which funds are available. The County shall notify the Contractor at the earliest possible time of the services that will or may be affected by the shortage of funds.
28. **Miscellaneous:**
 - a) **Force Majeure:** Either party shall be excused from performance under this Contract for any period of time during which the party is prevented from performing its obligations hereunder as a result of any Act of God, war, civil disobedience, court order, labor dispute, or other cause beyond the party's reasonable control. Such non-performance shall not constitute grounds for default.
 - b) **Title and Headings:** Titles and headings to articles, sections or paragraphs in this Contract are inserted for convenience of reference only and are not intended to affect the interpretation or construction of the Contract.
 - c) **Modification:** Any modification of this Contract or additional obligation assumed by either party in connection with this Contract shall be binding only if evidenced in a writing signed by either party or its authorized representative.
 - d) **Anticipatory Breach:** If the Contractor, at any time before delivery of services, declares its intent not to perform in accordance with this Contract, Ottawa County shall have an immediate cause of action for breach of this Contract, and shall be entitled to all remedies available to it at law or in equity.

In witness whereof, each party to this Contract has caused it to be executed on the date(s) indicated below.

COUNTY OF OTTAWA

By: _____
Joe Moss, Chairperson
Board of Commissioners

Date

By: _____
Justin F. Roebuck,
County Clerk/Register

Date

MCCORMICK SAND INC

By:  _____
Digitally signed by David P. VanderMolen
Date: 2023.12.13 12:07:15 -05'00'
David VanderMolen
Project Manager

12/13/23

Date

Exhibit A



Invitation to Bid 24-005

Ottawa Sands Lake Loop Project

The County of Ottawa, on behalf of Parks and Recreation Commission, is inviting experienced and qualified Contractors to bid on the construction project for Ottawa Sands Lake Loop Project in the City of Ferrysburg, Ottawa County.

By responding to this ITB, the Contractor agrees to perform in accordance with the terms and conditions set forth herein.

ITB Issue Date:	November 8, 2023
Voluntary On-site Pre-bid Meeting	November 21, 2023 @ 10:00AM ET
Questions Deadline:	November 28, 2023
Addendum Issuance:	November 30, 2023
ITB Deadline:	December 5, 2023 @ 10:00 AM ET

ITB Administrator: Steven Holden, Procurement Specialist, 616-994-4778,
purchasing.rfp@miottawa.org

All requests for additional information or questions should be directed to the ITB Administrator.

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Exhibit 1 – Project Specifications

Exhibit 2 – Construction Plans

Exhibit 3 – Contract Example

Section 1 - Information Summary:

General Information:

The County of Ottawa distributes solicitation documents through the Michigan Intergovernmental Trade Network (MITN), website at <http://www.bidnetdirect.com/mitn> and through the Purchasing page of the County of Ottawa's website located at <http://www.miottawa.org/Departments/FiscalServices/bids.htm>. Copies of bid documents obtained from any other sources are not considered official copies, and may result in failure to receive addenda, corrections or other revisions that may be issued.

Electronic copies of the plans and specifications are available at no charge. Bidding Documents may also be viewed at the following plan rooms:

Builders Exchange of Grand Rapids (616.949.8650)
Construction Association of Michigan (248.972.1113)
Dodge Data & Analytics (877.958.5062)
CDC News (1.800.652.0008)

For purposes of this ITB, the term "Contractor," "Vendor," "Proposer," "Respondent," or "Bidder" are considered to have the same meaning, all referring to the person or company responding to this ITB. Additionally, the terms "County," "Client," or "Owner" refers to the County of Ottawa. Finally, the terms "Bid," and "Offer" are considered to have the same meaning.

Bid Submission:

Bids must be received by December 5, 2023 @ 10:00AM ET. Bids received after this time will not be considered. Bids may be withdrawn at any time prior to the scheduled ITB Deadline. Bids must be firm and may not be withdrawn for a minimum period of 90 calendar days after the ITB Deadline. Bids should be concise and complete, covering all items identified, emphasizing an understanding of the project and the resources to perform the intended work. Bids will be reviewed to determine if submission requirements are met. Bids that do not comply with submittal instructions established in this document or that do not include the required information may be rejected as non-responsive. Vendor assumes responsibility for meeting the submission requirements and addressing all necessary technical and operational issues to meet the project objectives.

All bids must include completed, signed copies of all required attachments. Vendor assumes all risks associated with electronic submission (including possible technical issues). Attachments must be filled out in full and signed by an authorized Company representative.

Bid Response:

Bid response must contain completed, signed copies of each of the following required attachments:

- Bid Proposal Form
- Bid Bond (no less than 5% of total bid amount)

Bids will be accepted by e-mail submission, as follows:

Respondents will submit an electronic response (preferably single-file PDF format) by e-mail to: purchasing.rfp@miottawa.org with subject line of: "ITB 24-005 Ottawa Sands Lake Loop Project." The County can receive email attachments up to 25 megabytes. Bid documents larger than 20 megabytes should be sent in multiple emails with subject line of: "ITB 24-005 – 1 of 2." It will be the Contractors' responsibility to ensure that their bids have been appropriately delivered and received.

Bids will be accepted by Hard-Copy Submission, as follows: Responses may submit by express or overnight mail/shipping service, U.S. Postal Service, hand delivery by a company representative, or by Courier in a sealed package clearly marked on the outside: "ITB 24-005." The bid will be addressed to: County of Ottawa / Fiscal Services – Purchasing | 12220 Fillmore Street, Room 331 | West Olive, Michigan 49460.

Modification:

Prior to the date and time set forth as the ITB Deadline, bids may be modified or withdrawn by the Contractor's authorized representative. After the submission deadline, responses may not be modified or withdrawn without written consent of the County.

Pre-Bid Conference:

Members of the project team will be hosting a voluntary pre-bid meeting at the date/time and location below:

Tuesday, November 21, 2023 at 10:00AM ET

18280 North Shore Drive, Ferrysburg, MI 49409

It is voluntary that vendors attend as they will be able to examine the site and have the opportunity to request clarification of the bid documents and ask any questions relating to the project. Final answers will be released by Addendum and will be considered official and final.

Vendor representatives attending the pre-bid meeting are asked to RSVP attendance by Monday, November 20, 2023 at 5:00PM ET to: Steven Holden, Procurement Specialist, 616-994-4778, or email: purchasing.rfp@miottawa.org.

Questions:

Contractors may submit questions and requests for clarification relating to this ITB to the ITB Administrator by the stated deadline. Responses to all questions and inquiries received by the County will be issued in the form of an Addendum and posted on the MITN and the County's website, as needed. Only answers to questions submitted prior to the submission deadline and released in the form of an Addendum will be considered official and final. Any remarks or explanations made by phone, email or in-person will be considered draft and will be non-binding.

Public Bid Opening:

All bids received on or before 10:00AM ET on December 5, 2023, will be opened and recorded. No immediate decisions are rendered. All bids will be read aloud starting at 10:00AM ET at the County Administration building located at Ottawa County, 12220 Fillmore Street, West Olive, Michigan 49460 in Conference Room F. Bidders are not required to attend the bid opening and may alternatively request a copy of the public opening tabulation via email to purchasing.rfp@miottawa.org, available no later than 5:00 PM ET, depending on the number of bidders.

Section 2 - Background Information:

County Information:

Beautiful Ottawa County is located in the southwestern section of Michigan's Lower Peninsula. Its western boundary is formed by Lake Michigan and its eastern boundary is approximately 30 miles inland. The County landmass consists of a total area of 565 square miles with over 300 miles of water frontage. The County is composed of 6 cities, 17 townships, and 1 village.

The current County's legislative body is an eleven-member Board of Commissioners which is elected from single-member districts, determined by population, on a partisan basis for two-year terms. The Board of Commissioners provides oversight, establishes policy, and builds the strategic plan for County operations.

Ottawa County has been named the fastest growing population in the state. Between 2010 and 2019 there was a 10.63% increase in population. The estimated population in the County in 2019 was 291,830. This significant population growth is expected to continue in the years ahead.

Section 3 - Scope of Work:

The project involves site preparation and grading, including existing vegetation and small tree removal, construction of a forty-car parking area, bituminous paved path, and concrete path loop around an existing inland lake, restoration, and miscellaneous other items of work. The estimate for all work in this bid package is approximately \$900,000.

This project will be constructed under a unified contract held by the General Contractor with the owner, which will include all trades and subcontractors. Project substantial completion is July 19, 2024. Project final completion is October 31, 2024

Contract shall be based on a Stipulated Lump Sum Bid. Segregated bids will not be accepted. Each bid must be accompanied by a bid security, which shall not be less than five percent (5%) of the bid amount. A bid may not be modified, withdrawn, or cancelled for a period of seventy-five days after the public bid opening. The Owner reserves the right to reject any and all bids.

Addenda may be issued during the bidding period. Addenda becomes part of the Contract Documents. Include resultant costing in the Bid Sum and list Addenda on the Bid Form where indicated.

This project is partially funded by a Michigan Natural Resources Trust Fund Grant No. TF22-0153 and Land and Water Conservation (LWCF) Fund Grant No. 26-01892 and relevant state requirements apply. This includes Build America, Buy America requirements for LWCF portions of the project as shown on the plans.

All contractors and subcontractors must comply with all requirements of 1976 PA453 (Elliot-Larsen Civil Rights Act), the 1976 PA220 (Persons with Disabilities Civil Rights Act), and Executive Directive 2019-09 as amended so as not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, marital status, partisan considerations, or a disability or genetic information that is unrelated to the individual's ability to perform the duties of a particular job or position.

Refer to Exhibit 1-3 for additional scope.

Section 4 - Bonds and Securities:

Bid Security:

Each bid must be accompanied by a bid security, which will not be less than the amount of five percent (5%) of the total amount of the bid. Form of security may be a bid bond, certified or cashier's check made payable to Ottawa County. Personal checks are NOT acceptable. This will be a guarantee that the bid selected by Ottawa County will furnish the required performance bonds; failure to do so could mean forfeiture of Bid Security. If submitting the bid electronically, attach a copy of the properly executed Bid Bond to the bid. The original Bid Security may be requested by the Ottawa County Purchasing Division and is to be received within two (2) business days of request. The Bid Security of the unsuccessful respondents will be returned after the solicitation is awarded. The Bid Security of the successful respondent will be retained until the contract is fully executed by all parties involved.

Performance and Payment Bonds:

Each contract over \$50,000 must be accompanied by a Performance Bond and a Payment Bond, each payable to the County of Ottawa and each in the amount of one hundred percent (100%) of the contract price with a corporate surety approved by the funding agency, for the faithful performance of the contract. All bidders must indicate the cost of all bonds covering one hundred percent (100%) of the value of the Project. Bidders are to include the cost of the Performance and Payment Bonds in the Bid Amount and identify the amount on the bid form. Contractors will include the cost of all bonds, securities, insurance, taxes, and permits as required by the project. Contractor will provide all satisfactory bonds and insurance within 10 days of notice of award.

If the successful bidder fails to furnish satisfactory bonds and insurance within 10 days after notice of award, such guarantee will be forfeited as liquidated damages by the Ottawa County to compensate for losses due to delay or increased costs for the work. The guarantees of the two lowest bidders will be retained until the bonds and insurance of the successful bidder have been approved by the County.

Section 5 - Bid Award Process:

Upon public bid opening, a bid tabulation will be prepared by the County to summarize each Contractor's offer. All offers will be required to be submitted under a condition of irrevocability for a period of ninety (90) days after submission.

Bids will be reviewed to determine if submission requirements are met and confirm the lowest responsive, responsible bidder. Failure to meet submission requirements or complying with submittal instructions established in this document may result in rejection of the offer and declared non-responsive. Contractor assumes responsibility for meeting submission requirements and addressing all necessary technical and operational issues to meet the project objectives.

The County will coordinate a post-bid interview with the apparent low, responsive, responsible bidder to validate pricing and project understanding before issuing an intent to award. The County reserves the right to interview any number of qualifying bidders as part of the selection process. The County further reserves the right to award a contract without an interview, if determined to be in the best interest of the County.

The lowest priced response may not have a direct bearing on final selection. The County reserves the right to select and subsequently recommend for award the offer which best meets its required needs, quality levels, and budgetary considerations.

An intent to award will be issued to the successful Contractor and all bidders will be notified. In the event that a successful agreement cannot be executed, the County reserves the right to proceed with contract negotiations with the next lowest, responsive, responsible bidder.

Form of agreement will be by Standard Services Agreement issued by the County of Ottawa, which incorporates by reference this Invitation to Bid, any project manuals or Drawings as prepared by the County or the County's Representative and all terms and conditions therein, as well as the Bid Pricing Form as offered by the Contractor. No work is to commence prior to receipt of Purchase Order by Contractor.

Section 6 - Contract Terms, Period, Procedures and Use:

The County of Ottawa's intent is to award a contract that will cover the period from project kick-off to project completion as determined by the successful completion of the stated objective within this ITB. This contract will not be enforced until both parties have agreed and signed as accepted. The Vendor must execute and perform said Agreement.

The bid, or any part thereof, submitted by the awarded vendor may be attached to and become part of the contract. Bid pricing reflects a commitment to the terms indicated. As part of the contract negotiation process, the County reserves the right to delete or modify any task from the scope of services and reserves the right to modify the scope of services during the course of the contract. Any changes in pricing or payment terms proposed by the Vendor resulting from the requested changes are subject to acceptance by the County.

In the event that a successful agreement cannot be executed, the County reserves the right to proceed with contract negotiations with the other responsive, qualified vendors to provide service as referenced under negotiation process.

Contractors are not to start work until receipt of an Ottawa County Purchase Order, authorizing work to begin. The County's obligation will commence only following the parties' execution of the Contract and the County Board of Commissioners' approval. Upon written notice to the Contractor, the County may set a different starting date for the Contract. The County will not be responsible for any work done or expense incurred by the Contractor or any subcontractor, even if such work was done or such expense was incurred in good faith, if it occurs prior to the Contract start date set by the County.

This contract is for use only by the County, including departments, agencies, or courts of the County of Ottawa.

Section 7 - ITB Terms and Conditions:

By submitting a response, the Vendor confirms that they have read and will comply with the solicitation and all specified ITB terms and conditions listed below.

BID ACCEPTANCE, REJECTION, AND WITHDRAWAL:

The County reserves the right to accept or reject any and all bids submitted if in the best interest of the County. The County also reserves the right to let separate contracts on any aspect of the work.

The County may at its own discretion waive minor irregularities in bids. Minor irregularities are defined as those that have no adverse effect on the outcome of the selection process by giving a Vendor an advantage or benefit not afford to other Vendors. The County may waive any requirements that are not material.

The County may request or require clarification at any time during the bid process or require correction of arithmetic or other apparent errors for the purpose of assuring a full and complete understanding of a bid or to determine a bidder's compliance with the requirements of the solicitation.

After the ITB Deadline, bids may not be withdrawn without the written consent of the County after submission deadline. Bids must be firm and may not be withdrawn for a minimum period of 90 calendar days after the ITB Deadline. Any fees proposed are considered firm and cannot be altered.

BRAND NAME:

If and whenever, in the Specifications a brand name, make, name of any manufacturer, trade name, or vendor catalog number is mentioned it is for the purpose of establishing a grade or quality of material only. However, if a product other than that specified is bid, it is the vendor's responsibility to name such a product within their bid and to prove to the County that said product is equal to that specified. Evidence in the form of samples may be requested if brand is other than specified. Such samples are to be furnished after the date of bid opening only upon request of the County and within a reasonable period of time.

CANCELLATION OF ITB:

The County may, at its discretion and if in the best interest of the County, cancel any proposal or request for proposal or other solicitation in whole or in part. The ITB Administrator will notify vendors of any cancellation.

CHANGES:

The County will have the right to make changes, including additions, deletions, and revisions in the work. Should the County desire to make a change, it will request of the Contractor, either orally or in writing, to submit a written proposal to the County. The Contractor is authorized to proceed with a change in the work only upon execution by the County of a written Change Order.

CLAIMS RESOLUTION:

If the Contractor has a claim against the County, whether on its behalf or including any claim through the Contractor for the benefit of any of its subcontractors or material suppliers, such claim, and the factual basis, therefore, must be submitted in writing to the County within 10 days of the Contractor learning of the claim.

CLEANUP

Contractor will always keep the premises free from accumulations of waste materials or rubbish caused by his employees or work and at the completion of the work they will remove all his or her waste, tools, equipment, staging and surplus materials from the structure and grounds and leave his or her work clean and ready for use. Contractor may not use the County's trash containers. Burning of materials on the site is prohibited.

Contractor will provide for the control of materials, which can leach into the ground. Contractor will remove from the site immediately after the completion of the work all delivered, manufactured, spilled, disposed of, or stored chemicals, lime-based materials, hazardous materials, or toxic substances used on County's property as part of the project or work, or part of the Contract. Contractor will dispose of these hazardous materials and toxic substances in accordance with all laws and regulations. Contractor agrees to indemnify the County against all obligations and liabilities arising out of the claims made or suits resulting from the environmental contamination due to the acts of the Contractor or any subcontractor acting under this Contract. Contractor will ensure that all subcontractors fully comply with these clean-up provisions.

CONFIDENTIALITY:

All responses in entirety, produced by the Bidder, that are submitted to the County will become property of the County and may be considered public information under applicable law. Michigan FOIA requires the disclosure, upon request, of all public records; therefore, confidentiality of information submitted in response to this ITB is not assured.

CONFLICT AND ERRORS:

If the Contractor, in the course of work, finds any conflict or discrepancy between the plans or bid documents and the physical condition of the site, any errors or omissions in the plans or instructions given by the County Project Manager or County's designated representative, it will be the Contractor's duty to immediately inform the County. Work will not proceed on the area in questions until the concerned parties have agreed upon a course of action. Any work done by the Contractor to such resolution will be done at the Contractors risk.

EXECUTION, CORRELATION, INTENT, AND INTERPRETATION OF DOCUMENTS:

By executing the Contract, the Contractor represents that the Contractor has visited the site, familiarized themselves with the conditions under which the work is to be performed, and correlated their observations with the requirements of the Contract or Bid documents.

The intent of the documents is to include all labor, materials, equipment, tools and services necessary for the proper execution and completion of the work. Contractor will make field measurements to verify or supplement dimensions indicated and will assume full responsibility for quantities of material required and accurate to fit all work.

The Contract and related Contract Documents represent the entire and integrated agreement between the County and Contractor and supersedes prior negotiations, representations or agreements, either written or oral.

EXTENSION OF TIME:

If the Contractor is delayed at any time in progress of the work by an unusual, unavoidable or unexpected event beyond the control of the Contractor; by cause of the County, a separate contractor or consultant employed by the County; labor dispute; or by other unforeseeable circumstance, then the Contractor will, upon written application to the designated County representative, be granted a reasonable extension of time or completion of the project. Such application will be made at the time of the delay. Contractor's sole remedy is a reasonable extension of time and Contractor hereby waives any claims for damages by reason of delay.

FORCE MAJEURE:

Neither party to the resulting agreement will be held responsible for delay or default caused by fire, flood, civil disobedience, court, order, labor dispute, acts of God or war which is beyond that party's reasonable control. If either party is unable wholly or in part to carry out its obligations under any resulting agreement, then such party will give notice and full particulars of Force Majeure in writing to the other party within a

reasonable time after occurrence of the event. Such non-performance will not constitute grounds for default.

INCURRED EXPENSES:

The County will not be responsible for any cost or expense incurred by the bidders preparing and submitting a proposal or cost associated with meetings and evaluations of bids prior to the execution of an agreement. This includes any legal fees for work performed or representation by the bidder's legal counsel during any and all phases of the ITB process, any appeal or administrative review process, and prior to County Board approval of a contract award.

INDEPENDENT CONTRACTOR:

The awarded vendor will perform all work and services described herein as an independent contractor and not as an officer, agent, servant, or employee of Ottawa County. The vendor will have exclusive control of and the exclusive right to control the details of the services and work performed hereunder and all persons performing the same and will be solely responsible for the acts and omissions of its officers, agents, employees, contractors, and subcontractors, if any. No person performing any of the work or services described hereunder will be considered an officer, agent, servant, or employee of the County nor will any such person be entitled to any benefits available or granted to employees of the County.

INSPECTION:

Contractor will at all times permit and facilitate inspection of the work by the County. The County will have the authority to stop work, or reject work, in which their opinion does not meet requirements of the Contract. No changes in the work, however, will be made without the approval of the County.

KNOWLEDGE OF REGULATIONS:

Each bidder must familiarize themselves with and conform to all laws, ordinances, and codes that might affect the proposed work in any way and will be responsible for the procurement of and payment for all permits, fees, and licenses necessary for the complete prosecution of work.

LAWS:

This ITB and subsequent contract will be governed by and construed in accordance with the laws of the State of Michigan and any service or product herein will so comply. All persons providing goods or services to Ottawa County will comply with all applicable local, State and Federal laws, rules and regulations specifically including, but not limited to, State of Michigan Executive Orders.

MATERIALS AND WORKMANSHIP:

Unless otherwise specified, all materials and equipment will be new, and all work will be good quality, free from defects and in conformance with the Bid and Contract Documents.

OTHER CONTRACTS:

The County may let other contract in connection with the work. The Contractor will properly connect and coordinate his work with that of other contractors. If any part of the Contractor's work depends for proper results, upon the work of another contractor, the Contractor will promptly notify the County in writing of any apparent discrepancies or defects that will affect his work. Failure to so notify will constitute his acceptance of the other contractor's work.

OWNERSHIP OF DATA:

All information provided by the County and any reports, notes, and other data collected and utilized by the vendor, its assigned employees, or subcontractors, pursuant to any agreement resulting from this ITB, will become the property of the County as prepared, whether delivered to the County or not. Unless otherwise provided herein, all such data will be delivered to the County or its designee upon completion of any work performed or at such other times as the County or its designee may request.

PERMITS, FEES AND NOTICES:

Contractor will give all notices and secure and pay for all permits, fees and taxes required by law for the proper completion of the work. Contractor will comply with all laws, ordinances and codes applicable to the work stated in the bid.

PROJECT CLOSEOUT:

The Contractor will request a meeting with the County to verify substantial completion. After project inspection, County will advise Contractor of any unfulfilled requirements. If requirements remain to be completed, the Contractor will finish the work and request another inspection.

When all requirements of the contract have been met, the Contractor will submit a final payment request to the County for review and approval. Payment by the County will be considered final acceptance. This final acceptance in no way diminishes the right of the County to seek remedies arising from guarantees or other provisions of the contract.

PROJECT MEETINGS:

Pre-construction and construction progress meetings may be scheduled on a regular or "as-needed" basis. Pre-construction meetings will be attended by the Contractor and all

major Subcontractors, as applicable. The Contractor will be represented by a person with the authority to make decisions regarding the project work.

PROTECTION OF PERSONS AND PROPERTY

Contractor will be responsible for protection of County's property and will take care to prevent damage to structures, equipment, utility services, storm and sanitary drainage systems, lawns, trees, plant material, fences, walks, drives, and other improvements in and adjacent to the area of under this Contract. Any damage to County's property resulting from Contractor operations will be repaired or replaced by the Contractor without additional cost to the County.

Contractor will take all known and available measures and employ all techniques for the protection of the site, work in progress, or materials and equipment stored on site from damage, injury or loss from the elements, vandalism, theft or accelerated degradation or depreciation.

RETAINED RIGHTS:

The County reserves the right to use ideas presented in reply to this process notwithstanding selection and rejection of proposals or bids. The County reserves the right to make changes to or withdraw this request at any time.

SUBCONTRACTORS:

Since the contract is made pursuant to the bid submitted by the awarded vendor and in reliance upon the vendor's qualification and responsibility, the vendor will not sublet or assign the contract, nor will any subcontractor commence performance of any part of the work included in the contract without the previous written consent by the County.

The Contractor, as soon as reasonably practical after Contract award, shall furnish in writing to the Owner the names of the persons or entities proposed as subcontractors for each portion of work. The Contractor shall not subcontract with any person or entity with which the Owner has a reasonable objection. The Contractor shall not change subcontractors without the consent of the Owner.

SUBMITTALS:

Contractor will submit all materials as required in the plans and specifications in a timely manner to avoid unnecessary delay and allow reasonable time for review as required.

SUBSTITUTIONS:

Each bidder represents that their bid is based upon the materials and equipment described in the bidding documents. No substitution will be considered unless written request has been submitted to the owner at least three (3) business days prior to the

date for receipt of bids. Each such request will include a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data and other data necessary for a complete evaluation. If the County approves any proposed substitution, such approval will be set forth in an addendum.

SUPERVISION:

Contractor will have adequate supervision at the work site at all times and will have plans and specifications available on the site. Contractor will enforce good order among employees.

SUSPENSION FOR CONVENIENCE:

The County may, with or without cause, order the Contractor in writing to suspend, delay or interrupt the work in whole or part for such period of time as the County may determine. An adjustment may be made for increases in the cost of performance of the Contract for the suspension of work.

TAXES:

Contractor will include and be deemed to have included in their bid and Contract price all Michigan Sales and Use Taxes, currently imposed by legislative enactment and as administered by the Michigan Department of Treasury, Revenue Division, on the bid date.

Section 8 - General Terms and Conditions:

By submitting a response, the Vendor confirms that they have read and will comply with all the general terms and conditions listed below.

For purposes of these General Terms and Conditions, the following definitions apply:

1. "Contract" - The binding agreement between the Contractor and Ottawa County, which consists of the Agreement between the Contractor and the Owner; General Conditions to the Contract; Drawings, Specifications, Addenda issued prior to execution of the Contract; other documents listed in the Agreement; Modifications and Changes or Field Orders issued after execution of the Agreement; and all Bidding Documents including Invitations, Instructions to Bidders, or portions of addenda relating to bidding requirements. The term "Contract" may also be referred to as the "Agreement" and "Contract Documents."
2. "Contractor" - The bidder whose proposal is accepted by Ottawa County
3. "Owner" - The term owner refers to Ottawa County or its authorized representative.
4. "Landscape Architect" – The term Landscape Architect refers to the landscape architecture staff of the Ottawa County Parks & Recreation Commission or its authorized representative.
5. "Project" - The total construction of work as described by the plans and specifications performed under the Contract Documents.
6. "Work" - All labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

BACKGROUND CHECKS:

As required by the Facility, Contractor employees are subject to background checks to ensure, at a minimum, that no employee has a felony or domestic violence or other bar-able conviction(s). The background checks for Contractor employees will be conducted by the County prior to the commencement of any on-site work.

CLAIMS RESOLUTION:

NOTICE: If the Contractor has a claim against the Owner, whether on its own behalf or including any claim through the Contractor for the benefit of any of its subcontractors or material suppliers, such claim, and the factual basis therefore, must be submitted in writing to the Owner within 10 days of the Contractor learning of the claim.

Alternative Dispute Resolution: The Contractor and the Owner acknowledge and wish to implement a method of resolving some disputes which may arise during the project in a manner intended to be more efficient and less expensive than litigation. Notwithstanding the provisions set forth below, the parties may agree to any legal means and methods for resolving a claim or dispute. In absence of mutual agreement to the contrary, however, the contractual provisions described below will control.

If the parties pursue a claim upon a project for which the Owner retained an architect or engineer to serve as the design professional, and 1) both parties agree that the design professional bears no fault, responsibility or active involvement in the dispute, and 2) the claim is in an amount less than Twenty Thousand (\$20,000.00) Dollars, exclusive of interest, then both parties shall agree on a mediator, who shall investigate the facts, interview parties and witnesses, convene a meeting(s) if necessary, and take other measures it may deem appropriate, so to determine the outcome of the claim, and announce its determination to the parties within 30 days after the claim is submitted. The determination of the mediator shall be binding upon the parties, final and with no recourse or appeal to courts or other tribunals. The determination if not voluntarily implemented and/or paid by the parties shall be capable of being entered as a judgment pursuant to MCL600.500 and MCR 3.602. The cost of the mediator shall equally by the parties.

If, 1) either of the parties contend that the design professional bears some fault, responsibility or active involvement in the dispute, or 2) the parties have a claim pertaining to a project for which no design professional was retained by the Owner, and the claim is in an amount less than Twenty Thousand (\$20,000.00) Dollars, exclusive of interest, then the parties may demand arbitration pursuant to the American Arbitration Association and its rules and procedures for construction disputes, shall govern.

Litigation: If either party has a claim in an amount greater than Twenty Thousand (\$20,000.00) Dollars, the parties will avail themselves, if necessary, to their traditional rights as litigants in a court of law. The parties acknowledge that venue is proper in Ottawa County and that Michigan law shall govern all issues.

No Indirect Claims: The Contractor acknowledges that subcontractors and material suppliers have no direct claims, whether in contract or tort, law or equity, against the Owner ("indirect claim"). The Contractor indemnifies the Owner for any and all damages and expenses incurred, including actual attorney fees, by the Owner in defending indirect claims.

CONFLICT OF INTEREST:

By submission of a response, the Bidder agrees that at the time of submittal, they: (1) have no interest (including financial benefit, commission, finder's fee, or any other

remuneration) and will not acquire any interest, either direct or indirect, that would conflict in any manner or degree with the performance of Bidder's services, or (2) will not benefit from an award resulting in a "Conflict of Interest."

DEBARMENT AND SUSPENSION:

The Contractor certified to the best of its knowledge and belief, that the corporation, LLC, partnership, or sole proprietor, or its' principals, Countys, officers, shareholders, key employees, directors and member partners: (1) are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency; (2) have not within a three-year period preceding this form been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; (3) are not presently indicted for or otherwise criminally charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in (2) of this certification; and, (4) have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

DEFAULT

If Contractor defaults on the resulting contract, after the designated Cure Period, the County may do one or more of the following: (A) Exercise any remedy provided by law; (B) Terminate the resulting contract any related contracts or portions thereof; (C) Impose liquidated and other damages; or (D) Suspend Contractor from receiving future solicitations.

EMPLOYEE:

The Contractor and all Contractor' employees, while on County premises, shall carry proper identification. Examples of proper identification are State-Issued Driver's License or State-Issued Identification Card.

EQUAL EMPLOYMENT AND OPPORTUNITY:

Every contract or purchase order issued by the County is entered into under provisions requiring the contract, subcontractor or vendor not to discriminate against any employee or applicant for employment because of his/her race, religion, sex, color, national origin, height, weight, familial status, or disability that is unrelated to the individual's ability to perform the duties of a particular job or position.

Contractors and their subcontractors, as required by law, will not discriminate against the employee or applicant for employment with the respect to hire, tenure, terms, conditions or privileges of employment, or a matter directly relating to employment, because of race, color, religion, national origin, familial status, age, sex, height, weight, or disability that is unrelated to the individual's ability to perform the duties of a particular job or position. Breach of this covenant may be regarded as a material breach of the Contract.

The Vendor will adhere to applicable Federal, State and local laws, ordinances, rules and regulations prohibiting discrimination.

GUARANTEE:

Contractor shall furnish to the Owner a written guarantee to remedy any defect due to faulty materials or workmanship which appear in the work within one year from date of final acceptance by the Owner unless a longer period is provided otherwise in the Contract Documents.

INDEMNIFICATION:

Contractor agrees to indemnify, defend, and hold harmless the County and its officials, officers, employees, volunteers, and agents from and against any and all liability arising out of or in any way related to Contractor's performance of services under this Contract, including, but not limited to, any and all liability resulting from or arising out of intentional reckless, or negligent acts or omissions of the Contractor, its employees, agents or subcontractors.

INSURANCE:

Vendor will provide proof of the following coverages: worker's compensation, employer's liability, comprehensive general liability and if applicable, automobile, and professional malpractice. Coverage limits are to be statutory and if no statute is applicable, at least \$1,000,000 per occurrence or claim and \$2,000,000 aggregate. These limits may be provided in single layers or by combinations of primary and excess/umbrella policy layers. These coverages will protect the vendor, and County and their employees, agents, representatives, invitees, and subcontractors against claims arising out of work performed or products provided. The County and its elected officials, officers, employees, agents, and volunteers are to be additional insureds and a thirty-day notice is required to the County in the event of coverage termination.

IRAN-LINKED BUSINESS:

Pursuant to State of Michigan, Iran Economic Sanctions Act, 2012 P.A. 517, MCL 129.311 seq., the Contractor certifies, under civil penalty or false certification, that it is fully eligible to do so under law and that it is not an "Iran-linked business."

LIQUIDATED DAMAGES:

Liquidated Damages shall be withheld from payment requests in the amount of Two Hundred and fifty dollars (\$250.00) for each day of suitable working weather excluding Sundays and Legal Holidays that the contractor exceeds the specified date of completion. The damages are intended to compensate for losses incurred by the Owner and are not intended as a penalty or to punish.

MATERIAL SAFETY DATA SHEETS:

All County purchases require a Material Safety Data Sheet (MSDS) where applicable in compliance with MIOSHA "Right to Know" Law. Vendor will forward all relevant Material Safety Data Sheets to the designated County Representative upon request.

PAYMENT TERMS:

The Owner shall make monthly payments to the Contractor based upon the Contractor's application for payment to the Landscape Architect and a recommendation for payment to the owner by the Landscape Architect.

Applications for payment must be received by the Landscape Architect by an agreed upon schedule and if approved, the Owner shall make progress payments within forty five days of approval by the Landscape Architect.

Applications for payment shall include the percentage of work completed for the various portions of the work during the period covered by the application for payment. Applications shall include a schedule of itemized costs and quantities and other data to substantiate its accuracy as required by the Landscape Architect. If payment is requested for stored materials, copies of invoices showing actual payments made shall be submitted to substantiate such request. The amount of each progress payment shall be paid less ten-percent (10%) retained by the owner pending final determination of cost to the Owner and satisfactory evidence that all conditions of the contract documents have been completed. This amount may be reduced as the project proceeds by mutual agreement between the owner and the contractor.

Final payment, including the unpaid balance and retained amount will be made by the Owner to the Contractor following receipt of the final application for payment; satisfactory evidence that all payrolls, material bills and other indebtedness connected with the work have been paid; receipt and approval of all warranties, guarantees, certificates, as-built drawings, operating instructions, consent of surety, and other documents and conditions required by the contract documents; and final acceptance of the work has been given by the Owner.

The Owner may withhold all or portions of progress or final payments to protect against loss because of the following conditions:

- A. Defective work not remedied.
- B. Third party claim or evidence indicating probable filing of such claim.
- C. Failure of the Contractor to make payments due subcontractors or suppliers.
- D. Damage to the Owners or another contractor's property.
- E. Failure of the Contractor to complete work in accordance with approved project schedule.
- F. Failure of the Contractor to carry out the work in accordance with this Contract.
- G. Evidence that the work cannot be completed for the unpaid balance of the Contract Sum.

When the above grounds are removed, payments withheld shall be made.

Payment terms will be Net 30 unless otherwise mutually agreed upon by all parties.

RIGHT TO AUDIT:

The Vendor will maintain such financial records and other records as may be prescribed by Ottawa County or by applicable federal and state laws, rules, and regulations. The Vendor will retain these records for a minimum period of three years after final payment, or until they are audited by the County of Ottawa, whichever event occurs first. These records will be made available during the term of the contract and the subsequent three-year period for examination, transcription, and audit by Ottawa County, its designees or other authorized bodies.

ROYALTIES AND PATENTS:

Contractor shall pay all royalties and license fees, shall defend all suits or claims for infringement of any patent rights, and shall save the Owner harmless from loss on account thereof.

SAFETY:

All Contractors and Subcontractors performing services for the County are required to and will comply with all Occupational Safety and Health Administration (OSHA), State and County Safety and Occupational Health Standards and any other applicable rules and regulations. Also, all Contractors and Subcontractors will be held responsible for the safety of their employees and any unsafe acts or conditions that may cause injury or damage to any persons or property within and around work site area under this Contract.

SUBMITTALS:

Submit all materials as required in the plans and specifications in a timely manner to avoid unnecessary delay. Allow reasonable time for review as required. Submit the following items and materials at the times and in the forms as listed below:

A. Prior to the Pre-construction Meeting

1. Construction Schedule: a bar-chart type progress schedule showing each major category or unit of work along with its starting and ending dates as well as its sequencing with the other elements of work.
2. List of Subcontractors, including approximate values of their respective work items
3. List of Major Suppliers
4. Schedule of Values: a listing of construction elements and other cost items making up the contract amount. The listing shall be approved by the landscape architect and be of sufficient detail to be useful in determining percentage of completion for payment requests.

B. As Required during Construction:

1. Shop Drawings: submit a minimum of three (3) copies of all shop drawings for fabricated items of work or as indicated in the specifications for review and approval prior to commencement of that work. Shop drawings shall clearly and accurately illustrate every aspect of the item of work including dimensions, types of materials, accessories, and finishes. Subcontractor drawings shall be submitted through the Contractor and shall be checked and approved by the Contractor prior to submittal to the Landscape Architect. Drawings shall be clearly marked with the project name. Two copies will be retained by the Landscape Architect, and the remainder returned to the contractor.
2. Product Data and Samples: Submit information and samples for all items indicated as requiring clarification or to determine acceptability of a given product. Include the name of the source, specific product characteristics and all other relevant information. Samples should be of sufficient size to be easily evaluated.

C. Prior to Final Acceptance

1. As- built Drawings: A complete set of full size drawings clearly and accurately showing where actual construction was different from what was originally shown. Clearly and accurately dimension elements as required with contrasting colors. Give particular attention to concealed elements that would be difficult to measure or record at a later date.
2. Maintenance Information: Provide the owner with copies of all relevant information for the operation and maintenance of the finished project. This

information may include emergency instructions, spare parts lists, product data, etc.

3. Extra Materials
4. Guarantees
5. Consent of Surety
6. Permit Certifications (if required)
7. Other items as determined at Substantial Completion

TAX EXEMPT ENTITY:

The County is exempt from Federal Excise and State Sales Tax. Do not include such taxes in the proposal. The County will furnish the successful proposer with tax exemption certificate when requested.

TERMINATION FOR BREACH:

The Owner may terminate this contract when the approved progress schedule or any other requirement of this Contract is not met. In the event of such termination, the Owner may complete the contracted work and the Contractor will be liable for any excess cost occasioned by the Owner thereby and in such case the Owner may take possession of and utilize in completing the work such materials and equipment as may be on the site and necessary therefore.

TIME:

Unless stated otherwise, the Contract time is that period specified in the proposal and Agreement Form, including authorized adjustments. The date of commencement of the work is the date established by Notice of Commencement, given by the Owner. The date shall not be postponed by failure to act of the Contractor or of persons or entities for which the Contractor is responsible.

Times stated in the Contract are of the essence of the Contract. By executing this agreement, the Contractor ratifies that the Contract times and requirements are reasonable for performing the work.

WARRANTY:

Vendor warrants that the goods or services supplied will be good workmanship and material, free from defects, and if the intended use thereof is known to the seller, that they are suitable for the intended use. Awarded vendor will transfer all applicable manufacturer warranties to the County and agrees to coordinate all claims on the County's behalf.

Exhibit 1 - Project Specifications

01000 GENERAL SITE REQUIREMENTS

01000.1 GENERAL

1.1 INCLUDED PROVISIONS – The General Conditions as they apply to this work.

1.2 PROTECTION

- A. The owner desires that the spread of invasive species be minimized as much as possible. Therefore, all earth moving or similar equipment must be thoroughly washed before being transported to the project site.
- B. Maintain all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed.
- B. Provide approved barricades around trees, shrubs, or other plant life to protect and preserve them during construction.
- C. Protect improvements on the owner's property that are to be preserved. If damaged or destroyed, restore or replace to original condition as acceptable to owner.

1.3 LAYOUT AND STAKING

- A. Layout and grade staking shall be the responsibility of the contractor.
- B. Layout staking shall be approved by the Landscape Architect prior to commencing construction. Any errors or discrepancies in the dimensioning or layout information given on the plans shall be reported to the Landscape Architect immediately. Work completed prior to approval or without resolution of an error or discrepancy may be rejected.
- C. Subcontractors shall verify all staking as it applies to their work and imply acceptance and willingness to correct errors resulting from this staking if work is started.
- D. Work indicated as being laid out in the field shall be staked by the contractor to best approximate the location shown on the plan adjusting to best fit field conditions. After this initial staking, the contractor shall provide on-site assistance to the Landscape Architect to approve or modify final staking locations.

1.4 EXISTING UTILITIES

- A. The contractor shall be responsible for notification to MISS DIG utility alert for location of public utility lines in construction areas. Repairs required because of failure to fulfill this location requirement shall be the responsibility of the contractor.

1.5 TEMPORARY UTILITY SERVICES

- A. The contractor shall provide all required utility and sanitary services and facilities to complete the project. The Owners services and facilities may be used with prior permission.

1.6 FIELD OFFICE

- A. A field office is not required for this project.

1.7 FIELD DOCUMENTS

- A. A minimum of two (2) complete sets of construction documents shall be available on the site at all times that work is occurring. One set shall be used for general reference. The second set shall be used as to record all changes made in the field during the course of construction. This set will be used to create a final set of as-built drawings for the Owner.
- B. Copies of all required permits shall be kept on site at all times.

1.8 PROJECT SIGN

- A. A project sign is not required.
- B. A sign may be installed at the contractor's expense. If a sign is to be installed it must include the project name, Owners name, any design consultants names, and the Contractor's name. It may also include any subcontractors. The sign layout and proposed location shall be approved by the owner prior to fabrication and installation.

1.9 QUALITY CONTROL

- A. The contractor shall be responsible for all testing required to assure that materials and construction techniques meet the requirements of the specifications. This may include, but is not limited to, compaction testing and concrete cylinder testing.
- B. At the owner's discretion, additional testing by an independent testing laboratory may be performed at any time. The contractor shall reconstruct or otherwise repair any piece of work that the testing shows to be below the specified requirements.

END OF SECTION

02100 SITE PREPARATION AND REMOVALS

02100.1 GENERAL

- 1.1 INCLUDED PROVISIONS – The General Conditions as they apply to this work.
- 1.2 PROTECTION
 - A. Maintain all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed.
 - B. Provide approved barricades around trees, shrubs, or other plant life to protect and preserve them during construction.
 - C. Protect improvements on the owner's property that are to be preserved. If damaged or destroyed, restore or replace to original condition as acceptable to owner.
- 1.3 DESCRIPTION – This section of work includes:
 - A. Removal of trees and under story brush.
 - B. Removal of miscellaneous structures and other items as shown on the removal items plan.

02100.2 PRODUCTS

- 2.1 BARRICADES- Heavy timber or approved equivalent.

02100.3 EXECUTION

- 3.1 CLEARING AND GRUBBING
 - A. In areas where fill or construction is planned, remove vegetation (including sod), improvements or obstructions, not indicated to remain. Remove such items elsewhere on the site as specifically indicated. Removal includes all stumps and roots.
 - B. When constructing new walks and trails, carefully and cleanly cut roots and branches of trees indicated to be left standing. Use only hand methods for grubbing inside the drip line of these trees.
 - C. Remove trees, saplings, shrubs, bushes, vines, stumps and roots to a minimum of 18" below grade in paved areas. Treat stumps to prevent future growth. Remove all stumps and other debris from the site. No burning of this material will be permitted. Trees or shrubs not identified to be removed which are inadvertently damaged shall be repaired with an application of tree paint in accordance with the manufacturer's latest written instructions or replaced if not repairable.
 - D. Fill depressions caused by clearing and grubbing operations with approved soil material, unless further excavation or earthwork is indicated.

- E. Place fill material in maximum 6" layers and thoroughly compact. Refer to Section 02200.

3.2 DISPOSAL

- A. Unless specifically designated otherwise, waste and surplus materials including merchantable timber, shall become the property of the Contractor.
- B. Remove waste such as surplus or unsuitable excavated materials, merchantable timber, trash, debris and vegetation from the Owner's property and dispose legally.
- C. Do not store or burn on site any materials to be disposed.

END OF SECTION

02200 EARTHWORK

02200.1 GENERAL

- 1.1 INCLUDED PROVISIONS – The General Conditions as they apply to this work.
- 1.2 SUB-SURFACE SOIL DATA- Soil boring data has been provided by the owner but is not guaranteed to be continuous over the entire site. Contractor, at his option, may conduct his own investigation of existing soils.
- 1.3 QUALITY CONTROL- Refer to MDOT Standard Specification for Construction, latest published edition for materials, methods and standards.
- 1.4 DESCRIPTION – This work includes excavation, stockpiling and on-site redistribution of topsoil; excavation and removal of unsuitable soils; excavation for footings and structures; rough and finish grading to approved grade stakes; placement of new soil or aggregate materials; and all other grading and excavation operations as required for complete construction as shown on the plans

02200.2 PRODUCTS

- 2.1 IMPORTED FILL MATERIAL – Not required. Use clean sand or other suitable on-site fill material free of frost, ice, cinders, ashes, refuse, sod, roots, boulders, rocks, and chunks of concrete or other organic or inorganic materials.
- 2.2 GRANULAR FILL - Clean sand; MDOT 8.02.06, granular material Class II. limited to 1" maximum size.
- 2.3 BASE AND SUBBASE MATERIALS – MDOT designated material as shown on plans and details.
- 2.4 TOPSOIL - The surface layer of soil reasonably free from subsoil, roots, debris, or any other material detrimental to plant growth. Topsoil should be classifiable as a loam, silt loam, silty clay loam or clay loam according to the USDA soil texture chart. It shall have a ph range of between 5.5 and 7.0 and an organic content between 3% and 20% as determined by the wet combustion test. If topsoil is to be imported to the site, representative samples of the soil shall be professionally tested at a laboratory

approved by the landscape architect for conformance to the above requirements as well as a nutrient analysis.

- 2.5 SOIL EROSION CONTROLS – Soil erosion control products shall be suitable to comply with the requirements of the Michigan Soil Erosion & Sedimentation Control Act.

2200.3 EXECUTION

3.1 COMPACTING EQUIPMENT

- A. For predominately granular soil placed in up to 12” lifts: heavy duty, rolling drum, vibrating compactors.
- B. For predominately granular soil placed in not more than 8” lifts: pneumatic tired, wobble wheel rollers, loaded to not less than 325 lbs. per rated inch of tire width.
- C. For Compacting in small or tight areas: in granular soil use hand operated vibrating compactors, and in clay soil use Barco rammer type.
- D. For predominantly clay soils use sheep’s-foot roller or other suitable equipment.

3.2 PREPARATION

- A. Site limits are as indicated on the drawings where solid (proposed) contour lines indicate a change of the existing grade
- B. Install soil erosion controls as indicated on the drawings.
- C. Remove topsoil to depth at which subsoil is encountered under pavements and from areas which are to be cut to lower grades.
- D. Where trees are indicated to be left standing, stop topsoil stripping at a sufficient distance (drip line) to prevent damage to the main root system.
- E. Stockpile topsoil suitable for redistribution for finish grading at a convenient location, but with approval of the Owner.

- 3.1 GRADING- Finish grades are indicated on the Drawings with solid contour lines and/or spot elevations. Rough grades shall be established to allow for finish grades as specified herein.

3.2 EXCAVATING

- A. Excavate to elevations and dimensions indicated or required, plus sufficient space to permit erection of forms, etc. Bottoms of excavations shall be level and true to the grades indicated.
- B. Provide dewatering equipment, if necessary, to keep areas free of water. Discharge water a sufficient distance from excavations to prevent runback drainage. Avoid excessive removal of fine aggregate.
- C. Organic soil in the subgrade shall be excavated to firm soil or to 12” depth and replaced with MDOT class II sand compacted.
- D. If it is found necessary to excavate deeper than indicated in order to reach firm ground, do said work only after stipulating the cost and obtaining written approval from the Architect and Owner.

- E. Test bottom of excavation for minimum 2500 psf soil bearing pressure. If capacity test fails, compact to a depth of 5' with minimum two passes of a min. 10-ton vibratory roller and retest or overexcavate to reach soil with this capacity.

3.3 CONTROLLED FILL

- A. Compact fill to at least 95% Modified Proctor density (ASTM D1557) under bituminous and concrete paving and at least 85% Modified Proctor in lawns and other noncritical areas.
- B. Fill excavations in 6" layers maximum with approved granular material. Compact to required density and test prior to placing subsequent layer, until desired rough grade is achieved.
- C. Place no fill following a heavy rain without first making certain on isolated test area that compaction can be obtained without damage to the already compacted fill.
- D. Compact fills within 25% of the percentage at optimum moisture content. i.e., if optimum moisture content is 10% fill can be compacted at from 7.5% to 12.5% moisture. If fill is too wet, provide approved means to assist the drying of the fill until suitable for compaction. If fill material is too dry, provide approved means to add moisture to the fill layers. Avoid washout of fine aggregate.
- E. Use compacting equipment as specified. Other suitable compacting methods capable of producing equivalent results may be used with the approval of the testing lab and the Architect.

3.4 TOPSOIL DISTRIBUTION

- A. Redistribute the stockpiled topsoil to the final contours indicated. Remove unsuitable extraneous material which might hinder the fine grading operations including sticks, roots, stones 3/4" diameter and larger, clumps of soil or sod left over from stripping operations.
- B. Topsoil in excess of that which can be used on the site shall be graded smooth on the site at a location approved by the Owner.
- C. Where no grades are shown, areas shall have a smooth and continual grade between existing or fixed controls (such as walks, curbs, catch basins, elevations at steps or

building) and elevations shown on plans. All finish grades shall meet the approval of the Owner and Architect.

- D. Debris resulting from this work shall be removed from the site and properly disposed of by the Contractor.

3.5 PREPARATION OF PAVEMENT SUBGRADE AND BASE

- A. Prior to placing fill, strip areas of topsoil, prepare existing grade to a depth of 12" from the surface by compacting to same density as the fill it is to receive and test compaction. Correct deficient areas as specified under CONTROLLED FILL.
- B. Shape subgrade surface to drain to edge of pavement or underdrain system.
- C. Compact and test final shaped subgrade to verify 95% of modified Proctor has been achieved to a 12" minimum depth. Final compacted subgrade shall allow for specified minimum thickness of base material and final surfacing..
- D. Construct in minimum of 2 courses. In no instance shall the depth of any one layer be greater the 4" when screeded with an approved maintainer or motor patrol grader until the gravel surface is smooth and evenly distributed.
- E The screeding and leveling shall be done in combination with rolling by a tamping type, vibrating type or pneumatic type roller until each layer is thoroughly consolidated (95% Modified Proctor). Sprinkling to aid compaction will be allowed.

END OF SECTION

02513 BITUMINOUS PAVING

02513.1 GENERAL

- 1.1 INCLUDED PROVISIONS – The General Conditions as they apply to this work.
- 1.2 SCOPE – This section of work includes all labor, equipment and materials necessary for complete construction and placement of bituminous paving as shown on the plans and details.
- 1.3 SUBMITTALS
 - A. Bituminous mix design for approval by landscape architect.
- 1.4 QUALITY ASSURANCE
 - A. Comply with State highway or transportation department standard specifications, latest edition, and with local governing regulations if more stringent than herein specified.
- 1.5 SITE CONDITIONS
 - A. Weather Limitations: Apply prime and tack coats with ambient temperature is above 50F (10C), and when temperature has not been below 35F (1C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture. Construct bituminous surface course when atmospheric

temperature is above 40F (4C), and when base is dry. Base course may be placed when air temperature is above 30F (-1C) and rising.

- B. Grade Control: Establish and maintain the required lines and elevations including crown and cross-slope for each course during construction operations.

02513.2 PRODUCTS

2.1 BITUMINOUS MIXTURES

- A. Unless otherwise indicated on the plans, all mixtures shall conform to the requirements of the current Michigan Department of Transportation (MDOT) Standard Specification, current edition.
 - 1. Base Course: Mixture no. 2B or 2C.
 - 2. Leveling Course: Mixture no. 13A.
 - 3. Top Course: Mixture no. 13A or 36A as specified on plans
- B. Bituminous mixtures shall be prepared in accordance with the current MDOT standard specification.

2.2 PRIME COAT AND TACK COAT

- A. When specified, prime coat will be MDOT MS-OP and tack coat will be MDOT SS-1h.

02513.3 EXECUTION

3.1 CONSTRUCTION METHODS

- A. Construction methods to be used for placing bituminous mixtures shall conform to the requirements of the current MDOT Standard Specification for Construction, unless indicated otherwise on the plans.
- B. Equipment: As per MDOT requirements.

END OF SECTION

03300 CAST IN PLACE CONCRETE

03300.1 GENERAL

1.1 INCLUDED PROVISIONS – The General Conditions as they apply to this work.

1.2 QUALITY CONTROL

A. Codes and Standards:

1. ACI-301 “Specifications for Structural Concrete for Buildings”; ACI-304 “Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete”; ACI-311 “Recommended Practice for Concrete Inspection”; ACI-318 “Building Code Requirements for Reinforced Concrete.”
2. American Society for Testing and Materials (ASTM), latest edition for each classification.
3. MDOT – Standard Specifications for Construction, Current Edition.

B. Submittals:

1. Certification of quality by producer of the following
 - a. Cement
 - b. Aggregates
2. Concrete Test Specimen – submit testing results
3. Concrete Mix Design – provide job-mix formula

1.3 STORAGE OF MATERIALS – For site mixed concrete store cement on platform off ground and protect against the elements. Handle and store aggregates separately in a manner to prevent the intrusion of foreign material. Protect all reinforcement until used. Use no frozen materials or any hardened cement. Deliver and store manufactured materials in original unbroken and undamaged packages clearly marked with the brand

and maker's names. Completely remove damaged or deteriorated materials from the job.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Protect freshly placed concrete from heavy rain or snow.
- B. Concrete delivered to site when ambient air temperature is below 40 degrees shall arrive with a temperature of 60 to 90 degrees.

3300.2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: Portland Cement, ASTM C-150, Type I, or ASTM C-595, Type IP.
- B. High Early Cement: Portland Cement, ASTM C-150, Type III.
- C. Air Entrained Cement: Portland Cement, ASTM C-150, Type IA, or ASTM C-595, Type IP(A).
- D. Fine & Coarse Aggregates: Per ASTM C-33, limestone.
- E. Water: Clean, free of oil, acids, organic matter, potable.
- F. Air-Entraining Admixture: ASTM C-260.
- G. Water-Reducing Admixture: ASTM C-494, Type A. (Use admixtures only when specifically authorized by Architect).

- 2.2 SYNTHETIC FIBER REINFORCING – ¾" long 100% virgin homo polymer polypropylene fibrillated fibers as manufactured by Fibermesh Company. 125 Meridan, Dearborn, Michigan, (313) 278-7205, by Forta Corporation, 100 Forta Drive, Grove City, Pennsylvania 1 (800) 245-0306, or approved equivalent.

2.3 SURFACE TREATMENTS

- A. General: Selections based on products of Sonneborn Building Products. Equivalent products of Master Builders, W R Meadows, or Cormix Construction Chemicals may be submitted for Architect's approval.
- B. Curing compound for exposed concrete surfaces scheduled to receive no other finish: KURE-N-SEAL 0800; ASTM C-309 Type 2, white, membrane forming, with a minimum acrylic solids content of 15%.

- 2.4 CONCRETE FORMS – Plywood, lumber, metal or other acceptable material. Lumber, if used to be 6" or wider by 1" nominal thickness, dressed on at least 2 edges and one side for tight fit.

- 2.5 FORM COATINGS – Commercial formulation form coating compound that will not bond with, stain, or adversely affect concrete surfaces, and will not impair subsequent

treatment of concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds. Coatings containing mineral oils, waxes, petroleum or other nondrying ingredients will not be permitted. Approved as a basis of quality is CAST OFF as manufactured by Sonneborn Building Products. Equivalent products of NoxCrete Co., Arcal Chemical Corp., Industrial Synthetics Co., W R Meadows, Symons, Crescent Chemical Co. or equal may also submit products for architect approval.

- 2.6 REINFORCING BARS – ASTM A-615 Grade 60, epoxy coated.
- 2.7 WELDED WIRE FABRIC - ASTM A-185, wire size and spacing as noted on drawings.
- 2.8 REINFORCEMENT ACCESSORIES – Provide spacers, chairs, ties, and similar items as required for spacing, assembling, and supporting reinforcement in place. All accessories shall be galvanized steel or approved plastic accessories, conforming to the

applicable requirement of CRSI Standards. Wood, wood stakes, brick, etc. are not acceptable.

- 2.9 TIE WIRE – 16 gauge or heavier black or galvanized steel ASTM A-82 where noted or specified.

2.10 OTHER MATERIALS AND ACCESSORIES

- A. Premolded Expansion Joint Filler Strips: Closed cell polyethylene, ASTM D545. Sonneborn SONOFLEX F. Equivalent products from W R Meadows or equal may be submitted with Architect's approval.
- B. Isolation Joint Material: No. 15 building felt.
- C. Joint Sealer: Two component, cold poured, ASTM C 920, Type M, Grade P, Class 25. Sonneborn SONOLASTIC SL-2, W R Meadows GARDOX, or Tremco THC-900/901, in Architect's choice of colors.

3300.3 EXECUTION

3.1 REINFORCEMENT FABRICATION

- A. Per the details indicated on the Drawings, and approved shop drawings. Where specific details are not shown or noted, comply with the applicable requirements of the specified codes.
- B. Accurately bend, cut, and place bars as indicated on the drawings. Bend cold; heating of bars will not be permitted. Do not bend or straighten in any manner that will injure the material.

3.2 REINFORCEMENT PLACING

- A. Cleaning: Remove loose rust and mill scale, earth and other materials which reduce or destroy bond with concrete.
- B. Re-Bars: Set in place, space, and rigidly and securely tie at all crossing points and intersection in the position shown, or as directed. Do not use nails driven into forms as spacers or anchors. Set wire ties so ends are directed into concrete away from concrete surfaces. Position to obtain at least the minimum concrete coverages as specified by the referenced standards. Space chairs and accessories in conformance with CRSI'S "Recommended Practice for Placing Bar Supports." No wood permitted inside forms.
- C. Splices: Provide standard splices by lapping bar ends in compliance with ACI 318 for minimum laps, but in no case less than 12". Wherever possible, stagger splices

of adjacent bars. Place bars in contact and tightly tie with wire, weld or use mechanical connectors as required.

- 3.3 WIRE FABRIC – Furnish in as long lengths as practicable and wire at all laps and splices. Lap 10” minimum. Offset end laps in adjacent widths. While concrete is being placed, lift fabric into position.

3.4 CONCRETE

- A. Batch, mix, and transport ready-mixed concrete in accordance with ASTM C-94.
- B. Site-mixed concrete to comply with ACI 301-7.2.
- C. Concrete shall be air entrained by either the use of air-entraining cement or an admixture. Total air content: 4% - 6%.
- D. Minimum cement content shall be 5 ½ sack or 517 pounds per cubic yard. Maximum water/cement ratio shall be 0.446 by weight.
- E. Strength: 3,500 P.S.I. @ 28 Days and Max. Slump 3” per ASTM C-143.
- F. Synthetic fiber reinforcing, if specified, shall be incorporated in strict accordance with the manufacturer’s instructions at the rate of 1 ½ pounds per cubic yard of concrete.
- G. Mix concrete in such quantities as are required for immediate use and place while fresh, before loss of slump occurs. Re-tempering (adding water to restore slump lost during excessive mixing or due to too long an elapse of time since initial mixing) will not be permitted.
- H. The use of admixtures, salts, and chemicals to prevent freezing of concrete is prohibited.

3.5 CONCRETE PLACING

- A. Place around reinforcement, joints, and embedded items per ACI 301 and 318.
- B. Handle from mixer to place of final deposit in carts, buggies, or conveyors. Do not spout or deliver by trough or dump carts with a free fall of more than 3’. Avoid the separation or loss of ingredients.
- C. Remove construction debris and extraneous matter from within the forms. Remove struts, stays, bracing and blocks, serving temporarily to hold the forms in correct shape and alignment, when the concrete placing has reached an elevation rendering them unnecessary. Place Concrete on clean, damp surfaces, free from water, or upon properly consolidated fills, but never upon soft mud or dry porous earth. Deposit concrete in approximately horizontal layer, (not to exceed 18” in thickness) to avoid flowing along the forms. Carry on placement at a rate such that concrete

surfaces not yet to grade will not have reached their initial set before additional concrete is place.

- D. Apply mechanical vibration directly to freshly placed concrete with sufficient duration to accomplish thorough compaction and complete embedment of reinforcement and fixtures. Avoid segregation of mix with excess vibration.

- 3.6 NEW CONCRETE ON SET CONCRETE – Before depositing new concrete on or against concrete which has set, reset forms, thoroughly roughen the surface of the set concrete and remove all foreign matter and laitance. Saturate the surface with water, slush with a coat of mortar grout and place new concrete while grout is still soft.

3.7 PATCHING AND FINISHING

- A. After removal of forms, immediately and before surface is dry, patch all poor joints, voids, honeycomb, tie holes, etc., in accordance with ACI 301, Chapter 9.
- B. Remove all fins and projections on concrete exposed to public view.
- C. Finish all exposed concrete work as indicated on details

3.8 CURING

- A. Cure exposed concrete surfaces immediately after finishing. Unexposed surfaces within formwork need not be cured provided forms remain in place at least 7 days.
- B. Apply curing compound to surfaces as specified in part 2 of this section. Follow manufacturer's directions.

3.9 SPECIFIC ITEMS FOR CONCETE FLATWORK

- A. Place slabs on an approved sand cushion as specified in Section 02200, EARTHWORK. Before placing concrete, remove loose earth, lumps, foreign substances, trash, snow, ice and standing water. Do not place while frost is in or on ground. Place concrete on dampened sand cushion.
- B. Provide expansion joints at slabs to remain exposed to the exterior wherever abutting vertical surfaces and in a 90 deg. Crossing pattern 40' on center maximum each way unless specifically indicated otherwise on Drawings. Place control joints evenly between expansion joints each way so areas without joints do not exceed 100 s.f. unless otherwise indicated on the Drawings. . Provide control joints across walks at maximum intervals of 10', and divide walk with control joints into rectangular areas the length of which shall not exceed 1-1/2 times the width
- C. Pour concrete in thickness indicated. Install reinforcement 2" from top of slab unless otherwise noted. Screed to required level.
- D. Form expansion joints in slabs with premolded expansion strips set in concrete with top held 1/2" down from surface. After concrete has cured, fill joint with joint

sealer following manufacturer's directions. Clean excess sealer off adjacent surfaces.

- E. Accurately level surface of all flatwork so that any deviation is within 1/8" from a 10' straight edge.
- F. Slope slabs uniformly to drain per plans or @ 1.0% minimum.
- G. Do not add water, cement, or cement /sand mixtures to surfaces as an aid to troweling.
- H. After screeding, float slab surfaces. Finish to a nonslip surface with medium brooming at right angles to traffic.

END OF SECTION

Exhibit 3 - Contract Example



OTTAWA COUNTY CONTRACT FOR xxx

This AGREEMENT is made and hereby effective on the _____ day of _____, 20____ by and between the County of Ottawa, a municipality in the State of Michigan, (hereinafter, the "County") acting by and through its duly elected Board of Commissioners, (hereinafter the "Board"), and xxx (hereinafter, "Contractor"), with a principal place of business at xxx.

IT IS HEREBY AGREED AS FOLLOWS:

1. **Scope of Work:** Contractor agrees to provide the "Services" which as detailed in Exhibit A. It shall be the responsibility of the Contractor to employ and assign to the project adequate personnel and equipment required to undertake and complete the work in a diligent, timely and orderly manner.
2. **Compensation:** In consideration for the services to be performed by the Contractor, the County agrees to pay Contractor the compensation set forth on Exhibit B. Payment to the Contractor for services will be under the County's terms of Net 30.
3. **Contract Documents:** The following documents are the entire agreement between the Contractor and the County. The agreement includes the following documents listed below, which are incorporated herein by reference and are deemed to be part of this contract as if set forth in full:
 - a) This Contract (including attached exhibits)
 - b) All Provisions required by law to be inserted in this contract whether actually inserted or not.
4. **Performance**
 - a) Contractor shall perform the work as required by and in accordance with the schedule of time requirements set forth in Exhibit A.
 - b) Failure to complete services as required shall constitute breach of this Contract.
 - c) Contractor shall have five (5) calendar days to cure a breach of this Contract (the "Cure Period"). Failure to cure a breach of this Contract within said Cure Period shall allow the County to, without further notice to the Contractor, declare this Contract terminated and proceed with the replacement of the Contractor and the County shall be entitled to all remedies available to it at law or in equity.
5. **Terms of Contract:** The contract shall commence when signed by both parties and unless terminated earlier in accordance with the terms of this Contract, this Contract period will cover a period from project kick-off to project completion of stated objectives, Exhibit A.

This contract may be terminated prior to completion of the Services at the option of either party, upon delivery of written notice by the terminating party to the other party.

6. Expenses: Contractor shall be responsible for all the Contractor's expenses incurred while performing services under this Contract. This includes license fees, fuel and fleet maintenance, insurance premiums, telephone and all salary/payroll expenses, and other compensation paid to employees or contract personnel that the Contractor hires to complete the work under this Contract.

7. Employees: The Contractor and all Contractor' employees, while on County premises, shall carry proper identification. Examples of proper identification are State issued Driver's License or State issued Identification Card.

The Contractor shall employ only United States citizens, legal residents or legal resident aliens. Upon request of the County, the Contractor shall provide copies of, or access to, work/payroll records and necessary documents to verify status of employees.

The Contractor will be supplied with a phone number to contact in case of an emergency. Access to designated restricted areas is forbidden to Contractor's employees. Restricted area will be designated by the authorized County representative.

8. Materials: Contractor will furnish all materials, equipment and supplies used to provide the services required by this Contract.
9. Background Checks: (as required by the Facility) Contractor employees are subject to background checks to ensure, at a minimum, that no employee has a felony or domestic violence or other bar-able conviction(s). The background checks for Contractor employees will be conducted by the County prior to the commencement of any on-site work.
10. Compliance with Laws, Ordinances, and Regulations and Procurement of Permits:
- a) This Contract is governed by the laws of the State of Michigan.
 - b) The Contractor shall at all times comply with all local, state and federal laws, rules and regulations applicable to this Contract and the work to be done herewith.
 - c) The Contractor shall obtain, and pay thereof, all permits required by any agency or authority having jurisdiction over the work. The Contractor shall provide a copy of any permit to the County within 3 business days of the County's request.
11. Exclusive Contract: This Contract, including exhibits attached hereto, a County Purchase Order, if applicable, is the entire Agreement between Contractor and the County for the services as detailed in Exhibit A.
12. Modifying the Agreement: This Agreement may be modified only by a writing signed by both parties.
13. Record Keeping: The Contractor shall keep all records related to this Contract for the term of the Contract and 3 years thereafter.

14. **Dispute:** In the event of any conflicts or discrepancies in the wording of any terms, provisions and conditions contained in this Agreement, describing Contractor's obligations and responsibilities hereunder, said conflicts and discrepancies shall be resolved by first applying the interpretation of this Agreement and its exhibits, attachments, and addendums, then the mutually agreed Contractor's planning documents that affirm the details of the Services to be provided. Any agreement or modification of this Agreement shall be written and signed by both parties and will supersede any previous written understandings.

Should any disputes arise with respect to this Agreement, Contractor and County agree to act immediately to resolve any such disputes. Pending resolution of such dispute or difference and without prejudice to their rights, both the Contractor and the County shall continue to respect all their obligations and to perform all their duties under this Agreement.

15. **Jurisdiction and Venue:** The parties' consent to the exercise of general personal jurisdiction over it by the Ottawa Court Circuit Court. Any action on a controversy that arises under or in association with this Agreement shall be brought in the State of Michigan, which both parties agree is a reasonably convenient place for trial of the action. The parties both agree that their consent in accordance with this Section is not obtained by misrepresentation, duress, the abuse of economic power, or other unconscionable means.
16. **Liability and Insurance:** Contractor agrees to indemnify, defend, and hold harmless the County from any and all liability arising out of or in any way related to Contractor's performance of services during the term of this Contract, including any liability resulting from intentional or reckless or negligent acts or the acts of the employees or agents of Contractor. Contractor shall provide proof of the following coverages: Workers' Compensation, employer's liability, comprehensive general liability and if applicable, automobile and professional malpractice. Coverage limits are to be statutory and if no statute is applicable, at least \$1,000,000 per occurrence or claim and \$2,000,000 aggregate. These coverages shall protect the vendor and County and their employees, agents, representatives, invitees and subcontractors against claims arising out of the work performed or products provided.
17. **Relationship of Parties:** The Contractor is an independent contractor and is not an agent or employee of the County for any purpose including, but not limited to, the ability to bind the County and all labor or employee related matters such as tax withholding/reporting, employee wages or benefits, or workers compensation. This Contract is not intended to create any joint venture or partnership of any kind. The provisions of this Agreement are for the benefit of the parties hereto, and not for the benefit of any other person or legal entity.
19. **Subcontracts:** Contractor may not assign or subcontract any rights or obligations under this agreement without the County's prior written approval.

20. Governmental Immunity: The County does not waive its governmental immunity by entering into this Agreement, and fully retains all immunities and defenses provided by law with respect to any action based upon or occurring as a result of this Agreement.
21. Safety: The Contractor shall at all times observe and comply with all federal, state, local and County facility laws, ordinances, rules and regulations that may in any manner affect the safety and the conduct of the work. The Contractor shall indemnify and hold the County harmless against any claim or liability arising from the violation of any such provisions.
22. Absence of Waiver: The failure of either party to insist on the performance of any of the terms and conditions of this Contract, or the waiver of any breach of such terms and conditions, shall not be construed as thereafter waiving such terms and conditions, which shall continue and remain in full force and effect as if such forbearance or waiver had occurred.
23. Notices:
- a) All notices and other communications for the parties may be served, mailed, or delivered at the following addresses:
- If to the Contractor:
- Attn:
- Email:
- If to Ottawa County: Ottawa County
- 12220 Fillmore St.
- West Olive, MI 49460
- Email:

24. **Partial Invalidity:** The partial invalidity of any portion of this Agreement shall not be deemed to affect the validity of any other provision. In the event that any provision of this Agreement is held to be invalid, the parties agree that the remaining provisions shall be deemed to be in full force and effect as if they had been executed by both parties subsequent to the expunction of the invalid provision.
25. **Attorney Review:** The parties represent that they have carefully read this Agreement and have had the opportunity to review it with an attorney. The parties affirmatively state that they understand the contents of this Agreement and sign it as their free act and deed.
26. **No Third Party Benefit:** The provisions of this Agreement are for the benefit of the parties hereto, and not for the benefit of any other person or legal entity.
27. **Availability of Funds:** Each payment obligation of the County is conditioned upon the availability of government funds appropriated or allocated for the payment of this obligation. If funds are not allocated and available for continuance of the services performed herein, either party may terminate this Agreement at the end of the period for which funds are available. The County shall notify the Contractor at the earliest possible time of the services that will or may be affected by the shortage of funds
28. **Miscellaneous:**
 - a) **Force Majeure:** Either party shall be excused from performance under this Agreement for any period of time during which the party is prevented from performing its obligations hereunder as a result of any Act of God, war, civil disobedience, court order, labor dispute, or other cause beyond the party's reasonable control. Such non-performance shall not constitute grounds for default.
 - b) **Title and Headings:** Titles and headings to articles, sections or paragraphs in this Agreement are inserted for convenience of reference only and are not intended to affect the interpretation or construction of the Agreement.
 - c) **Modification:** Any modification of this Agreement or additional obligation assumed by either party in connection with this Agreement shall be binding only if evidenced in a writing signed by either party or its authorized representative.
 - d) **Anticipatory Breach:** If the Contractor, at any time before delivery of services, declares its intent not to perform in accordance with this Agreement, Ottawa County shall have an immediate cause of action for breach of this Agreement, and shall be entitled to all remedies available to it at law or in equity.

In witness whereof, each party to this Contract has caused it to be executed on the date(s) indicated below.

COUNTY OF OTTAWA

By: _____
Joe Moss, Chairperson
Board of Commissioners

Date _____

By: _____
Justin F. Roebuck,
County Clerk/Register

Date _____

COMPANY NAME

By: _____

Date _____

EXAMPLE



Fiscal Services Department – Purchasing Division
12220 Fillmore Street - Room 331 - West Olive, Michigan 49460

Phone 616-738-4855
E-mail: purchasing.rfp@miottawa.org

ADDENDUM 1 – ITB 24-005 OTTAWA SANDS LAKE LOOP PROJECT

NOVEMBER 9, 2023

All Vendors:

The purpose of this addendum is to modify and/or clarify the above project. Information published here becomes part of the solicitation and is official and final. Vendors are to acknowledge the receipt of all addenda in their submission.

ITEM 1: REVISION:

The Exhibit 2 – Construction Plans is missing 02 Day Use Area Plan per Sheet Index. Attached to this addendum is that document.



Fiscal Services Department – Purchasing Division
12220 Fillmore Street - Room 331 - West Olive, Michigan 49460

Phone 616-738-4855
E-mail: purchasing.rfp@miottawa.org

ADDENDUM 2 – ITB 24-005 OTTAWA SANDS LAKE LOOP PROJECT

NOVEMBER 30, 2023

All Vendors:

The purpose of this addendum is to modify and/or clarify the above project. Information published here becomes part of the solicitation and is official and final. Vendors are to acknowledge the receipt of all addenda in their submission.

ITEM 1: REVISION:

From Addendum 1: “Day Use Area Plan” revision:

“2. Recycle station to be Waste Wise Products LLC (1-866-217-4066 wastewiseproducts.com) 105 gallon triple stream Excel Slant Top loading container with rectangular openings or approved equal.”

ITEM 2: VENDOR QUESTIONS RECEIVED AND ANSWERED:

Q1. What is the projected start date for the project?

A1. We would estimate the start date to be April 1. However, the contract will be executed in January or February and once executed, the awarded vendor can begin work. It should be noted that a critical dune permit is required for most of the lake loop. The application for this permit has been submitted, but not yet approved.

Q2. Will there be tree removal needed?

A2. Removal should be limited to brush or small trees, no large tree removal is required.

Q3. Is this project required to use prevailing wage?

A3. No.

Q4. What are the access points? Is there access to using the lake for mobilization?

A4. Access is from the proposed day use parking lot area and also to the south side of the lake via an existing gravel “two track” starting near the first existing park building along the paved road going south.

Q5. Will sand be needed?

A5. No, cut and fill should balance. Additional sand is available on site if required.

Q6. Which type of trash/recycling containers?

A6. Excel Slant Top 105 Gallon – Triple Stream from Waste Wise Products LLC. Please see the first revision in Addendum 2.

Q7. Can Ottawa County confirm that “plugs” are preferred over “sprigs” for dune grass planting.

A7. Dune grass plantings should be stems (culms), not plugs.

Q8. Regarding the Bituminous Path Paving on Existing Gravel Base, will supplemental gravel be necessary to prepare the grade for paving? If so, to what extent and how will this be paid?

A8. No. The existing gravel is ready for final grading and paving.

Q9. Regarding the aggregate base under the parking lot pavement and HMA path alternate, will recycled concrete gravel material be permissible?

A9. Yes.

Q10. If earthwork operation for the Day Use Area generates excess soil, is this material able to be wasted onsite? If so, where is this location?

A10. Yes. There should be room directly adjacent to the construction area.

Q11. Is the “piano key” crosswalk shown within the Day Use Area Plan to be included in this contract? If so, could Ottawa County provide additional details and means of payment?

A11. Yes. It is painted and should match the existing crosswalk directly to the east. It should be bid as part of parking lot striping, Bid Item S17.

Q12. Will pickup trucks (with or without trailers) or ATVs be permitted to drive on the finished trail?

A12. Yes, the county would allow this if needed for work along the trail and would work to accommodate this with park visitors. The general contractor would be responsible for any damage caused by this activity.

Q13. What is the warranty period on dune grass plugs?

A13. One year. As mentioned above, bid should be stems not plugs.

Q14. Are there any specs/details for the dune grass planting?

A14. Dune grass should be planted at a rate of approximately 1 stem per square foot in a triangular pattern and to a depth of 8" min.

Q15. Will the bioswale/raingarden area receive topsoil prior to planting and seeding?

A15. The best available salvaged soil from the project area will be used in this area. No imported topsoil is specified.

Q16. Will areas seeded with bioswale/raingarden seed mix need to be covered with erosion control (straw, blanket, etc.)?

A16. Probably. Erosion control blanket is to be placed in areas as directed based on site conditions. It is included in bid item S3.

Q17. Is there a performance standard and/or warranty period for the seeded areas (90% cover after 1 year, etc.)?

A17. Warranty is one year with cover sufficient to limit erosion.

Q18. Will Ottawa County provide the contractor with the CAD file for machine control and staking purposes?

A18. Yes. It should be noted, however, that accurate survey is available in the day use area only. Elevations around the lake are based on GIS data and will likely need to be adjusted in the field.

Q19. Is bid item S15 Dune Grass Plugs accurate: unit is Square Feet (SF)?

A19. This would be more accurately labeled as stems. Dune grass is to be planted at a rate of approximately 1 stem per square foot. The bid form estimates 60,000 stems for 60,000 square feet, however, the density may be adjusted if the area to be restored is larger or smaller than 60,000 sf.



ITB 24-005 Ottawa Sands Lake Loop Project Post-Bid Interview

Date/Time: 12/11/2023

Location: via Teams

County Representatives:

Curt TerHaar, Coordinator of Park
Planning and Development
Steven Holden, Procurement Specialist

McCormick Sand Inc Representatives:

David VanderMolen, Project Manager

Review of Project Information:

The project involves site preparation and grading, including existing vegetation and small tree removal, construction of a forty-car parking area, bituminous paved path, and concrete path loop around an existing inland lake, restoration, and miscellaneous other items of work.

Contractor Project Manager: David VanderMolen

Phone: 231-766-0466

Ottawa County Project Manager: Curt TerHaar

Phone: 616-738-4656

Project Timeline:

Project Start Date: approx. February 1, 2024

Project Substantial Completion Date: July 19, 2024

Project Final Completion Date: October 31, 2024

Subcontractors:

- Martin J Concrete, Inc. – *Site Concrete*
- Asphalt Paving, Inc. – *HMA Paving*
- Spicer Group – *Survey Staking*

Pricing:

Total Lump Sum of Base Bid: \$788,314.25

Amount(s) listed above is correct? Y___ N___

Comments:

Ottawa County On-Site Project Guidelines:

Vendor to initial each condition below for acknowledgment and agreement:

1. Observe County's restriction for tobacco use while on County property. ____
2. Vendor to clean site and maintain safe working environment. ____
3. Vendor to follow all safety regulations and maintain compliance with federal OSHA rules. ____
4. Vendor to be aware and sensitive of staff and community members in area during the course of work. ____
5. Vendor understands restricted areas will be designated by County Project Manager. ____
6. Vendor employees and subcontractors may be subject to security check to ensure staff has no outstanding felony or domestic violence or other bar-able offence(s). ____
7. Vendor agrees to follow security protocols and regulations of the facility. ____
8. Vendor understands work is not to commence until receipt of County Purchase Order and County's Project Manager approves. ____

Bidder Acknowledgment:

1. Have you fully reviewed the scope of services outlined in the solicitation documents? Y____ N____
2. Vendor agrees to the terms and conditions set forth in the solicitation documents? Y____ N____
3. Did you inspect the site and review the current environment? Y____ N____
4. Do you carry Worker's Comp and Liability Insurance, and are able to provide a certificate of insurance to Ottawa County Fiscal Services prior to the project start date? Y____ N____
5. Vendor acknowledges and confirms that the company has the resources and capacity to provide all labor, materials, and equipment for the complete execution of work stated in the bid? Y____ N____
6. Vendor understands and is able to coordinate all work to be performed with the County's Project Manager? Y____ N____
7. Vendor acknowledges its responsibility for the protection of all County property during the course of work. Y____ N____
8. Vendor acknowledges that vendor is responsible for complete Project Scope. Y____ N____

Contractor Assumptions:

The undersigned acknowledges that the information contained in these notes to be correct and will remain true through project completion. The undersigned understands that work is not to commence until receipt of County Purchase Order and approval of County's Project Manager. Furthermore, the undersigned acknowledges that any additional costs above the stated bid amount will not be paid unless approved by Ottawa County in writing through a change of Purchase Order.

Authorized Representative's Signature

Date

Authorized Representative's Printed Name, Title, and Company (Legal) Name

BID PROPOSAL FORM**THIS BID IS SUBMITTED TO:**

Curt TerHaar, Coordinator of Park Planning & Development
Ottawa County Parks & Recreation Commission
12220 Fillmore Street, Room 267
West Olive, MI 49460

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. BIDDER accepts all of the terms and conditions as described in the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for seventy-five (75) days after the day of Bid opening. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within ten days after the date of OWNER'S Notice of Award.

3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

- a. BIDDER has examined copies of all the Bidding Documents and of the following Addenda (receipt of all that is hereby acknowledged):

Date 11/09/23 Number 01

Date 11/30/23 Number 02

Date _____ Number _____

- b. BIDDER has familiarized itself with the nature and extent of the Contract Documents, work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.
- c. BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing underground facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said underground facilities are or will be required by BIDDER in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents.

- d. BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the contract.
- e. BIDDER has given the Landscape Architect written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by the Landscape Architect is acceptable to BIDDER.
- f. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.
4. **TOTAL BASE BID:** The undersigned bidder hereby states that he will provide all necessary materials and labor called for by the plans and specifications and will accept as full and complete payment therefore the Lump Sum Base Bid amount of:

TOTAL BASE BID: \$ 788,314.25

Seven Hundred and Eighty-Eight Thousand, Three Hundred Fourteen Dollars

And Twenty-Five Cents.

5. **UNIT PRICES:** This is **not** a unit price contract. The following unit prices will be utilized to assess bids, revise contract amounts, and develop change orders. Quantities indicated are estimates only and not guaranteed. Each bidder is required to estimate their own quantities and submit a Lump Sum Bid that will cover all work indicated on the drawings and specifications:

Item	MNRTF Grant Items Description	Qty.	Unit	Installed Unit Price	Item Total
	General Items				
G1	PLM Bond cost for MNRTF items	1	LS	6,660.-	6,660.-
G2	Mobilization, general conditions, permits, management, and supervision for MNRTF items	1	LS	25,000.-	25,000.-

Item	MNRTF Grant Items Description	Qty.	Unit	Installed Unit Price	Item Total
	Site Work				
S1	Site preparation and grading for site area improvements complete including removal of existing vegetation, excavation, and finish grading.	1	LS	83,000.-	83,000.-
S2	Supply and install Silt Fence	1310	LF	2.50	3,275.-
S3	Supply and install Erosion Control blanket in areas as directed.	100	SY	5.-	500.-
S4	Install bituminous paving on existing gravel base for entrance pathway	1008	SY	25.-	25,200.-
S5	Install 8" gravel base for parking area	1543	SY	19.-	29,317.-
S6	Install 1.5" 13A leveling course for parking area	1543	SY	9.20	14,195.60
S7	Install 1.5" 36A top course for parking area	1543	SY	10.10	15,584.30
S8	Install 4" concrete paving adjacent to parking area and restroom	2463	SF	5.45	13,423.35
S9	Install 10' wide 4" thick concrete paving for lake loop	83,490	SF	5.45	455,020.50
S10	Install turn-down edge along 10' lake loop path at future beach area	265	LF	18.-	4,770.-
S11	Install 4' x 10 concrete bench pads along edge of path in locations as directed	5	EA	500.-	2,500.-
S12	Supply and install concrete wheel stops	40	EA	125.-	5,000.-
S13	Supply and install parking area signs	3	EA	500.-	1,500.-
S14	Supply and install cast iron tactile warning plates on both sides of pedestrian crossing (five tiles on each side).	10	EA	740.-	7,400.-
S15	Supply and install recycle station	1	EA	4,500.-	4,500.-
S16	Supply and install benches	5	EA	2,000.-	10,000.-
S17	Supply and install dune grass plugs to disturbed areas as directed.	60,000	EA	0.60	36,000.-
S18	Seed rain garden/bioswale area with specified seed	1855	SF	2.-	3,710.-
S19	Paint parking lot lines and BF symbols	1	LS	1,875.-	1,875.-

TOTAL MNRTF ITEMS \$ 748,430.75

Item	LWCF Project Items Description	Qty.	Unit	Installed Unit Price	Item Total
General Items					
LG1	PLM Bond cost for LWCF items	1	LS	500.-	500.-
LG2	Mobilization, general conditions, permits, management, and supervision for LWCF	1	LS	2500.-	2,500.-
Site Work					
LS.	Site preparation and grading for site area improvements complete including removal of existing vegetation, excavation, and finish grading.	1	LS	4,500.-	4,500.-
LS2	Install 4" concrete paving adjacent to parking area and restroom	2882	SF	5.45	15,706.90
LS3	Install 4" thick exposed aggregate paving for bike racks	174	SF	10.-	1,740.-
LS4	Install 4' x 10 concrete bench pads along edge of path in locations as shown on plan	3	EA.	500.-	1,500.-
LS5	Supply and install dune grass plugs to all disturbed areas	1561	SF	0.60	936.60
LS6	Supply and install benches	3	LS	2,000.-	6,000.-
LS7	Supply and install recycle station	1	LS	4,500.-	4,500.-
LS8	Supply and install bike loops	4	EA	500.-	2,000.-

TOTAL LWCF ITEMS \$ 39,883.50

6. **ALTERNATES:** The Base Bid amount may be increased or decreased in accordance with the following alternates. The owner reserves the right to select any or all of the bid alternates.

Item	Description	Qty.	Unit	Installed Unit Price	Item Total
A1.	Install bituminous paving complete with base material in place of concrete for lake loop	9,277	SY	45.20	419,320.40

7. **BID BOND:** The following documents are attached to and made a condition of this Bid:
Required Bid Security in the form of a bid bond or certified check in the amount of 5% of the bid.
8. The Bidder acknowledges that other contractors may be working on the site and he accepts responsibility to coordinate all of his activities with all other contractors who may be affected by his work.
9. The Undersigned Bidder proposes to furnish all labor, materials, equipment, tools and services required to complete the work in accordance with the proposed Contract Documents listed herein, including all addenda issued pertaining to same, for the sum stated, and agrees that these Documents will constitute the Contract if accepted by the Owner.

10. CONTRACTOR INFORMATION

SUBMITTED on December 5, 2023

By: McCormick Sand, Inc.
(Company Name)

Business Address: 5430 Russel Rd, Twin Lake, MI 49457

Phone No.: 231.766.0466 Email: estimating@mccormicksand.com

10. CONTRACTOR SIGNATURE

Dan P. Verh Mah, V.P. 12/05/2023
Contractor Representative Date

END OF PROPOSAL

THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A310

Bid Bond

Bond No.: 453237

KNOW ALL MEN BY THESE PRESENTS, that we McCormick Sand, Inc.

5430 Russell Rd, Twin Lake, MI 49457

as Principal, hereinafter call the Principal, and Merchants Bonding Company (Mutual)
P.O. Box 14498, Des Moines, Iowa 50306-3498

a corporation duly organized under the laws of the State of Iowa

as Surety, hereinafter called the Surety, are held and firmly bound unto Ottawa County Parks & Recreation Commission

12220 Fillmore Street, Room 267, West Olive, MI 49460

as Obligee, hereinafter called the Obligee, in the sum of Five Percent of Bid Amount

Dollars (\$ 5 %),
for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for Ottawa Sands Lake Loop Project

NOW THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and materials furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this 5th day of December 2023 XXX

McCormick Sand, Inc.

Jennifer A. Flanery
(Witness)

David P. Van der Mark
(Principal)
Vice President
(Title)

Jodi Spencer
(Witness)
Jodi Spencer

Merchants Bonding Company (Mutual)
Jessie Twork
(Seal)
(Title)
Jessie Twork Attorney-in-Fact

MERCHANTS
BONDING COMPANYTM
POWER OF ATTORNEY

Bond #: 453237

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa, d/b/a Merchants National Indemnity Company (in California only) (herein collectively called the "Companies") do hereby make, constitute and appoint, individually,

Jessie Twork

their true and lawful Attorney(s)-in-Fact, to sign its name as surety(ies) and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

This Power-of-Attorney is granted and is signed and sealed by facsimile under and by authority of the following By-Laws adopted by the Board of Directors of Merchants Bonding Company (Mutual) on April 23, 2011 and amended August 14, 2015 and adopted by the Board of Directors of Merchants National Bonding, Inc., on October 16, 2015.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed."

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and authority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner - Department of Highways of the Commonwealth of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 5th day of December, 2023.



MERCHANTS BONDING COMPANY (MUTUAL)
MERCHANTS NATIONAL BONDING, INC.
d/b/a MERCHANTS NATIONAL INDEMNITY COMPANY

By

Larry Taylor
President

STATE OF IOWA
COUNTY OF DALLAS ss.

On this 5th day of December, 2023, before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC.; and that the seals affixed to the foregoing instrument are the Corporate Seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.



Kim Lee
Notary Public

(Expiration of notary's commission
does not invalidate this instrument)

I, William Warner, Jr., Secretary of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this 5th day of December, 2023.



William Warner Jr.
Secretary



EQUAL OPPORTUNITY EMPLOYER

5430 Russell Rd. · Twin Lake, MI 49457 · Ph. 231-766-0466 · Fax 231-766-5162

Consent Resolution of Shareholders and Directors

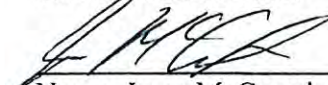
The undersigned, as holders of 80% of the outstanding shares of **McCormick Sand, Inc.** make the following resolution pursuant to the Michigan Business Corporation Act:

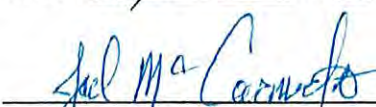
Resolved, that the CEO of the Corporation, Jesse McCormick, the President of the Corporation, Joel McCormick and the Vice President of the Corporation, David P. VanderMolen, is authorized to sign all bids, documents and applications on behalf of the Corporation to provide services.


Resolved, that this consent be filed with the minutes of the proceedings of the Shareholders and Board of Directors of the Corporation.

This consent is executed pursuant to the laws of the State of Michigan.

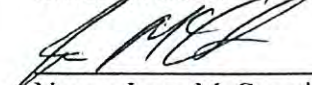
SHAREHOLDERS:

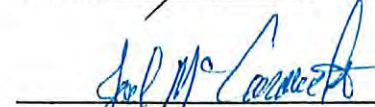

Name: Jesse McCormick
Dated: 6/10, 2022



Name: Joel McCormick
Dated: 06/10, 2022


Name: David P. VanderMolen
Dated: June 10, 2022

DIRECTORS:


Name: Jesse McCormick
Dated: 6/10, 2022


Name: Joel McCormick
Dated: 06/10, 2022


Name: David P. VanderMolen
Dated: June 10, 2022



County of Ottawa

Fiscal Service-Purchasing

Exhibit C

12220 Fillmore Street • Room 331 • West Olive, MI, 49460

(616) 738-4670
Fax (616) 738-4897

VENDOR INSURANCE REQUIREMENTS / REQUEST

Please be advised that before any vendor can begin work in a County facility, or before a purchase order can be processed, if applicable, the County requires that you provide evidence of insurance as follows:

WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY

Workers' Compensation Limits	Michigan Statutory
Employers' Liability Limits	\$500,000 Each Accident
	\$500,000 Each Employee
	\$500,000 Aggregate Injury by Disease

COMMERCIAL GENERAL LIABILITY

Each Occurrence	\$1,000,000
Personal & Advertising Injury	\$1,000,000
General Aggregate	\$2,000,000
Products/Completed Operations Aggregate	\$2,000,000
There shall be no Products/Completed Operations or Contractual Liability exclusion.	
The General Aggregate limit shall apply separately per location or project.	

AUTOMOBILE (if applicable)

Residual Liability Limit	\$1,000,000 Each Accident
Personal Injury Protection	Michigan Statutory
Property Protection	Michigan Statutory

PROFESSIONAL LIABILITY (if applicable)

Limit of Liability	\$2,500,000 Aggregate Limit
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Please provide a **certificate of insurance** detailing your coverage which meets the above requirements. These coverages shall protect the vendor, its employees, agents, representatives, and subcontractors against claims arising out of the work performed or products provided.

These limits may be provided in single layers or by combinations of primary and excess/umbrella policy layers.

The County of Ottawa and its officers, officials, employees, volunteers and agents are to be additional insureds as respects to the services provided under this agreement. This additional insured status shall not terminate after completion of the services. A certificate of insurance shall be provided and show the required limits, and the above-mentioned listed as additional insureds. A **30-day** notice is required in the event of coverage termination for any reason

Additional Insured Endorsement to the Commercial General Liability policy **must accompany the certificate**, OR the **certificate must state** that the General Liability policy includes a blanket additional insured provision on the primary basis for any entity required by contract or agreement to be an additional insured.

Please forward your evidence of insurance to; OTTAWA COUNTY PURCHASING , 12220 Fillmore St Rm 331, West Olive, MI 49460, purchasing@miottawa.org, Fax Number 616-738-4897

RECORD OF BID OPENING

BID TITLE: ITB 24-005 Ottawa Sands Lake Loop Project

LOCATION OF BID OPENING: Administration Building, 12220 Fillmore St., West Olive

DATE OF BID OPENING: 12/05/2023

Record of Bids Opened and Details Read Aloud			
Name of Company	Receipt Time & Date	Bid Amount (Total)	Alternate (Total)
Cole Concrete	12/4 8:46PM	Not Complete Bid	Not Complete Bid
APEX Contractors	12/5 9:23AM	\$978,174.22	\$313,918.83
Dan's Excavating	12/5 9:27AM	\$1,019,622.62	\$361,803
Jackson-Merkey	12/5 9:57AM	\$1,138,542.95	\$423,031.20
McCormick Sand, Inc	12/5 9:43AM	\$788,314.25	\$419,320.40
Dan Hoe Excavating	12/5 9:56AM	\$865,273.50	\$417,465
Bultsema Excavating	12/5 9:49AM	\$1,604,967.22	\$504,112.18
Denny's Excavating	12/5 9:49AM	\$929,000	\$389,634
Inner City Contracting	12/5 9:51AM	\$965,916.35	\$302,430.20
Katerberg VarHage	12/5 9:55AM	\$859,988	\$440,657.50

Note: Evaluation of bids will be completed at a later date to confirm if any bids will be considered non-responsive. Non-responsive bids are those missing required documentation or unable to meet specifications.

Confirmed by Fiscal Services to confirm that all bids received on time in response to the solicitation were opened, read out, and recorded:		
Signature: See signature document	Position: See signature document	Date: See signature document
Signature: See signature document	Position: See signature document	Date: See signature document

Construction Plans for the OTTAWA SANDS LAKE LOOP PROJECT

Including the Idema Explorers Trail Connection and Day Use Area

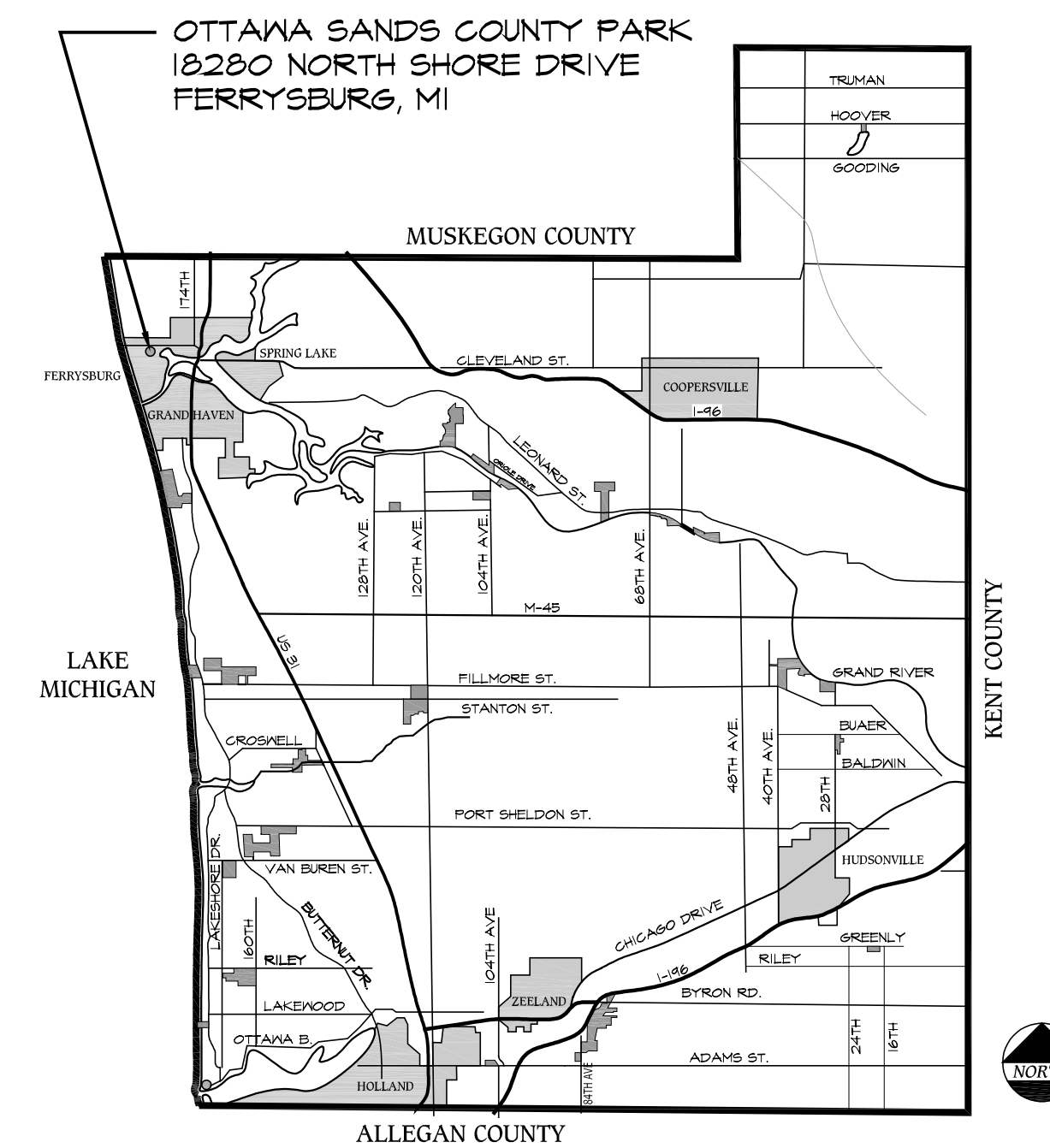
Michigan Natural Resources Trust Fund
Project No. TF22-0153

Land and Water Conservation Fund
Project No. 26-01892

Sheet Index

- 00 COVER SHEET
- 01 OVERALL SITE PLAN
- 02 DAY USE AREA PLAN
- 03 LAKE LOOP ENLARGEMENT - SEGMENTS A & B
- 04 LAKE LOOP ENLARGEMENT - SEGMENT C NORTH
- 05 LAKE LOOP ENLARGEMENT - SEGMENT C CENTRAL
- 06 LAKE LOOP ENLARGEMENT - SEGMENTS C SOUTH & D
- 07 LAKE LOOP ENLARGEMENT - SEGMENTS D, E , & F
- 08 LAKE LOOP ENLARGEMENT - SEGMENTS F, G, H,
& ENTRANCE PATH
- 09 SITE PHOTOS

Project Location Map



Ottawa County, Michigan



Ottawa County Parks &
Recreation Commission
12220 Fillmore St. West Olive, MI 49460
(616) 738-4810 www.michigan.org/parks



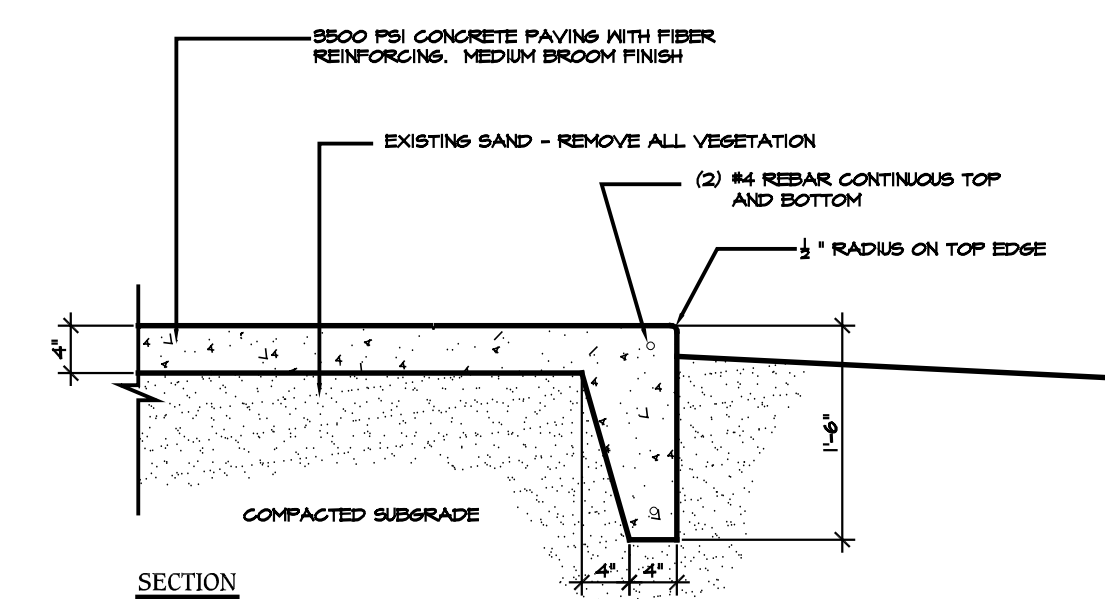
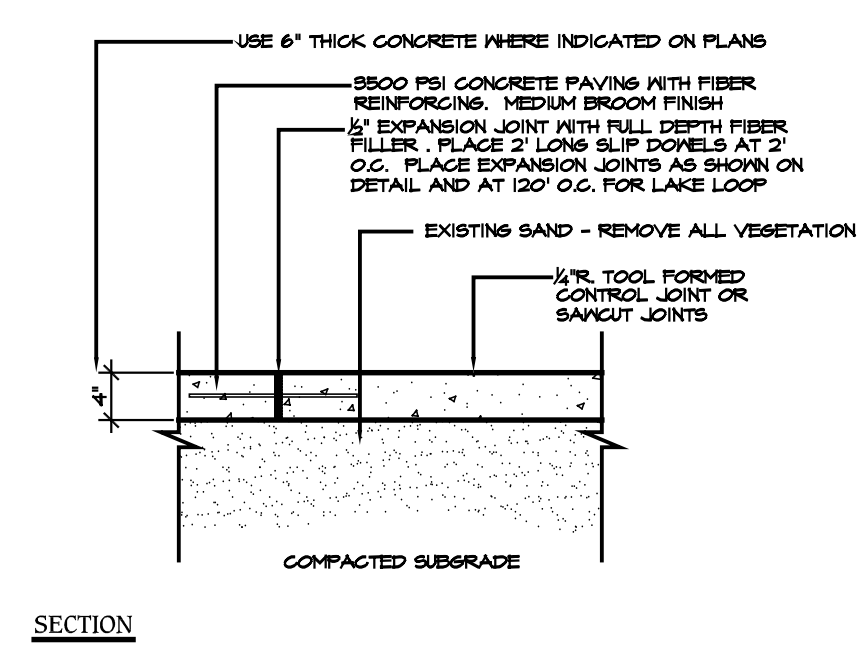
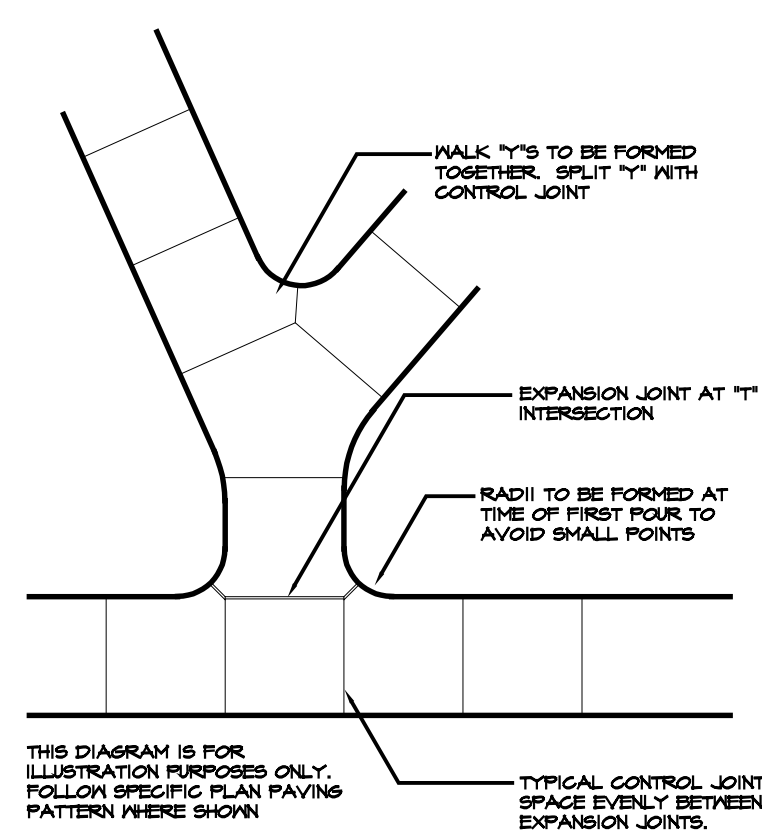
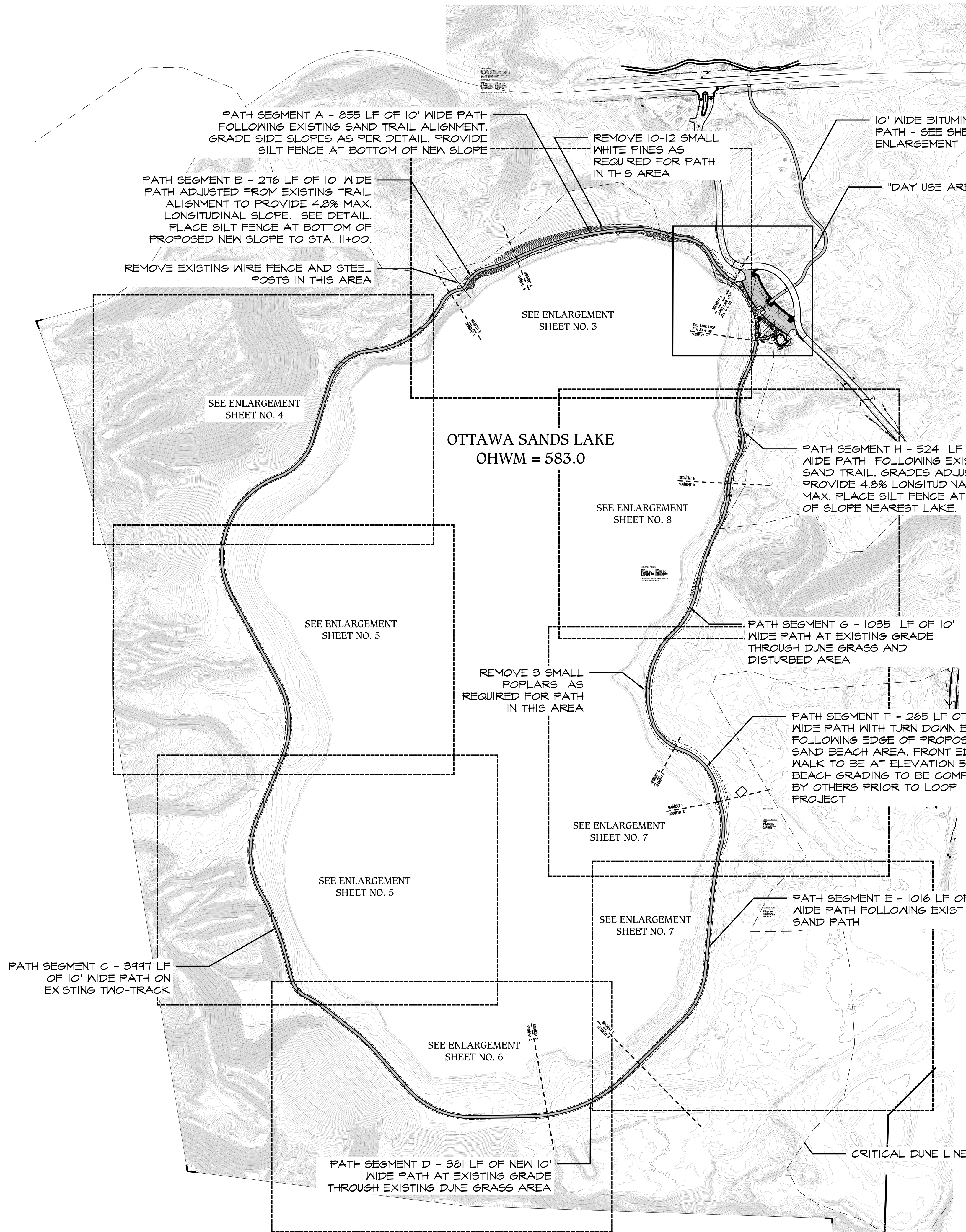
LAKE LOOP TRAIL & PARKING
OTTAWA SANDS COUNTY PARK
Ferrysburg, Michigan

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DESIGN:	
DRAFTS:	
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DATE	ISSUED FOR:
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08.10.23	EGL PERMITTING
09.12.23	MNRFT REVIEW
11.08.23	BIDDING

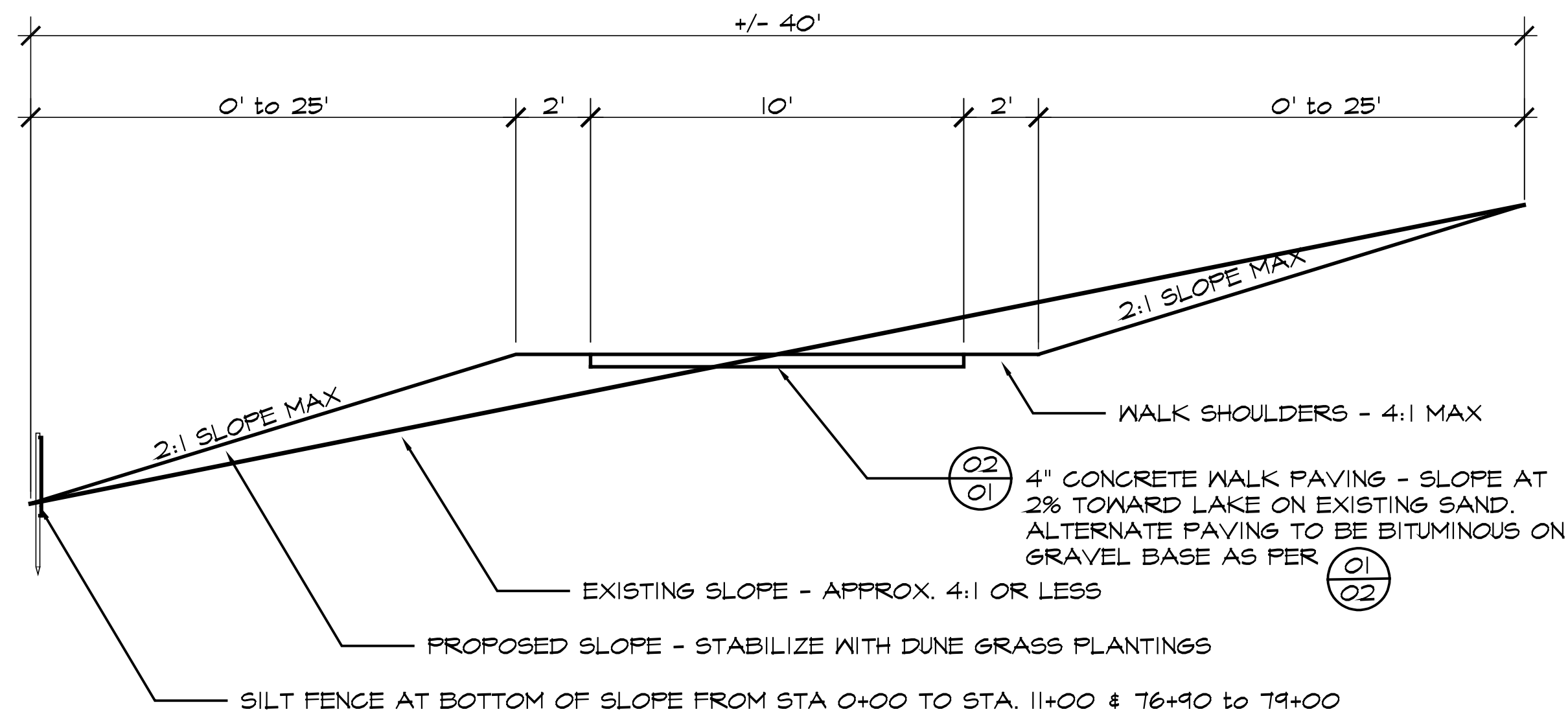
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SHEET TITLE:
COVER SHEET

SHEET NO:
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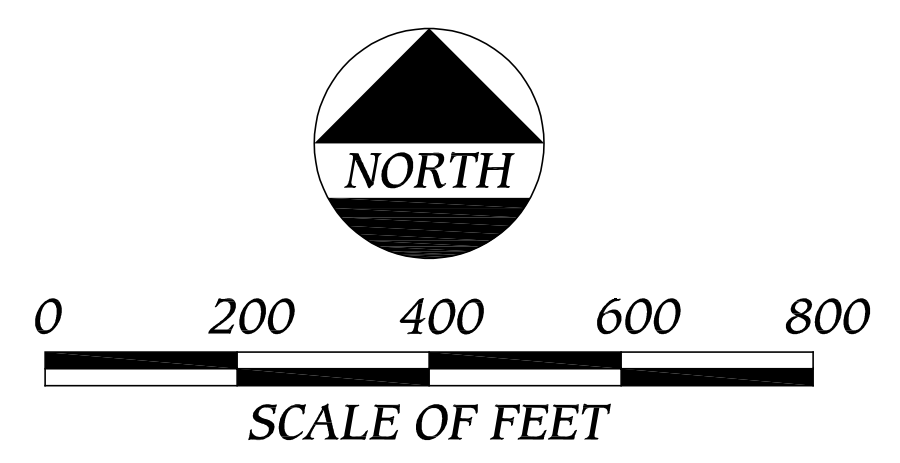
01 01 CONCRETE PAVING DETAILS
NOT TO SCALE



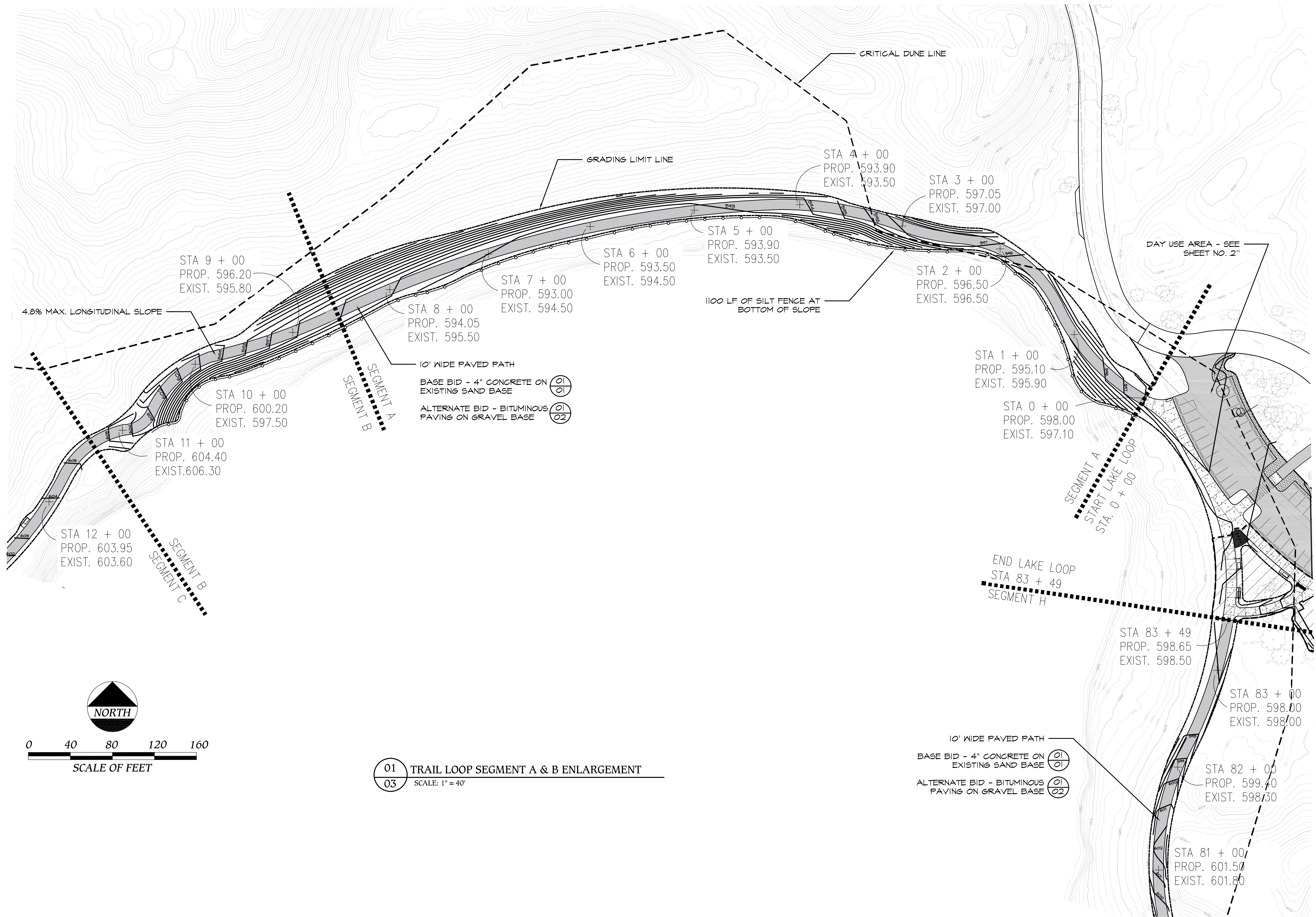
02 01 STANDARD WALKWAY AT SIDESLOPE
NOT TO SCALE

PERMIT NOTES

1. THE REQUIRED SOIL AND SEDIMENTATION CONTROL PERMIT FOR THIS PROJECT HAS BEEN OBTAINED BY THE OWNER AND WILL BE PROVIDED TO THE SUCCESSFUL BIDDER
2. AN APPLICATION FOR THE REQUIRED PERMIT TO WORK IN THE CRITICAL DUNE AREAS OF THIS SITE HAS BEEN SUBMITTED TO THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY FOR REVIEW. APPROVAL IS EXPECTED IN EARLY 2024.



S:\001 ACTIVE PROJECTS\E-4-1-3-8-3 OTTAWA SANDS LAKE LOOP\00 LAKE LOOP CD'S FOR BIDDING.DWG



Ottawa County Parks &
Recreation Commission
12220 Fillmore St. West Olive, MI 49460
(616) 736-4810 www.michigan.org/parks



LAKE LOOP TRAIL & PARKING OTTAWA SANDS COUNTY PARK Ferrysburg, Michigan

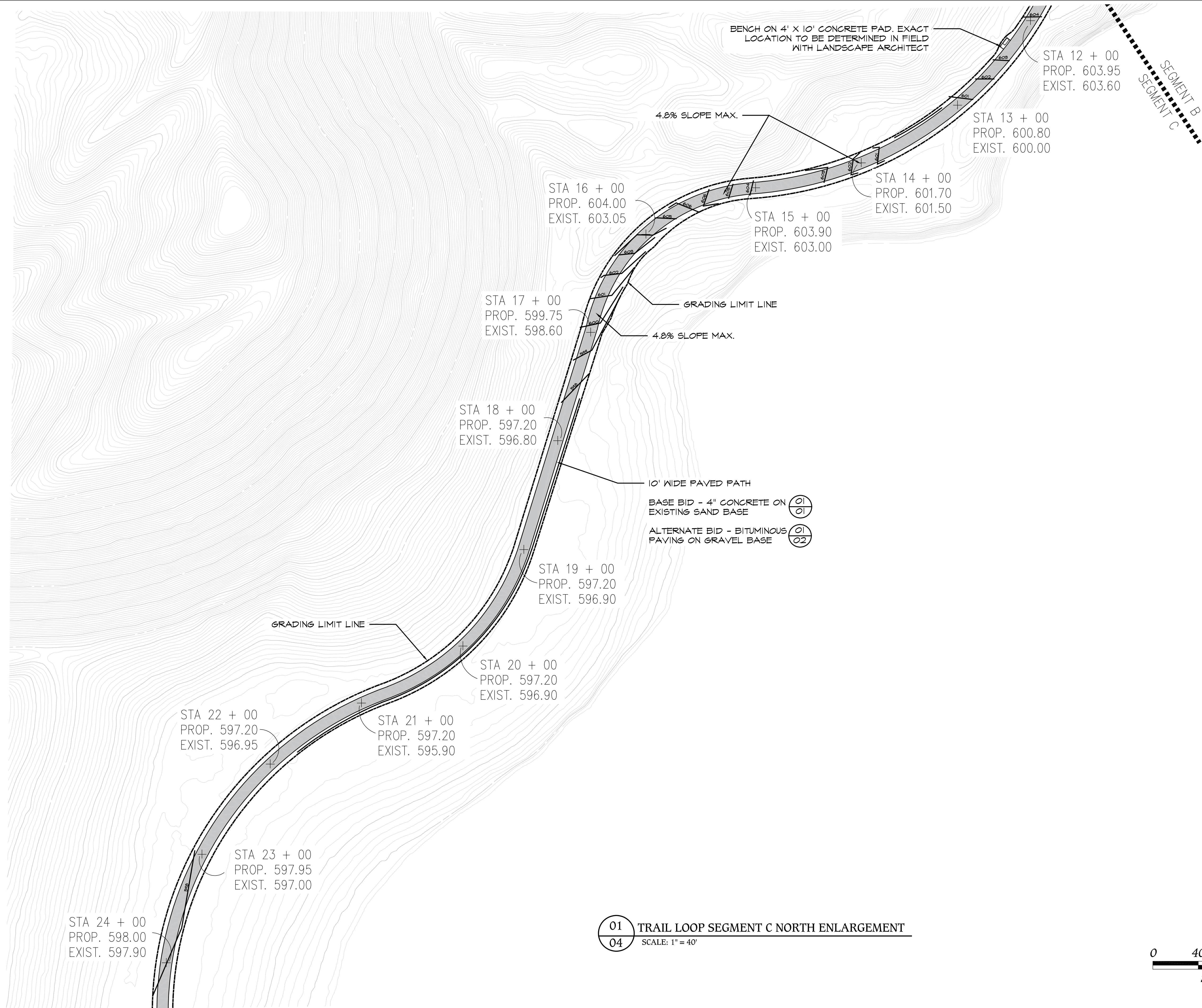
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08.08.23	EGLE PERMITTING
09.12.23	MNRTF REVIEW
11.08.23	BIDDING

PROJECT NO:
E-4-1-3-8-1

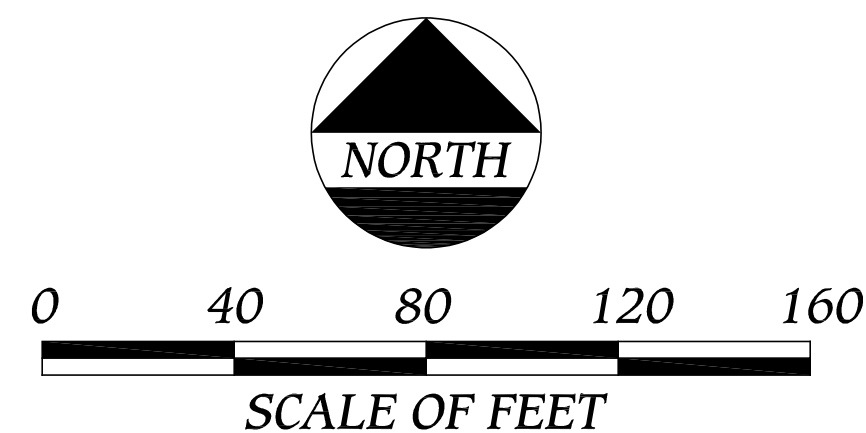
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**TRAIL LOOP
ENLARGEMENT**

SHEET NO:
03

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01 TRAIL LOOP SEGMENT C NORTH ENLARGEMENT
04 SCALE: 1" = 40'



Ottawa County Parks &
Recreation Commission
12220 Fillmore St. West Olive, MI 49460
(616) 738-4810 www.mtawwa.org/parks



LAKE LOOP TRAIL & PARKING

OTTAWA SANDS COUNTY PARK

Ferrysburg, Michigan

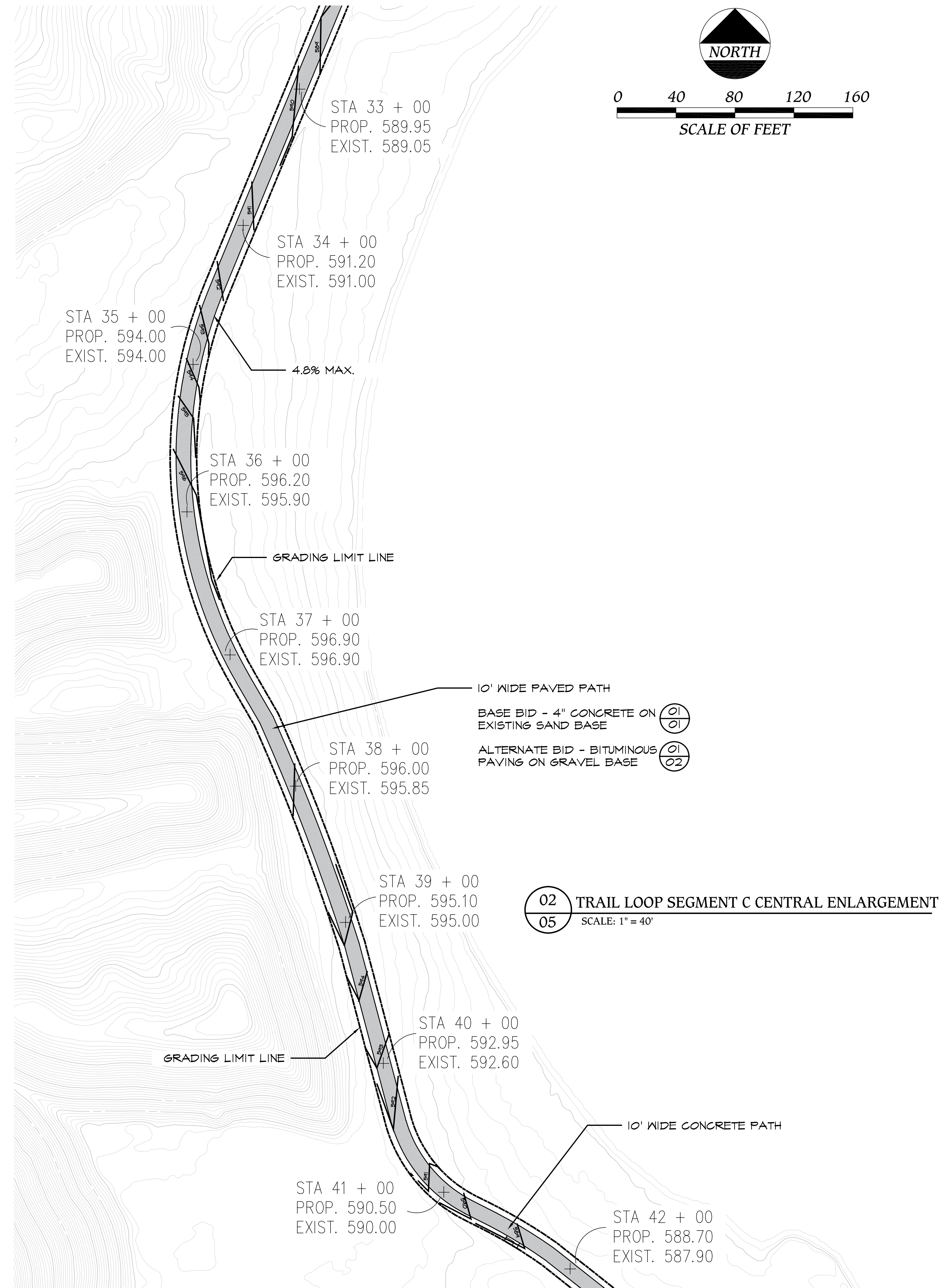
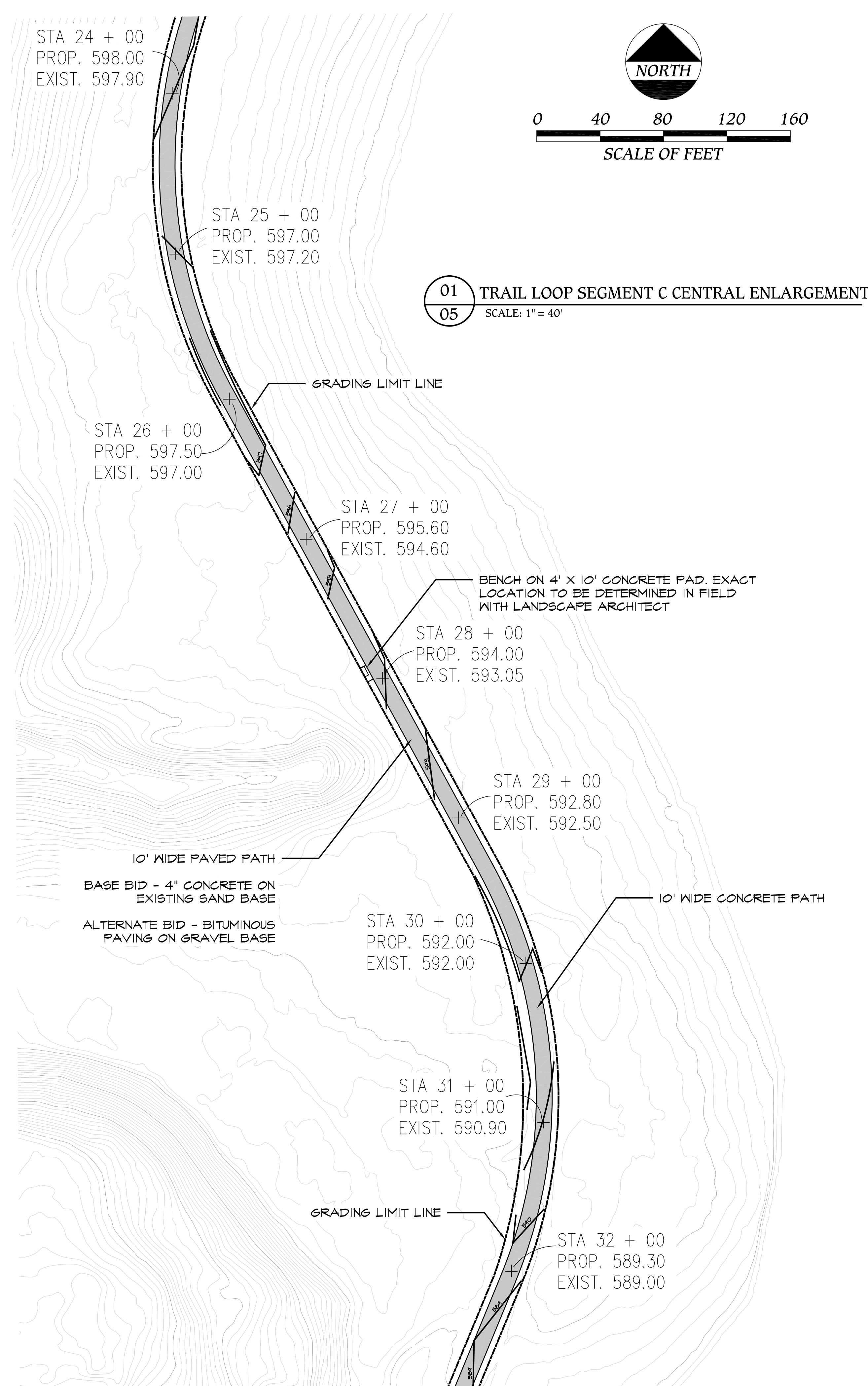
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08.08.23	EGLE PERMITTING
09.12.23	MNRTF REVIEW
11.08.23	BIDDING

PROJECT NO:
E-4-1-3-8-1

SHEET TITLE:
TRAIL LOOP
ENLARGEMENT

SHEET NO:
04

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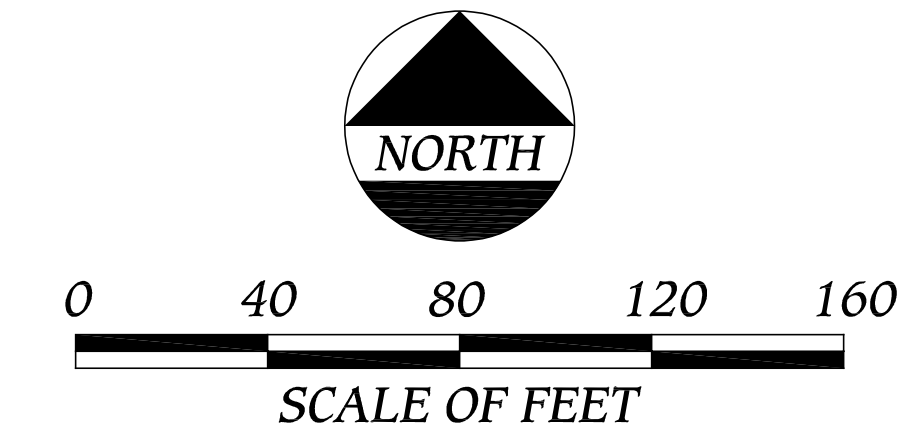
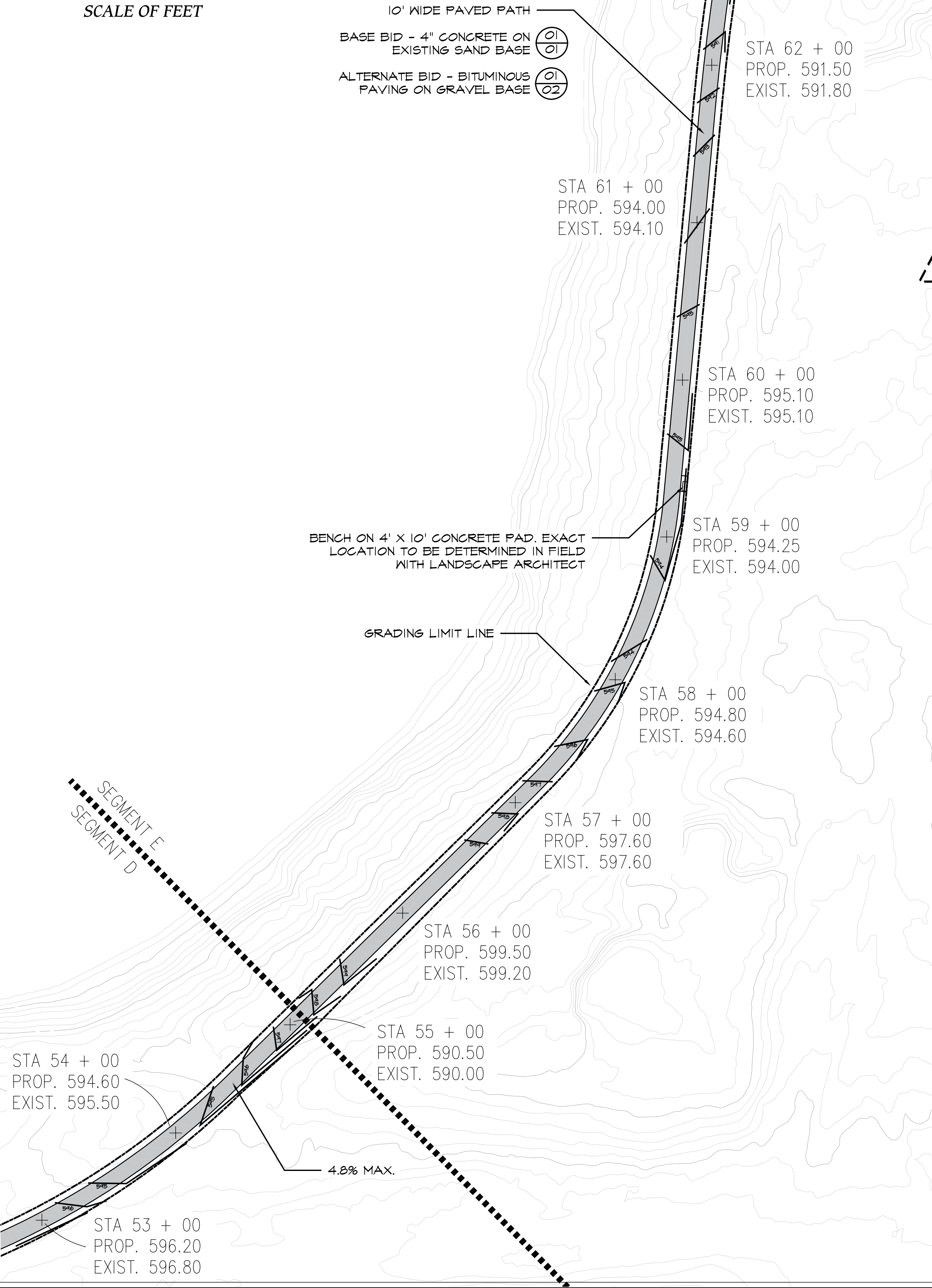
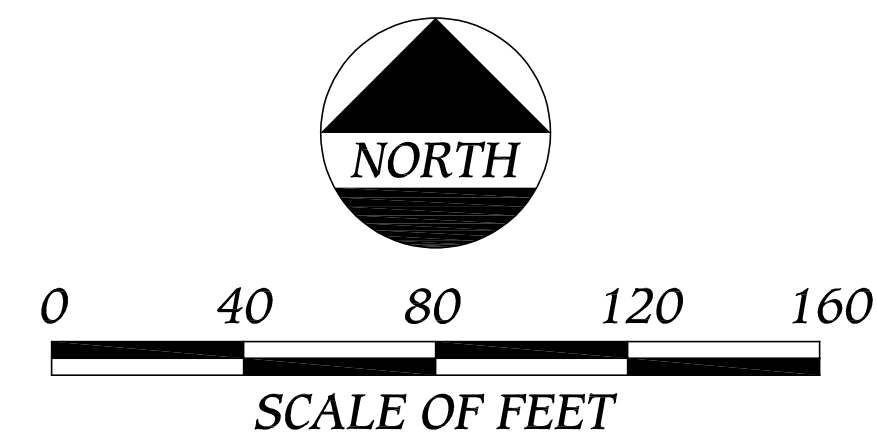


LAKE LOOP TRAIL & PARKING
OTTAWA SANDS COUNTY PARK
Ferrysburg, Michigan

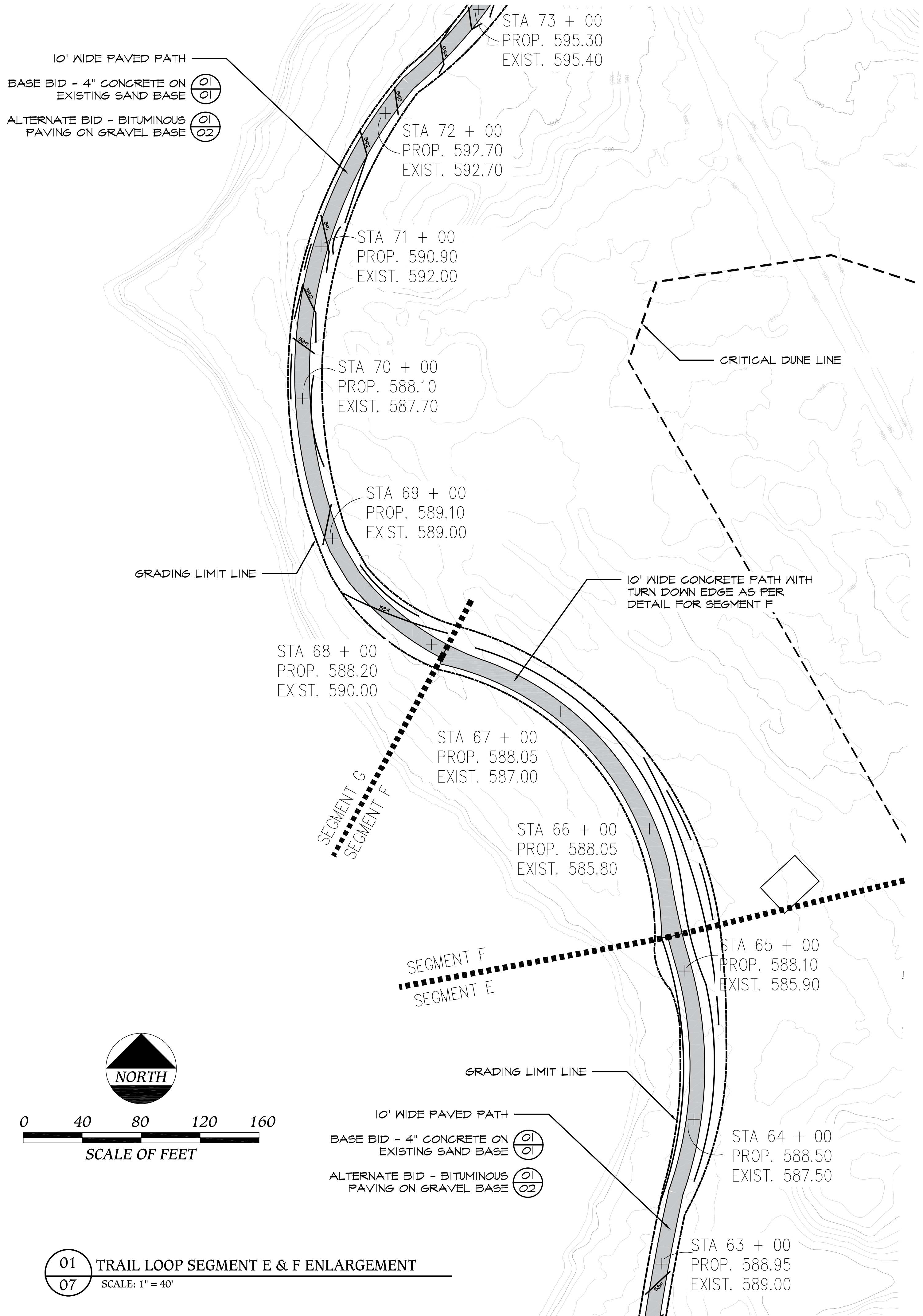
Ottawa County Parks & Recreation Commission
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08.08.23	EGLE PERMITTING
09.12.23	MNRFT REVIEW
11.08.23	BIDDING
PROJECT NO:	E-4-1-3-8-1
SHEET TITLE:	TRAIL LOOP ENLARGEMENT
SHEET NO:	05

S:\001 ACTIVE PROJECTS\E-4-1-3-8-3 OTTAWA SANDS LAKE LOOP\00 LAKE LOOP CD'S FOR BIDDING.DWG



01 TRAIL LOOP SEGMENT E & F ENLARGEMENT
07 SCALE: 1" = 40'



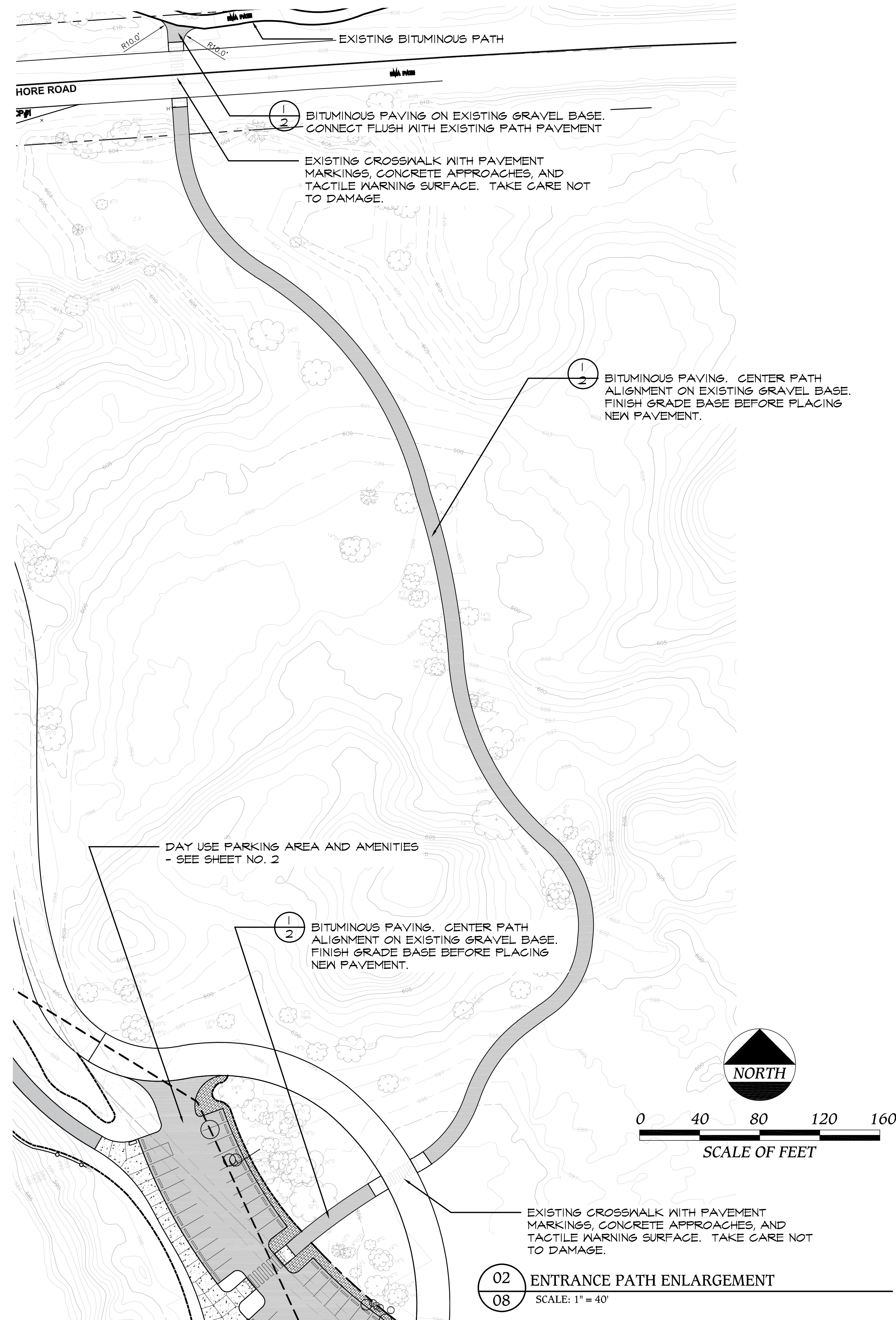
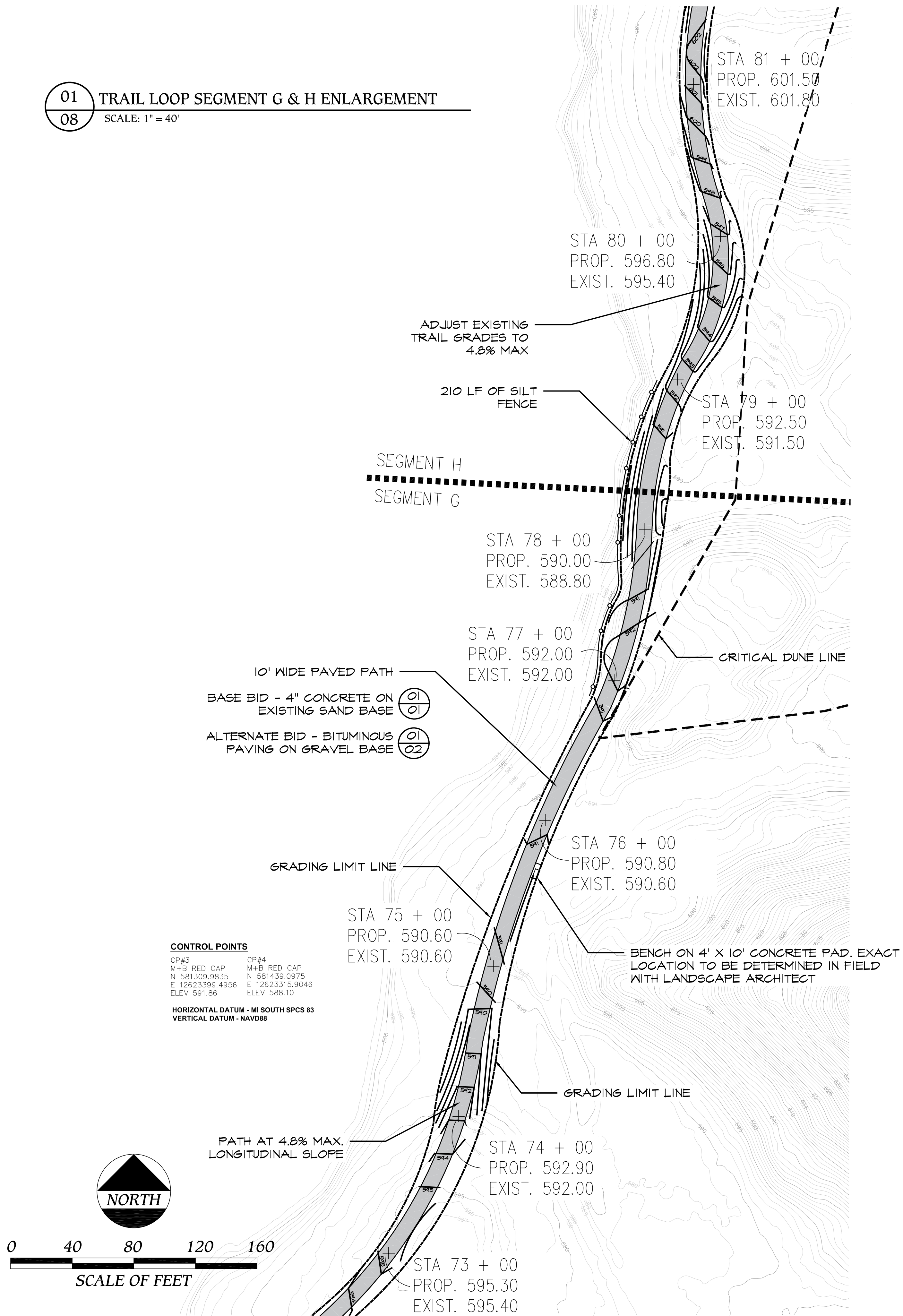
LAKE LOOP TRAIL & PARKING OTTAWA SANDS COUNTY PARK Ferrysburg, Michigan



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DATE	ISSUED FOR:
08.04.23	SESC PERMITTING
08.08.23	EGLE PERMITTING
09.12.23	MNRTF REVIEW
11.08.23	BIDDING
PROJECT NO:	E-4-1-3-8-1
SHEET TITLE:	TRAIL LOOP ENLARGEMENT
SHEET NO:	07

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01 TRAIL LOOP SEGMENT G & H ENLARGEMENT
08 SCALE: 1" = 40'



LAKE LOOP TRAIL & PARKING
OTTAWA SANDS COUNTY PARK
Ferrysburg, Michigan

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DESIGN:	
DRAFTS:	
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DATE	ISSUED FOR:
08.04.23	SESC PERMITTING
08.08.23	EGLE PERMITTING
09.12.23	MNRTF REVIEW
11.08.23	BIDDING
PROJECT NO:	E-4-1-3-8-1
SHEET TITLE:	LAKE LOOP ENLARGEMENT
SHEET NO:	08



MCCOSAN-01

GWHITE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

1/19/2024

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

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

PRODUCER Lenz-Balder Insurance, Inc. 340 120th Ave Holland, MI 49424	CONTACT NAME: Jessie Twork	
	PHONE (A/C, No, Ext): (616) 748-9440 FAX (A/C, No): (616) 748-9444	
	E-MAIL ADDRESS: jtwork@lenzbalderins.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : Incline Casualty Company	11090
INSURED McCormick Sand, Inc. 5430 Russell Road Twin Lake, MI 49457	INSURER B : Safety National	15105
	INSURER C : Westchester Surplus Lines	10172
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

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

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC OTHER:	X	X	CP5006585	1/1/2024	1/1/2025	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY			CA5003027	1/1/2024	1/1/2025	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$ 10,000			UM5001642	1/1/2024	1/1/2025	EACH OCCURRENCE \$ 6,000,000 AGGREGATE \$ 6,000,000
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) <input type="checkbox"/> Y / N If yes, describe under DESCRIPTION OF OPERATIONS below		N / A	MCCOR-C	5/1/2023	5/1/2024	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000
C	Pollution Liability			G2711684A011	11/20/2023	11/20/2024	Pollution Liability \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
The County of Ottawa and its officers, vehicles, employees, volunteers, and agents are considered an additional insured with respect to the general liability when required by written contract for work or services provided by insured. Waiver of subrogation applies with respect to the general liability when required by written contract. 30-day notice of cancellation applies.

CERTIFICATE HOLDER

CANCELLATION

The County of Ottawa 12220 Fillmore St. West Olive, MI 49460	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE

Action Request

Electronic Submission – Contract # 2188



Committee: PLANNING AND POLICY

Meeting Date: 2/6/2024

Vendor/3rd Party: DENNY'S EXCAVATING, INC.

Requesting Department: PARKS AND RECREATION

Submitted By: CURT TERHAAR

Agenda Item: OTTAWA SANDS DAY USE RESTROOM CONSTRUCTION

Suggested Motion:

To approve the bid from Denny's Excavating in the amount of \$510,000 for construction of the day use restroom at Ottawa Sands and forward to the Board of Commissioners for final approval. Furthermore, the Parks Commission requests that the Fiscal Services Department transfers \$100,000 from CP2208 Ottawa Sands Development Phase 1 (Parks contribution) to CP2301 Ottawa Sands Restroom, to fully fund this project with contingency for a total project amount of \$585,000.

Summary of Request:

This project will construct a fully accessible, modern restroom building with heat for year-round use at the main access and activity area at Ottawa Sands County Park. Together with the concurrent lake loop parking and trail paving project, it will significantly increase the accessibility, comfort, and overall usability of the park for all park visitors. The current budget for this project is \$485,000 but was estimated at \$550,000.

Financial Information:

Total Cost: \$510,000.00

General Fund Cost: \$0.00

Included in Budget: Yes

If not included in Budget, recommended funding source:

Action is Related to an Activity Which Is: Non-Mandated

Action is Related to Strategic Plan:

Goal 2: To Contribute to the Long-Term Economic, Social and Environmental Health of the County.

Administration:

Recommended by County Administrator:

1/30/2024 10:53:10 AM

Committee/Governing/Advisory Board Approval Date: 2/6/2024



Ottawa County

**OTTAWA COUNTY
CONTRACT FOR OTTAWA SANDS PARK RESTROOM BUILDING**

This CONTRACT is made and hereby effective on the 16th day of January 2024 by and between the County of Ottawa, a municipality in the State of Michigan, (hereinafter, the "County") acting by and through its duly elected Board of Commissioners, (hereinafter the "Board"), and Denny's Excavating (hereinafter, "Contractor"), with a principal place of business at 9399 136th Ave, West Olive, MI 49460.

IT IS HEREBY AGREED AS FOLLOWS:

1. **Scope of Work:** Contractor agrees to provide the "Services" which as detailed in Exhibit A. It shall be the responsibility of the Contractor to employ and assign to the project adequate personnel and equipment required to undertake and complete the work in a diligent, timely and orderly manner.
2. **Compensation:** In consideration for the services to be performed by the Contractor, the County agrees to pay Contractor the compensation set forth on Exhibit B. Payment to the Contractor for services will be under the County's terms of Net 30.
3. **Contract Documents:** The following documents are the entire Contract between the Contractor and the County. The Contract includes the following documents listed below, which are incorporated herein by reference and are deemed to be part of this Contract as if set forth in full:
 - a) This Contract (including attached exhibits)
 - b) All Provisions required by law to be inserted in this contract whether actually inserted or not.
4. **Performance**
 - a) Contractor shall perform the work as required by and in accordance with the schedule of time requirements set forth in Exhibit A.
 - b) Failure to complete services as required shall constitute breach of this Contract.
 - c) Contractor shall have five (5) calendar days to cure a breach of this Contract (the "Cure Period"). Failure to cure a breach of this Contract within said Cure Period shall allow the County to, without further notice to the Contractor, declare this Contract terminated and proceed with the replacement of the Contractor and the County shall be entitled to all remedies available to it at law or in equity.
5. **Terms of Contract:** The Contract shall commence when signed by both parties and unless terminated earlier in accordance with the terms of this Contract, this Contract period will cover a period from project kick-off to project completion of stated objectives, Exhibit A.

This Contract may be terminated prior to completion of the Services at the option of the County, upon delivery of written notice by the County to the Contractor.

6. **Expenses:** Contractor shall be responsible for all the Contractor's expenses incurred while performing services under this Contract. This includes license fees, fuel and fleet maintenance, insurance premiums, telephone and all salary/payroll expenses, and other compensation paid to employees or contract personnel that the Contractor hires to complete the work under this Contract.
7. **Employees:** The Contractor and all Contractor' employees, while on County premises, shall carry proper identification. Examples of proper identification are State issued Driver's License or State issued Identification Card.

The Contractor shall employ only United States citizens, legal residents, or legal resident aliens. Upon request of the County, the Contractor shall provide copies of, or access to, work/payroll records and necessary documents to verify status of employees.

The Contractor will be supplied with a phone number to contact in case of an emergency. Access to designated restricted areas is forbidden to Contractor's employees. Restricted area will be designated by the authorized County representative.

8. **Materials:** Contractor will furnish all materials, equipment and supplies used to provide the services required by this Contract.
9. **Background Checks:** (as required by the Facility) Contractor employees are subject to background checks to ensure, at a minimum, that no employee has a felony or domestic violence or other bar-able conviction(s). The background checks for Contractor employees will be conducted by the County prior to the commencement of any on-site work.
10. **Compliance with Laws, Ordinances, and Regulations and Procurement of Permits:**
 - a) This Contract is governed by the laws of the State of Michigan.
 - b) The Contractor shall at all times comply with all local, state, and federal laws, rules, and regulations applicable to this Contract and the work to be done herewith.
 - c) The Contractor shall obtain, and pay thereof, all permits required by any agency or authority having jurisdiction over the work. The Contractor shall provide a copy of any permit to the County within 3 business days of the County's request.
11. **Exclusive Contract:** This Contract, including exhibits attached hereto, a County Purchase Order, if applicable, is the entire Contract between Contractor and the County for the services as detailed in Exhibit A.
12. **Modifying the Contract:** This Contract may be modified only by a writing signed by both parties.

13. Record Keeping: The Contractor shall keep all records related to this Contract for the term of the Contract and 3 years thereafter.
14. Dispute: In the event of any conflicts or discrepancies in the wording of any terms, provisions and conditions contained in this Contract, describing Contractor's obligations and responsibilities hereunder, said conflicts and discrepancies shall be resolved by first applying the interpretation of this Contract and its exhibits, attachments, and addendums, then the mutually agreed Contractor's planning documents that affirm the details of the Services to be provided. Any contract or modification of this Contract shall be written and signed by both parties and will supersede any previous written understandings.
Should any disputes arise with respect to this Contract, Contractor and County agree to act immediately to resolve any such disputes. Pending resolution of such dispute or difference and without prejudice to their rights, both the Contractor and the County shall continue to respect all their obligations and to perform all their duties under this Contract.
15. Jurisdiction and Venue: The parties' consent to the exercise of general personal jurisdiction over it by the Ottawa County Circuit Court. Any action on a controversy that arises under or in association with this Contract shall be brought in the State of Michigan, which both parties agree is a reasonably convenient place for trial of the action. The parties both agree that their consent in accordance with this Section is not obtained by misrepresentation, duress, the abuse of economic power, or other unconscionable means.
16. Indemnification: Contractor agrees to indemnify, defend, and hold harmless the County and its officials, officers, employees, volunteers, and agents from and against any and all liability arising out of or in any way related to Contractor's performance of services under this Contract, including, but not limited to, any and all liability resulting from or arising out of intentional, reckless, or negligent acts or omissions of the Contractor, its employees, agents or subcontractors.
17. Insurance: Contractor agrees to provide proof of the following insurance coverages, as more fully set forth in Exhibit C, entitled Vendor Insurance Requirements: Workers' Compensation; Employers' Liability; Commercial General Liability; Umbrella/Excess Liability; and, if applicable, Automobile, Professional Liability, and Privacy and Security Liability (Cyber Security). Coverage limits are to be statutory and, if no statute applies, are to be at least \$1,000,000 per occurrence or claim and \$2,000,000 aggregate. These coverages shall protect the Contractor and the County and their respective representatives against any and all claims arising out of or related in any way to the work performed or the products provided.
18. Relationship of Parties: The Contractor is an independent contractor and is not an agent or employee of the County for any purpose including, but not limited to, the ability to bind the County and all labor or employee related matters such as tax withholding/reporting, employee wages or benefits, or workers compensation. This Contract is not intended to create any joint venture or partnership of any kind. The

provisions of this Contract are for the benefit of the parties hereto, and not for the benefit of any other person or legal entity.

19. Subcontracts: Contractor may not assign or subcontract any rights or obligations under this contract without the County's prior written approval.
20. Governmental Immunity: The County does not waive its governmental immunity by entering into this Contract, and fully retains all immunities and defenses provided by law with respect to any action based upon or occurring as a result of this Contract.
21. Safety: The Contractor shall at all times observe and comply with all federal, state, local and County facility laws, ordinances, rules, and regulations that may in any manner affect the safety and the conduct of the work. The Contractor shall indemnify and hold the County harmless against any claim or liability arising from the violation of any such provisions.
22. Absence of Waiver: The failure of either party to insist on the performance of any of the terms and conditions of this Contract, or the waiver of any breach of such terms and conditions, shall not be construed as thereafter waiving such terms and conditions, which shall continue and remain in full force and effect as if such forbearance or waiver had occurred.
23. Notices:
 - a) All notices and other communications for the parties may be served, mailed, or delivered at the following addresses:

If to the Contractor: Denny's Excavating Inc.
Attn: Dan Leeuw
9399 136th Ave
West Olive, MI 49460
Email: dirtorsnowdan@aol.com

If to Ottawa County: Ottawa County Parks and Recreation Commission
Attn: Curt TerHaar
12220 Fillmore St.
West Olive, MI 49460
Email: cterhaar@miottawa.org

24. **Partial Invalidity:** The partial invalidity of any portion of this Contract shall not be deemed to affect the validity of any other provision. In the event that any provision of this Contract is held to be invalid, the parties agree that the remaining provisions shall be deemed to be in full force and effect as if they had been executed by both parties subsequent to the expunction of the invalid provision.
25. **Attorney Review:** The parties represent that they have carefully read this Contract and have had the opportunity to review it with an attorney. The parties affirmatively state that they understand the contents of this Contract and sign it as their free act and deed.
26. **No Third-Party Benefit:** The provisions of this Contract are for the benefit of the parties hereto, and not for the benefit of any other person or legal entity.
27. **Availability of Funds:** Each payment obligation of the County is conditioned upon the availability of government funds appropriated or allocated for the payment of this obligation. If funds are not allocated and available for continuance of the services performed herein, either party may terminate this Contract at the end of the period for which funds are available. The County shall notify the Contractor at the earliest possible time of the services that will or may be affected by the shortage of funds.
28. **Miscellaneous:**
 - a) **Force Majeure:** Either party shall be excused from performance under this Contract for any period of time during which the party is prevented from performing its obligations hereunder as a result of any Act of God, war, civil disobedience, court order, labor dispute, or other cause beyond the party's reasonable control. Such non-performance shall not constitute grounds for default.
 - b) **Title and Headings:** Titles and headings to articles, sections or paragraphs in this Contract are inserted for convenience of reference only and are not intended to affect the interpretation or construction of the Contract.
 - c) **Modification:** Any modification of this Contract or additional obligation assumed by either party in connection with this Contract shall be binding only if evidenced in a writing signed by either party or its authorized representative.
 - d) **Anticipatory Breach:** If the Contractor, at any time before delivery of services, declares its intent not to perform in accordance with this Contract, Ottawa County shall have an immediate cause of action for breach of this Contract, and shall be entitled to all remedies available to it at law or in equity.

In witness whereof, each party to this Contract has caused it to be executed on the date(s) indicated below.

COUNTY OF OTTAWA

By: _____
Joe Moss, Chairperson
Board of Commissioners

Date

By: _____
Justin F. Roebuck,
County Clerk/Register

Date

DENNY'S EXCAVATING INC

By:  _____
Ryan Talsma
Vice President

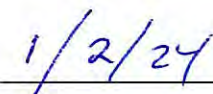
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Date

Exhibit A

BID PROPOSAL AND SPECIFICATIONS

Project: **OTTAWA SANDS PARK RESTROOM
BUILDING**

18280 North Shores Dr., West Olive, MI 49460

Owner:

**OTTAWA COUNTY PARKS and
RECREATION COMMISSION**

12220 Filmore St., West Olive, MI 49460



**LAND AND WATER CONSERVATION
FUND GRANT NO. 26-01892**

Architect:



Landscape Architects and Architects
EAST GRAND RAPIDS • MICHIGAN

529 Greenwood Ave. SE,
Grand Rapids, MI 49506

Bid Specifications Issued: **November 8, 2023**

Proposal Due Date: **December 12, 2023 @ 10:00AM**



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OTTAWA SANDS PARK RESTROOM BUILDING

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(16 sheets)

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Landscape Architecture
Park & Recreation Planning
Urban Design
Sports Facility Planning

SECTION 00 0020 - INVITATION TO BID

Sealed proposals for the **Ottawa Sands Park Restroom Building**, located at 18280 North Shores Dr., West Olive, MI 49460, will be received at the office of Ottawa County Parks & Recreation Commission, 12220 Fillmore Street, West Olive, MI 49460, until **10:00 a.m. local time, December 12, 2023**, at which time all bids will be publicly opened and read aloud.

All bids envelopes shall be labeled:” **Ottawa Sands Park Restroom Building Project**” and shall have the name and address of the bidder on the outside of the envelope.

The scope of work involves: Construction of the Restroom Building and new septic field system serving the restroom building. The restroom building will be heated using underslab hydronic system heated by propane fueled boiler unit. The building envelope will be insulated and the insulation will be installed under the entire building’s concrete floor slab. The flooring at public access areas will be a seamless epoxy system with integral cove base. The hollow metal doors / frames / hardware and metal clad wood awning windows are part of scope of work. The solid surfacing countertops, plastic partitions, toilet rooms accessories are per construction documents. The exterior envelope materials are: concrete masonry units, rigid continuous insulation , painted wood siding and trim, pre-finished standing seam metal roofing with self-adhered underlayment installed over plywood roof sheathing supported by pre-engineered wood trusses and glulam trusses. The project scope includes General, Mechanical, Electrical, Plumbing trades, and Excavation, Backfill, required for the complete building construction work. Septic Field replacement is a part of this proposal and will be installed under this Contract. The Building project contractors are to make final connections to respective trades site utilities.

This project is partially funded by a Land and Water Conservation (LWCF) Fund Grant No. 26-01892 and relevant federal and state requirements apply.

This includes Build America, Buy America requirements. As required by Section 70914 of the Bipartisan Infrastructure Law, none of the funds under a federal award that are part of Federal financial assistance program for infrastructure may be obligated for a project unless all of the iron, steel, manufactured products, and construction materials used in the project are produced in the United States. None of the funds provided under this award may be used for a project for infrastructure unless:

- 1. all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;**
- 2. all manufactured products used in the project are produced in the United States —this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of**



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Architecture
Landscape Architecture
Park & Recreation Planning
Urban Design
Sports Facility Planning

domestic content of the manufactured product has been established under applicable law or regulation; and

3. all construction materials are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States.

The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of the structure or permanently affixed to the infrastructure project.

All contractors and subcontractors must also comply with all requirements of 1976 PA453 (Elliot-Larsen Civil Rights Act), the 1976 PA220 (Persons with Disabilities Civil Rights Act), and Executive Directive 2019-09 as amended so as not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, marital status, partisan considerations, or a disability or genetic information that is unrelated to the individual's ability to perform the duties of a particular job or position.

Bid documents will be available for examination at the Builder's Exchange of Grand Rapids, 678 Front Street N.W., Suite 330, Grand Rapids, MI 49504, Dodge Data & Analytics, 914 E. Vine Street, Kalamazoo, MI 49001, and Ottawa County Parks & Recreation Commission, 12220 Fillmore Street, West Olive, MI 49460.

Bid documents in electronic format (pdf) will be available from MCSA Group, Inc. via e-mail. Contact Jolanta Stecka at jstecka@mcsagroup.com to request a digital copy.

Proposals must be accompanied by a certified check, bank draft of bid bond of an approved surety company doing business in Michigan in an amount equal to five percent (5%) of the total amount proposed. Proposals shall be submitted in accordance with the Information for Bidders of the bid documents.

The Owner (Ottawa County Parks & Recreation Commission) reserves the right to reject any or all bids or any parts of the same, waive any irregularities, and to accept any bid in their own best interest.

Contact Curt TerHaar, Ottawa County Parks & Recreation Commission, at (616) 738-4656, to enquire about access to the site other than during pre-proposal meeting.



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Milestone dates (subject to change after bid documents are issued for Proposal Request) :

Bid Documents Available: Wednesday, November 8, 2023.

Voluntary Pre-proposal meeting: Tuesday, November 21, 2023 at 10:00 AM.

Inquiries/Questions Deadline: Monday, December 4, 2023, by 1:00 PM (e-mail Jolanta at jstecka@mcsagroup.com).

Bid Opening: Tuesday, December 12, 2023 at 10:00 a.m.

Parks Commission Approval : December 20, 2023.

County Commission Approval: January 9, 2024.

Contract awarded: January 16, 2024.

Construction Final Completion: August 1, 2024.

END OF SECTION 00 0020

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SECTION 00 0100 - INFORMATION FOR BIDDERS

1.00 GENERAL:

The purpose of this Request for Proposal (RFP) is to obtain bids from qualified contractors to provide the labor, materials, and equipment necessary to complete the scope of work described herein.

The bidder must demonstrate knowledge and experience in construction on projects of similar scope and size. Bidders must complete all required informational requests and forms listed in the Proposal Specification. Lump Sum bid price is requested in Bid Form document. Based on the response to this RFP, including experience, ability, and bid price submitted, Ottawa County Parks and Recreation Commission will select a contractor to provide the required services.

The work shall begin as soon as Contract obligations are met and Notice to Proceed is issued with following schedule conditions:

1. Substantial Completion shall be achieved by July 1, 2024.
2. Final Completion by August 1, 2024.

2.00 PRE-BID MEETING:

A voluntary pre-bid meeting will be held at project's site: Ottawa Sands Park located at 18280 North Shores Drive, West Olive, MI 49460 on Tuesday, November 21, 2023 at 10:00 AM.

3.00 ISSUING OFFICE :

The RFP is issued by Ottawa County Parks and Recreation Commission. Bid Documents may be obtained or examined at the locations listed in the Invitation to Bid. All correspondence, questions and additional information regarding this RFP shall be submitted via e-mail, no later than 1:00p.m. EST, Monday, December 4, 2023 to: Jolanta Stecka, Architect/Project Manager jstecka@mcsagroup.com .

4.00 FAMILIARIZATION WITH WORK:

Bidders shall be responsible for completely familiarizing themselves with the extent and nature of the work by thoroughly examining the project's plans and specifications, proposal forms, and evaluating the quantities and types of labor, equipment, and materials necessary to complete the work. Bidders can visit the site during park open hours in addition to scheduled voluntary pre-proposal meeting.

COMPLETION OF PROPOSAL FORM:

- 5.00 The bid must be submitted using provided Proposal Form and shall give the price for the items of the work required as shown on the drawings or elsewhere both in writing

and in figures, in ink, and be signed by the bidder with his business address and telephone number. Alteration of the Proposal in any way, inclusion of unsolicited items, failure to comply with the specified procedures for bidding or any other irregularity shall be adequate grounds for rejection of the bid proposal.

6.00 SUBMISSION OF BID PROPOSAL:

Submit Bid Proposal and Security in an opaque, sealed envelope clearly identified with:
1) project name: "Ottawa Sands Park Restroom Building Project"
2) name and address of bidder and in accordance with the Invitation to Bid.

Bidders shall sign and date all documents requested:
1) Proposal Form

Additional Information Requested to be submitted as part of this Proposal:

- 1) On bidder's company letterhead provide references for 3 completed projects of similar scope and size.
- 2) Provide names of subcontractors for following trades:
 - a. Mechanical
 - b. Plumbing
 - c. Electrical
 - d. Septic Field System

Bid Security: required with each bid submittal is a 5% Bid Bond, certified check or Cashier's check. The successful bidder will be required to obtain a Performance Bond and Payment Bond for 100% of the contract total for the project.

The bid bonds of unsuccessful bidders shall be returned within three (3) days after award of the Contract.

7.00 PROPOSAL WITHDRAWAL:

Proposals may be withdrawn at any time before the hour of opening bids. Bid proposals are irrevocable for a period of seventy-five (75) days from the date of the bid opening.

8.00 PERMITTING:

Contractor is solely responsible for compliance with all permits required by local, State and Federal agencies, including but not limited to the Grand Haven Township, the County of Ottawa and SESC. Each bidder must familiarize himself with and conform to all laws, ordinances and codes that might affect the proposed work in any way and shall pay for all permits, fees, and licenses necessary to perform this work.

9.00 RIGHT OF REJECTION:

The Owner reserves the right to reject any or all bids or parts thereof or waive any informality in any bid and to accept any proposal considered to be in their best interest regarding price, quality of service, the contractor's qualifications and capabilities to provide specified service, and other factors that that the Ottawa County Parks and

Recreation Commission (the Owner) may consider including those items which under Michigan law, constitute the basis of qualified bidder.

The Owner reserves the right to accept or further negotiate cost, terms, or conditions of any bid determined by Owner to be in the best interests of Ottawa County Parks and Recreation Commission even though not the lowest bid.

10.00 **ERRORS AND OMISSIONS:**

Bidders shall immediately notify the Architect of any errors, omissions, or discrepancy in the bid documents so the addenda will be provided. Deadlines for submission of RFP's may be adjusted to allow for revisions.

11.00 **QUALIFICATION STATEMENT:**

Each bidder may be asked during the bid review process to complete the Qualification Statement included with the annexed section of Specifications.

12.00 **SUCCESSFUL BIDDER NOTIFICATION:**

The successful bidder will be notified following approval of the bid proposal by the Owner's representative and is to execute the contract, complete with performance sureties and insurance certificates, within 10 days of notifications of award of the Contract.

13.00 **COMMENCEMENT OF WORK:**

The Contractor shall begin the work within five (5) days after execution of the contract and shall proceed in an expeditious and professional manner with the highest quality material and workmanship.

14.00 **PRE-CONSTRUCTION CONFERENCE:**

A pre-construction meeting **may be** held prior to commencement of the work to review items of work and establish a sequence and timetable for the execution of the work.

15.00 **PLANS FOR CONSTRUCTION:**

Prior to construction the successful contractor will be provided with two complete sets of construction plans and specifications. Additional sets of plans may be purchased from the architect at their current schedule of rates for printing and binding of these plans and specifications.

End of Section 00 0100

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Bidder's Name: _____

PROPOSAL FORM

Ottawa Sands Park Restroom Building

TO: Mr. Curt TerHaar, Coordinator
Ottawa County Parks & Recreation
12220 Fillmore St.
West Olive MI 49460

The undersigned bidder has carefully examined the plans and specifications for the construction of Ottawa Sands Park Restroom Building, in West Olive, Michigan, as prepared by MCSA Group, Inc. and, having carefully examined the existing building and site and completely familiarized himself with local conditions affecting the cost of the work; hereby states that he will provide all necessary labor, equipment, tools, machinery, apparatus and all other means of construction, do all the work and furnish all materials called for by said plans and specifications in the manner prescribed by in accordance with the requirements of the contract, specifications and drawings; and will accept as full and complete payment therefore the Lump Sum Bid Amount Which Is The Summation Of The Cost Of The Work Items 1 through 2 in the **Base Bid Total amount** of

_____ Dollars

and _____ Cents (\$ _____)

This is a Lump Sum Bid. The base bid as submitted is for complete construction as shown by the plans, details and specifications.

Ottawa Sands Park Restroom Building Project

BASE BID WORK ITEMS:

Work Items:

Bid Items Amount

Work Item 1. Construction of the Restroom Building,
Work includes general trades,
mechanical, plumbing and electrical work. \$ _____

Work Item 2. Construction of site utilities to the building
including septic field system, site electrical
service and water service.
\$ _____

Bidder's Name: _____

LIST OF SUBCONTRACTORS

LIST ALL SUBCONTRACTORS: To be completed as part of Bid Proposal.

<u>Name of Subcontractor</u>	<u>Type of Work</u>	<u>Amount</u>

The undersigned agrees as follows:

To do any extra work not covered by the above schedule of prices, which may be ordered by the Architect, and to accept compensation therefore as provided in Section 23 of the General Conditions entitled "Unclassified Work".

Begin work as soon as possible after the contract is executed and perform said work in such a manner as to complete it in accordance with the Contract and to coordinate their work with the other contractors involved.

The undersigned acknowledges the right of the Owner to accept or reject any proposal or part of any proposal submitted.

We hereby acknowledge receipt of the following addenda and have included them in our proposal; Addenda Nos. _____

_____ Dated _____

_____ Dated _____

Bidder's Name:_____

Dated this_____day of_____, 2023.

By: Signature of Bidder_____

Name of Business_____

Business Address of Bidder _____

Business Telephone of Bidder_____

Business Fax Number of Bidder_____

Email Address of Bidder_____

Incorporated under the laws of the State of_____

President_____

Secretary_____

Treasurer_____

If Non-incorporated:_____

Names and Addresses of Members of the Firm:

End of Section 00 0400 (Proposal Form)

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OTTAWA COUNTY CONTRACT FOR xxx

This AGREEMENT is made and hereby effective on the _____ day of _____, 20____ by and between the County of Ottawa, a municipality in the State of Michigan, (hereinafter, the "County") acting by and through its duly elected Board of Commissioners, (hereinafter the "Board"), and xxx (hereinafter, "Contractor"), with a principal place of business at xxx.

IT IS HEREBY AGREED AS FOLLOWS:

1. **Scope of Work:** Contractor agrees to provide the "Services" which as detailed in Exhibit A. It shall be the responsibility of the Contractor to employ and assign to the project adequate personnel and equipment required to undertake and complete the work in a diligent, timely and orderly manner.
2. **Compensation:** In consideration for the services to be performed by the Contractor, the County agrees to pay Contractor the compensation set forth on Exhibit B. Payment to the Contractor for services will be under the County's terms of Net 30.
3. **Contract Documents:** The following documents are the entire agreement between the Contractor and the County. The agreement includes the following documents listed below, which are incorporated herein by reference and are deemed to be part of this contract as if set forth in full:
 - a) This Contract (including attached exhibits)
 - b) All Provisions required by law to be inserted in this contract whether actually inserted or not.
4. **Performance**
 - a) Contractor shall perform the work as required by and in accordance with the schedule of time requirements set forth in Exhibit A.
 - b) Failure to complete services as required shall constitute breach of this Contract.
 - c) Contractor shall have five (5) calendar days to cure a breach of this Contract (the "Cure Period"). Failure to cure a breach of this Contract within said Cure Period shall allow the County to, without further notice to the Contractor, declare this Contract terminated and proceed with the replacement of the Contractor and the County shall be entitled to all remedies available to it at law or in equity.
5. **Terms of Contract:** The contract shall commence when signed by both parties and unless terminated earlier in accordance with the terms of this Contract, this Contract period will cover a period from project kick-off to project completion of stated objectives, Exhibit A.

This contract may be terminated prior to completion of the Services at the option of either party, upon delivery of written notice by the terminating party to the other party.

6. Expenses: Contractor shall be responsible for all the Contractor's expenses incurred while performing services under this Contract. This includes license fees, fuel and fleet maintenance, insurance premiums, telephone and all salary/payroll expenses, and other compensation paid to employees or contract personnel that the Contractor hires to complete the work under this Contract.

7. Employees: The Contractor and all Contractor' employees, while on County premises, shall carry proper identification. Examples of proper identification are State issued Driver's License or State issued Identification Card.

The Contractor shall employ only United States citizens, legal residents or legal resident aliens. Upon request of the County, the Contractor shall provide copies of, or access to, work/payroll records and necessary documents to verify status of employees.

The Contractor will be supplied with a phone number to contact in case of an emergency. Access to designated restricted areas is forbidden to Contractor's employees. Restricted area will be designated by the authorized County representative.

8. Materials: Contractor will furnish all materials, equipment and supplies used to provide the services required by this Contract.
9. Background Checks: (as required by the Facility) Contractor employees are subject to background checks to ensure, at a minimum, that no employee has a felony or domestic violence or other bar-able conviction(s). The background checks for Contractor employees will be conducted by the County prior to the commencement of any on-site work.
10. Compliance with Laws, Ordinances, and Regulations and Procurement of Permits:
 - a) This Contract is governed by the laws of the State of Michigan.
 - b) The Contractor shall at all times comply with all local, state and federal laws, rules and regulations applicable to this Contract and the work to be done herewith.
 - c) The Contractor shall obtain, and pay thereof, all permits required by any agency or authority having jurisdiction over the work. The Contractor shall provide a copy of any permit to the County within 3 business days of the County's request.
11. Exclusive Contract: This Contract, including exhibits attached hereto, a County Purchase Order, if applicable, is the entire Agreement between Contractor and the County for the services as detailed in Exhibit A.
12. Modifying the Agreement: This Agreement may be modified only by a writing signed by both parties.
13. Record Keeping: The Contractor shall keep all records related to this Contract for the term of the Contract and 3 years thereafter.

14. **Dispute:** In the event of any conflicts or discrepancies in the wording of any terms, provisions and conditions contained in this Agreement, describing Contractor's obligations and responsibilities hereunder, said conflicts and discrepancies shall be resolved by first applying the interpretation of this Agreement and its exhibits, attachments, and addendums, then the mutually agreed Contractor's planning documents that affirm the details of the Services to be provided. Any agreement or modification of this Agreement shall be written and signed by both parties and will supersede any previous written understandings.

Should any disputes arise with respect to this Agreement, Contractor and County agree to act immediately to resolve any such disputes. Pending resolution of such dispute or difference and without prejudice to their rights, both the Contractor and the County shall continue to respect all their obligations and to perform all their duties under this Agreement.

15. **Jurisdiction and Venue:** The parties' consent to the exercise of general personal jurisdiction over it by the Ottawa Court Circuit Court. Any action on a controversy that arises under or in association with this Agreement shall be brought in the State of Michigan, which both parties agree is a reasonably convenient place for trial of the action. The parties both agree that their consent in accordance with this Section is not obtained by misrepresentation, duress, the abuse of economic power, or other unconscionable means.
16. **Liability and Insurance:** Contractor agrees to indemnify, defend, and hold harmless the County from any and all liability arising out of or in any way related to Contractor's performance of services during the term of this Contract, including any liability resulting from intentional or reckless or negligent acts or the acts of the employees or agents of Contractor. Contractor shall provide proof of the following coverages: Workers' Compensation, employer's liability, comprehensive general liability and if applicable, automobile and professional malpractice. Coverage limits are to be statutory and if no statute is applicable, at least \$1,000,000 per occurrence or claim and \$2,000,000 aggregate. These coverages shall protect the vendor and County and their employees, agents, representatives, invitees and subcontractors against claims arising out of the work performed or products provided.
17. **Relationship of Parties:** The Contractor is an independent contractor and is not an agent or employee of the County for any purpose including, but not limited to, the ability to bind the County and all labor or employee related matters such as tax withholding/reporting, employee wages or benefits, or workers compensation. This Contract is not intended to create any joint venture or partnership of any kind. The provisions of this Agreement are for the benefit of the parties hereto, and not for the benefit of any other person or legal entity.
19. **Subcontracts:** Contractor may not assign or subcontract any rights or obligations under this agreement without the County's prior written approval.

20. Governmental Immunity: The County does not waive its governmental immunity by entering into this Agreement, and fully retains all immunities and defenses provided by law with respect to any action based upon or occurring as a result of this Agreement.
21. Safety: The Contractor shall at all times observe and comply with all federal, state, local and County facility laws, ordinances, rules and regulations that may in any manner affect the safety and the conduct of the work. The Contractor shall indemnify and hold the County harmless against any claim or liability arising from the violation of any such provisions.
22. Absence of Waiver: The failure of either party to insist on the performance of any of the terms and conditions of this Contract, or the waiver of any breach of such terms and conditions, shall not be construed as thereafter waiving such terms and conditions, which shall continue and remain in full force and effect as if such forbearance or waiver had occurred.
23. Notices:
- a) All notices and other communications for the parties may be served, mailed, or delivered at the following addresses:
- If to the Contractor:
- Attn:
- Email:
- If to Ottawa County: Ottawa County
- 12220 Fillmore St.
- West Olive, MI 49460
- Email:

24. **Partial Invalidity:** The partial invalidity of any portion of this Agreement shall not be deemed to affect the validity of any other provision. In the event that any provision of this Agreement is held to be invalid, the parties agree that the remaining provisions shall be deemed to be in full force and effect as if they had been executed by both parties subsequent to the expunction of the invalid provision.
25. **Attorney Review:** The parties represent that they have carefully read this Agreement and have had the opportunity to review it with an attorney. The parties affirmatively state that they understand the contents of this Agreement and sign it as their free act and deed.
26. **No Third Party Benefit:** The provisions of this Agreement are for the benefit of the parties hereto, and not for the benefit of any other person or legal entity.
27. **Availability of Funds:** Each payment obligation of the County is conditioned upon the availability of government funds appropriated or allocated for the payment of this obligation. If funds are not allocated and available for continuance of the services performed herein, either party may terminate this Agreement at the end of the period for which funds are available. The County shall notify the Contractor at the earliest possible time of the services that will or may be affected by the shortage of funds
28. **Miscellaneous:**
 - a) **Force Majeure:** Either party shall be excused from performance under this Agreement for any period of time during which the party is prevented from performing its obligations hereunder as a result of any Act of God, war, civil disobedience, court order, labor dispute, or other cause beyond the party's reasonable control. Such non-performance shall not constitute grounds for default.
 - b) **Title and Headings:** Titles and headings to articles, sections or paragraphs in this Agreement are inserted for convenience of reference only and are not intended to affect the interpretation or construction of the Agreement.
 - c) **Modification:** Any modification of this Agreement or additional obligation assumed by either party in connection with this Agreement shall be binding only if evidenced in a writing signed by either party or its authorized representative.
 - d) **Anticipatory Breach:** If the Contractor, at any time before delivery of services, declares its intent not to perform in accordance with this Agreement, Ottawa County shall have an immediate cause of action for breach of this Agreement, and shall be entitled to all remedies available to it at law or in equity.

In witness whereof, each party to this Contract has caused it to be executed on the date(s) indicated below.

COUNTY OF OTTAWA

By: _____
Joe Moss, Chairperson
Board of Commissioners

Date _____

By: _____
Justin F. Roebuck,
County Clerk/Register

Date _____

COMPANY NAME

By: _____

Date _____

EXAMPLE

GENERAL CONDITIONS

1.00 TERMS DEFINED:

Wherever in the bid or contract documents the term "ARCHITECT" appears, it shall refer to MCSA Group, Inc., or his authorized representative. Wherever the term "OWNER" is used, it shall refer to Ottawa County Parks and Recreation Commission as "Party of the First Part" in the Proposal Agreement and Contract. The term "CONTRACTOR" shall refer to the "Party of the Second Part" in the Proposal Agreement and Contract.

2.00 BOND:

The Contractor shall, at the time of the execution and delivery of the contract and before the taking effect of the same in other respects, furnish and deliver to the Owner a written bond or indemnity to the amount of One Hundred Percent (100%) of the total base price of this contract which is herein stated, in form and substance and with surety thereon satisfactory and acceptable to the Owner, to insure the faithful performance of the Contractor of all the covenants and agreements on the part of the Contractor contained in this contract, or any part thereof, and for the period of extension that may be granted on the part of the Owner as well as for all changes, and modifications of the contract as herein provided, for the prompt payment of all laborers, tradesmen, mechanics, subcontractors for materials, supplies or provisions for carrying on such work, and all just dues and demands incurred in the performance of the work, and to indemnify and save harmless the Owner against any direct or indirect damages that may be suffered or claimed or from injuries to persons or property during the construction of said work until it is accepted, and against claims or royalties on patents and to indemnify and save the Owner harmless from all losses, costs and expenses which it may sustain by reason of any negligence of the Contractor.

3.00 CONTRACTOR'S UNDERSTANDING:

It is understood and agreed that the Contractor has, by careful examination satisfied himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during the prosecution of the work, the general and special conditions, and all other matters which can in any way affect the work under the contract. No verbal agreement or conversation with any officer, agent or employee of the Owner, either before or after the execution of this contract shall affect or modify any of the terms or obligations herein contained.

4.00 SUBSTITUTIONS:

Each bid or proposal shall be based upon the materials and equipment described in the bidding documents. Whenever a material, article or piece of equipment is identified on the Drawings or in these specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other

manufacturers or vendors which will perform comprehensively the duties imposed by the general design will be considered equivalent provided the material, article, or piece of equipment so proposed is, in the opinion of the Architect, equivalent in substance, appearance and function.

No substitution will be considered unless written request has been submitted to the Architect for approval at least seven (7) days prior to the date of receipt of bids. Each such request shall include a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data and any other data or information necessary for a complete evaluation. A bidder requesting approval of a substitute shall also promptly submit additional data requested by the Architect. Only approvals embodied in a written Addendum shall be binding.

Substitutions submitted after bid date will be reviewed for compliance with Construction Documents for a Review Fee (to be charged to the Prime Contractor) as follows:

- A. A minimum review fee of \$250.00 for reviewing and processing non-specified items will be charged to Prime Contractor. Request must be submitted in writing to the Architect with fee attached.
- B. If review time exceeds \$250.00 minimum charge, the additional time will be billed at an hourly rate of \$100.00 per hour to be paid before Architect renders decision.

5.00 **APPROVED EQUAL:**

References to the term "equal" or "approved equal" shall mean that alternate or substitute items shall be equal to or greater in every respect than the item specified. All such substitutions shall be proposed to the Architect in writing prior to bidding. The Contractor shall receive written notice of approval prior to committing himself in any way to the item. The Contractor will be proceeding at his own risk in the absence of a written approval and shall be fully responsible for all removal, replacement and restoration necessary to conform to the Contract and shall incur all costs directly or indirectly related to such activities.

6.00 **PERMITS:**

The Contractor shall be responsible for the procurement of and payment for all permits, and licenses necessary for the complete prosecution of the work.

7.00 **PROTECTION:**

Whenever the local conditions, circumstances, laws or ordinances require, the Contractor shall furnish and maintain, at his own expense and cost, necessary passageways, barriers, lights and such facilities and means of protection as may be required to provide safe conditions at all times.

8.00 **RIGHTS OF VARIOUS INTERESTS:**

Whenever work being done by Owner's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Architect to secure the completion of the various portions of the work in general harmony.

9.00 **CONSENT TO TRANSFER:**

The Contractor shall not let or transfer this contract or any part thereof (except for the delivery of material) without the written consent of the Architect. Such consent does not release or relieve the Contractor from any of his obligations and liabilities under this Contract.

10.00 **SUPERINTENDENCE:**

The Contractor shall constantly supervise all the work embraced in this contract in person or by a duly authorized manager acceptable to the Architect.

11.00 **TIMELY DEMAND FOR INSTRUCTIONS:**

The Contractor shall provide reasonable and necessary opportunities and facilities for review. He shall not proceed until he has made timely demand upon the Architect for, and received from him, such instructions as may be necessary as the work progresses. The work shall be done in strict conformity with such instruction. The Contractor shall furnish the Architect, from his force, sufficient and competent help for any field work in connection with the project which the Architect may require. The Contractor shall employ diligence and care in protecting all points and stakes approved by the Architect. The Contractor shall be responsible also for the failure to follow stakes given him by the Architect as well as failure to conform to other directions or instructions of the Architect, and shall rectify any work which does not conform to the Architect's directions, at his own expense.

12.00 **REPORT ERRORS AND DISCREPANCIES:**

If the Contractor, in the course of the work, finds any discrepancy between the plans and the physical conditions of the locality or any errors or omissions in plans or in the layout as given by said instructions, it shall be his duty to immediately inform the Architect, in writing, and the Architect shall promptly verify the same. Any work done after such discovery, until authorized, will be done at the Contractor's risk.

13.00 **COMPLIANCE:**

All construction shall conform to all aspects of currently enforced the State of Michigan Building Code (MBC), Uniform Federal Accessibility Standards (UFAS), the ADA Accessibility Guidelines for Buildings and Facilities (ADAAG) and the Americans with Disabilities Act (ADA). All work by the Contractor for complete execution of this project shall meet or exceed laws, guidelines, and statutes in every situation. In the event the Contractor believes that any portion of the work is inconsistent with the MBC, UFAS, ADAAG, and ADA they must immediately inform the Architect. For electrical, mechanical and plumbing Codes work shall comply with current enforced respective trades Codes and Standards.

14.00 **INSPECTIONS:**

All work and materials shall be open to the inspection, acceptance and rejection of the Architect or his duly authorized representative at all times. The Contractor shall give the Architect reasonable and necessary facilities for inspection, even to the extent of taking out portions of finished work, if the work is found satisfactory, the cost of taking out and replacement will be paid by the Owner.

15.00 **DEFECTIVE WORK OR MATERIALS:**

The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill his contract as herein prescribed, and defective work shall be made good and unsuitable materials may be rejected, notwithstanding that such work and materials have been previously overlooked by the Owner and accepted or estimated for payment. If the work or any part thereof shall be found defective before the final acceptance of the work, the Contractor shall forthwith make good such defect, without compensation, in a manner satisfactory to the Architect as unsuitable or not in conformity with the specifications, the Contractor shall forthwith remove them from the site. If the Contractor shall fail to replace any defective work or materials after reasonable notice, the Architect may cause such defective work or materials to be replaced and the expense thereof shall be deducted from the amount to be paid the Contractor. It is further expressly agreed that the granting of any progress certificate, the signing of any periodic estimate, or the payment of any money hereunder shall not be considered an acceptance of all or part of the work and shall in no way lessen the liability of the Contractor to replace defective work, though the same may not have been detected prior to the time that such money was paid. All periodic estimates are to be made merely on approximate quantities and shall be subject to correction at the time or before final estimate or final payment is made. However, nothing in this Contract shall be construed to mean that the Owner or its Architect waives or forfeits any right it or he has or had to later complain about defective materials or workmanship.

16.00 **INDEMNITY:**

The Contractor shall defend, indemnify, protect and save harmless the Owner, its Architect and their officers and agents, from all suits or claims of every name or description brought against the Owner or its officers and/or agents for or on account of

any loss, injuries or damages to persons or property received or sustained by any person or persons, or from the Contractor, his servants or agents in or on account of work done under the contract or extensions of, or additions thereto, whether caused by negligence or in consequence of any negligence in guarding the same, or by or account of any improper materials used in its construction or by or on account of any accident or of any acts of omission of the Contractor, his servants or agents; and Contractor further agrees that so much of the money due to him under this agreement as shall be considered necessary by the Owner, may be retained until all such suits or claims for damages aforesaid have been settled, and evidence to that effect has been furnished to the satisfaction of the Owner. This covenant of indemnification shall include reasonable costs and attorney fees incurred in defense of such claim, action, or liability.

17.00 SETTLEMENT FOR WAGES AND MATERIALS:

If at any time during the progress of said work, said Contractor shall fail or neglect to pay for any labor performed, transportation charges, materials furnished, or tools, machinery, appliances, fuel, provisions or supplies of any sort or kind used or consumed in, upon, or on account of said work, for ten (10) days after payment for same shall become due, then the Owner shall have the power to pay for such labor, or for such transportation charges, materials, tools, machinery, appliances, fuel, provisions or supplies, and the amount so paid shall be retained out of the money due or to become due to said Contractor, and said Owner may refuse to make the payment hereinafter mentioned to the extent of such indebtedness until satisfactory evidence in writing has been furnished and said indebtedness has been discharged. In any case, said Owner is hereby authorized and empowered by said Contractor to ascertain by the Architect the amount due or owing from said Contractor, to any laborer, or laborers, or to any person or persons or corporations for labor, transportation charges, materials, tools, machinery, appliances, fuel, provisions or supplies of any sort or kind used or consumed upon, in or on account of work covered by this Contract in such manner upon such proof as the Architect may deem sufficient.

18.00 RISK:

The Contractor shall take all responsibility of the work and shall bear all losses resulting to him on account of the amount and character of the work, because the nature of the land in or upon which the work is done is different from what is assumed or expected or on account of the weather, floods, or other causes.

19.00 ORDER AND DISCIPLINE:

The Contractor shall at all times enforce strict discipline and good order among his employees, and any superintendent, foreman or other employee of the Contractor who shall appear to be incompetent, disorderly, or in any way disqualified or unfaithful to the work entrusted to him, or whom the Architect may consider prejudicial to the prosecution of the work, shall be discharged immediately upon the request of the Architect, and shall not again be employed on the work without the Architect's written consent.

20.00 **CLEANUP:**

The Contractor, on completion of the work, or significant parts thereof, shall put the site in a clean, orderly, usable manner free of construction debris, temporary structures, unnecessary materials or equipment, irregularities in ground grades or other project related conditions. The cost of such clean-up and removal shall be part of the Contract and shall in no way entitle the Contractor to additional fees or payments. Final or partial payments and execution of the Certificate of Substantial Completion will be withheld until such items are completed to the satisfaction of the Architect.

21.00 **AUTHORITY OF ARCHITECT:**

The Architect shall have the authority to reject or condemn all work or materials which does not conform to his contract; to direct application of forces to any portion of the work, which, in his judgement requires it; to order forces increased or diminished, and to decide questions which arise between the parties relative to the execution of the work. All questions or controversies which may arise between the Contractor and Owner under or in reference to this Contract shall be subject to the decision of the Architect, and his decision shall be final and conclusive upon both parties, except in cases where time and/or financial considerations are involved; which, if no agreement in regard thereto is reached, shall be subject to arbitration.

22.00 **AUTHORITY OF OWNER:**

The Owner shall advise the Architect of changes in their financial capability, changes in their understanding of the intent of the plans, concerns for progress or quality of the work or of any other comment or concern related to the work in any way. The Owner shall not directly administer alterations to the work nor direct or supervise any employee or representative of the Contractor in any way at any time without the written consent of the Architect to both parties.

23.00 **UNCLASSIFIED WORK:**

In case any work shall be required to be furnished whether specified herein or indicated on the plans or not, or whether or not such work is typical work listed in the proposal which is in the opinion of the Architect, not susceptible of classification under the Schedule of Unit Prices, the Contractor shall and will, if ordered by the Owner, do and perform such work and furnish such materials as may be required. If possible, an agreement as to the cost and payment for said additional work will be reached and agreed upon by the Owner and Contractor. In the event of failure to reach such satisfactory agreement, the Contractor may be ordered by the Owner to proceed with such work and furnish such materials on a cost plus basis, on which basis the contractor shall receive the cost of any materials which he may be required to purchase plus ten percent (10%) and the cost of any labor which may be required to supply plus fifteen percent (15%). The ten percent (10%) and fifteen percent (15%) of such net cost are for profit, the use of the plant, tools, superintendence, overhead costs, and all other expenses incidental to the performance of such work and the furnishing of such materials, and the Contractor shall have no further claim in excess of the above; but this method of payment shall not apply to the performance of any work or the furnishing of any

materials which, in part or in whole, is in the opinion of the Architect, susceptible of classification under such schedule which work or material shall be paid for in part or in whole as the case may be, at the Unit Price given in such schedule, except as herein otherwise expressly provided.

In case any work or material is required to be done or furnished under the provisions of this article for cost plus ten percent (10%) and fifteen percent (15%) as stipulated above, the Contractor shall at the end of each day, during the progress thereof, furnish to the Architect daily time slips showing the name and/or number of each workman employed thereon, the character of work his workmen are doing the wage paid or to be paid to therefore. If required, the Contractor shall produce any books, vouchers, records or memoranda showing the work and materials actually paid for the actual prices therefore.

Such daily time slips and memoranda shall not, however, be binding upon the Owner and if any question or dispute shall arise as to the correct cost of such work or material, the determination of the Architect upon such question or dispute shall be final and conclusive.

24.00 CHANGES:

The Architect shall have the right to increase or diminish all or any contract amount or items without impairing the volume or scope of this contract so long as these alterations do not change the amount of the contract price more than 35%.

Decreases in the quantity of work by more than 35% does not constitute a claim for damage or for loss of profits on the work to be dispensed with. Such alterations shall not in any way release or impair the bond or the sureties nor will any payments be made for items of work not actually constructed, regardless of the quantities shown in the bid and contract documents.

25.00 UNAVOIDABLE DELAYS - EXTENSION OF TIME:

If the Contractor shall be delayed in the performance of the work from any natural or unavoidable cause or for which the Owner or his authorized representative is responsible, he shall, upon written application to the Architect at the time of such delay, be granted such extension of time as the Architect shall deem equitable and just.

26.00 SUSPENSION OF WORK:

Should the Architect deem it necessary to suspend operations on the work due to severity of the weather, he may notify the Contractor in writing to suspend operations on the entire project or any part thereof, and in the event of such right being exercised, the Architect shall grant to the Contractor an extension of the work. The Contractor shall on not less than ten (10) days notice, again resume the work if ordered to do so by the Architect. The Owner shall also reserve the right to suspend operations for any reason that it may deem necessary for a period not longer than ten (10) days, at any one time in which event the Contractor will be allowed an extension of time equivalent to the time that the work has been suspended. Should such a suspension be deemed necessary by the Owner, the Contractor shall have no claim for damage due to such suspension.

27.00

EXPEDITING WORK:

(A) **Correcting Imperfections:** If the Architect or the Owner shall at any time be of the opinion that the Contractor is neglecting to remedy any imperfections in the work, or is not progressing with the work as fast as necessary to insure its completion within the time and as required by the contract, or is otherwise violating any of the provisions of this contract, said Architect, on behalf of the Owner, shall have the power, and it shall be his duty to notify the Contractor to remedy such imperfections and/or proceed more rapidly with said work, or otherwise comply with the provisions of this contract.

(B) **Annulment:** In such case the Owner may give the Contractor ten (10) days written notice, and at the end of that time, if the Contractor continues to neglect the work, the Owner may provide labor and materials and deduct the cost from any money due the Contractor under this agreement and may terminate the employment of the Contractor under this agreement and take possession of the premises and of all materials, tools, and appliances thereon, and employ such forces as may be necessary to finish the work. In such case the Contractor shall receive no further payment until the work shall be finished, when, if the unpaid balance that would be due under this Contract exceeds the cost to the Owner of finishing the work, such excess shall be paid to the Contractor; but if such cost exceeds such unpaid balance, the Contractor shall pay the difference to the Owner.

(C) **Owner May Do Part Of Work:** Upon failure of the Contractor to comply with any notice given in accordance with the provisions hereof, the Owner shall have the alternative right, instead of assuming charge of the entire work, to place additional forces, tools, equipment, and materials on parts of the work for the purpose of carrying on such parts of the work and the costs incurred by the Owner in carrying on such parts of the work shall be payable by the Contractor and such work shall be deemed to be carried on by the Owner on account of the Contractor, and the Contractor shall be allowed therefore, the contract price. The Owner may retain the amount of the cost of such work, with seven percent (7%) added for any such sum or sums due or to become due the Contractor under this agreement.

28.00

PAYMENT TO CONTRACTOR:

At the end of each thirty (30) days following the agreed upon starting date for the work under this agreement, the Contractor shall estimate the quantities of work completed and have the quantities invoiced verified by the Architect. The Architect will certify the amount due the Contractor within 5 working days after receipt. The Owner shall pay the Contractor up to ninety percent (90%) of the amount of the approved invoice within thirty (30) days after receipt.

All partial and final payment requests shall be submitted in duplicate on AIA Documents G 702 and G 703, Application and Certificate for Payment, and shall completely describe and account for all items in accordance with the provisions of the forms. No other forms of payment requests will be accepted.

Upon completion of the work and certification of acceptance by the Owner and its representatives, the ten percent (10%) retained during construction shall be paid to the

Contractor. In the event a performance bond is not in force and effect, the retained ten percent (10%) shall be retained by the Owner for the one year guarantee period, after which and if all work is still in acceptable condition the Contractor shall be paid in full.

At the time of issuance of the Certificate of Completion, the Contractor shall be paid the full amount due him within forty-five (45) days. All prior estimates upon which partial payments have been made, being merely estimates, shall be subject to adjustment in the final certification. Before final payment is made, the Contractor shall show to the Owner satisfactory evidence that all just liens, claims and demands of his employees or from parties from whom material used in the construction of the work may have been purchased or procured as duly satisfied, and that the material furnished and the work done are fully released from all such liens, claims and demands.

29.00 **ACCEPTANCE:**

The Architect shall inspect the work for acceptance within ten (10) days of receipt of written notice from the Contractor that he is ready for such inspection. The listing of items to be completed on a "Certificate of Substantial Completion" or "Punch List" does not constitute a final acceptance of the work and the Contractor shall not submit a final billing on that basis.

30.00 **INSURANCE:**

The Contractor shall comply with the laws of the State of which the work is performed regarding employment and payment of employees, and shall maintain insurance satisfactory to the Owner to protect both himself and the Owner from claims under workmen's compensation acts and from any other damages for personal injury, including deaths, which may arise from operations under this Contract, whether such operations by himself or by any subcontractor or anyone directly or indirectly employed by either of them. Certificates of such insurance shall be filed with the Architect and shall be subject to his approval for adequacy of protection.

The Contractor shall furnish the Owner Certificates of Insurance evidencing such protection. The Contractor shall provide and maintain Workmen's Compensation Insurance for all of his employees employed at the site of the work; General Liability and Contingent or Protective Insurance as shall protect himself and the Owner from any and all claims that may arise from damage for personal injury, including accidental death as well as for claims for property damage which may arise from operations under this Contract. For the purpose of this agreement, the contractor shall carry the following types of insurance in at least the limits specified as follows:

<u>Coverages</u>	<u>Limits of Liability</u>
Builders Risk	Same Amount as Total Contract
General Liability	
Commercial General Liability	\$1,000,000.00 Gen. Aggregate \$500,000.00 Each Occurrence

Automobile Liability Combined Single Limit	\$500,000.00
Excess Liability Umbrella Form	\$1,000,000.00 Each Occurrence \$1,000,000.00 Aggregate
Workman's Compensation	Statutory Limits \$100,000.00 Each Accident

All policies affording the various coverages required by this section shall be endorsed to provide for a thirty (30) day prior written notice to be delivered to the Certificate Holder before any of the coverages afforded by these policies are either reduced or canceled.

The General Liability Policy shall name MCSA Group, Inc. and Ottawa County Parks and Recreation Commission as additional insured for the length of the agreement.

The name of the project should be listed on the Certificate of Insurance.

The Contractor is advised that the Owner is not liable for the safety, security, or condition of his equipment or materials.

31.00 **TIME AND RESPONSIBILITIES:**

The work under this agreement shall be inspected by the firm of MCSA Group, Inc., 529 Greenwood Avenue S.E., East Grand Rapids, Michigan 49506, herein called the Architects. The Contractor shall be responsible to said firm as agents of the Owner, as well as the Owner for proper execution of said agreement. The Contractor shall notify the Architect, in writing, of concerns about their ability to conform to work progress schedules outlined at the pre-construction of any other work-related items in ample time to avoid unnecessary delays or alterations to the Contract.

32.00 **DAMAGES FOR NONCOMPLETION:**

The Owner shall withhold the aforesated amount of not less than \$250.00 Dollars per day for each day of suitable working weather, except for Sundays and legal holidays, that the Contractor exceeded the specified date for completion of the work as compensation for liquidated damages and additional costs suffered by the Owner due to the Contractors failure to complete the work as specified.

In the event the Architect is required to provide construction administration for inspection services after the specified completion date, the cost of this work shall be paid by the Contractor. The cost of these services shall be \$146.00 per hour, including: all travel time; all on-site time; and all office administration time. These costs shall be deducted from outstanding retainage and paid by the Owner to the Architect. Additionally, the Contractor shall pay for travel expense to and from the site at \$.53 per mile. The cost of these services shall be deducted from the contract retainage and paid

by the Owner to the Architect.

33.00 **GUARANTEE:**

The Contractor shall guarantee all materials, equipment, and workmanship against defects for a period of one (1) year from the date of final acceptance. Any failure of materials during this period shall be removed and completely replaced and guaranteed for one year at no additional cost to the Owner.

34.00 **MAINTENANCE:**

The Contractor shall provide maintenance, as specified, on all landscape materials during and after construction through the one (1) year guarantee period, which begins on the date of certification of final acceptance or as herein specified.

35.00 **CONTRACTORS IDENTIFICATION SIGN:**

The Contractor shall furnish and install a contractor's identification sign which lists all construction contractors and design and engineering firms by name and type of work. Sign layout shall be approved by the Architect prior to painting. Location on the site shall be as directed by the Architect. The Contractor shall furnish this sign as part of the contract with no additional cost to the project.

36.00 **SHOP DRAWINGS:**

The Contractor shall submit digital format of all shop drawings for any manufactured or fabricated item of work for review and approval prior to commencement of that work. Subcontractor shop drawings shall be submitted through the prime Contractor and shall be checked and approved by the Contractor prior to submission to the Architect.

Shop drawings shall clearly and accurately illustrate every aspect of the item of work and include dimensions, types of materials, fasteners, finishes, space requirements, performance and quality ratings and approvals and all other relevant information.

Shop drawings shall be required for all work items that are not totally described in the plans and specifications or for items that require unusual or specialized fabrication, whether or not it is so stated.

Submit shop drawings with a transmittal indicating the date of submission, project title, contractor identification, number and title of each item submitted, deviations from contract and statement of action required. Approved shop drawings shall be signed by the Contractor and the Architect.

37.00 **PRODUCT DATA AND SAMPLES:**

Product data and samples shall be submitted for all items specified or requiring further clarification, for purposes of modifying or substituting a specified material or to determine acceptability of a given product. Submissions should include the name of the source, specific product characteristics and capabilities, product cost and all other

relevant information in sufficient size and description to make a realistic evaluation of the material.

38.00 MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS:

All product materials, equipment and site furnishings of any kind shall be installed as specified and recommended by the manufacturer. The Contractor shall obtain from each manufacturer their comprehensive specifications and recommendations for utilization of their product. All assembly, installation and utilization shall be in conformance with the manufacturer's specifications and recommendations. In the event that any portion of these specifications and related plans and details vary from the manufacturer's specifications and recommendations, it shall be the Contractors' responsibility to immediately notify the Architect prior to any construction for clarification and directions on product utilization and installation.

39.00 RECORD DOCUMENTS: (AS-BUILTS)

Record documents are defined to include those documents or copies relating directly to performance of the work, which Contractor is required to prepare or maintain for Owner's records, recording work as actually performed. In particular, record copies show changes in work in relation to work in which shown or specified by original contract documents; and show additional information of value of Owner's records, which was not indicated in original contract documents. Record copies include marked-up product data submittals, record samples, and field reports for variable miscellaneous record information on work which is otherwise recorded only schematically or not at all.

A. At the time of substantial completion, submit record drawings to Architect for Owner's records. Organize into sets, bind and label sets for Owner's continued use.

40.00 OPERATING AND MAINTENANCE DATA: (MANUALS)

"Operating and Maintenance Manuals" are to be prepared for the Owner and the Owner's personnel. These manuals contain information necessary for the safe and efficient operation and maintenance of equipment and operating systems, and information relative to the inspection, care and maintenance or repair of products and finishes.

Each manual shall include the following:

- General system or equipment description.
- Copies of applicable shop drawings and product data.
- System equipment identification, including name of manufacturer, model number and serial number of each component.
- Operating instructions.
- Emergency instructions.
- Wiring diagrams.
- Inspection and test procedures.
- Maintenance instructions and procedures.
- Precautions against improper use and maintenance.
- Copies of Warranties.

Repair instructions including spare parts listing.
Names and addresses of sources of required maintenance materials and related services.

41.00 **CONTRACTOR COORDINATION:**

The Contractor shall make every effort to coordinate every aspect of his work with that of other contractors on the site to assure an efficiently managed and proper installation. Special attention shall be given to the coordination of utility service installation and related construction.

End of Section 00 0700 General Conditions (GC)

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GENERAL REQUIREMENTS

SECTION 01 0000

Sections of Division 1, General Requirements, are specifications written to cover the administrative requirements and work related requirements of the Contract. This Division is intended to supplement the requirements of the Contract Specifications, in any instance where Division one contradicts or does not agree with the Contract Specifications, the Contract shall take precedence. The basic titles and section numbers are as follows:

<u>TITLE</u>	<u>SECTION NO.</u>
Summary of Work.....	01 0100
Allowances	01 0200
Measurements and Payments	01 0250
Alternates	01 0300
Coordination	01 0400
Regulatory Requirements	01 0600
References	01 0900
Special Project Procedures	01 1000
Demolition/Removal Project Procedures	01 1100
Project Meetings.....	01 2000
Submittals.....	01 3000
Mobilization.....	01 3100
Survey and Layout Data	01 3300
Quality Control.....	01 4000
Construction Facilities and Temporary Controls	01 5000
Soil Erosion and Sedimentation Control	01 5650
Material and Equipment.....	01 6000
Storage and Protection.....	01 6200
Facility Start Up	01 6500
Contract Close Out.....	01 7000
Project Record Documents.....	01 7200
Warranties and Bonds.....	01 7400

SUMMARY OF WORK

SECTION 01 0100

1.1. GENERAL

- A. General information covering the "Scope of Work" is specified on Section 00 0020 - Invitation to Bid. Additional information is as follows:
1. The **work** for the new Sands Park Restroom Building project includes a new septic field system and reconnecting to the site utilities. The septic system installation is part of this contract. This project's work includes making final connections to the site utilities. The General Contractor is responsible for providing all services and coordination necessary for the proper execution and completion of the **work**.

ALLOWANCES

SECTION 01 0200

1.1. GENERAL

- A. Inspection and Testing Allowances:
1. Bidders must include in their Base Proposal all costs for testing certifications as required to be done by the **Contractor** as specified in Section 01330 and 01400 and for project stakeout.

MEASUREMENT AND PAYMENT

SECTION 01 0250

1.1. GENERAL

- A. Schedule of Values: Before subdivision of first application for payment, the **Contractor** must submit a Schedule of Values, approved by the **Professional**, of the various tasks that must be performed to complete all the **work**. The schedule must show each task and the corresponding value of the task, including separate monies allocated for withholding. The aggregate total value for all tasks must be equal to the total contract sum.

ALTERNATES – Not Applicable

SECTION 01 0300

1.1. GENERAL

- A. The Contract will be awarded on the basis of the Base Proposal Sum stated on the Proposal and Contract, and any alternates selected by the Owner.

COORDINATION

SECTION 01 0400

1.1. GENERAL

A. Project Coordination:

1. Prior to beginning **work** the **Contractor** must meet with the **Owner** and arrange the schedule for the project. Once the project is started, it must be carried to completion without delay.
2. Phasing of **work** must be clearly established and verified with the **Engineer** prior to commencing **work** in any area. No **work** will begin until authorized by the Owner.
3. Any facility utility service interruptions or outages, including security, required by the **Contractor** in performing the **work** must be prearranged with the **Owner** and must occur only during those scheduled times.

B. Coordination:

1. If a scheduling conflict occurs between the **Contractors** and other work authorized by the **Owner**, the parties must provide 48 hour advance written conflict notification to the **Professional** who must coordinate and provide resolutions and re-scheduling without affecting the contract.
2. Coordination, mutual scheduling and excellent working relationships with all parties is necessary and specific for this project.
3. The **Contractor** must do all cutting, fitting or patching of the work that may be required to make its parts fit together properly or make new **work** join with the existing site features. The **Contractor** must take proper precautions so as not to endanger any existing **work**.

REGULATORY REQUIREMENTS

SECTION 01 0600

1.1. GENERAL

A. Regulations:

1. **LAWS:** The **Contractor** and its **Subcontractors/Suppliers** must comply with all Federal, State and local Laws applicable to the **work** and site.
2. **Codes:** All **works** must be provided in accordance with the State Construction Code Act, 1972 PA 230, as amended, MCL 125.1501 et seq., and all applicable Michigan construction codes and fire safety including but not limited to: Michigan Building Code, Michigan Rehabilitation of Existing Buildings Code, Michigan Uniform Energy Code, National Electrical Code & Michigan Part 8 Electrical Rules, Michigan Mechanical Code, International Fire Protection Code and Michigan Plumbing Code, MBC, 1966 PA 1 MCL 125.1351 to 125.1356

ICC/ANSI A117.1. If the **Contractor** observes that any Contract Document conflicts with any Laws or the State Construction Code or any permits in any respect, the **Contractor** must promptly notify the **Professional** in writing. If the **Contractor** provides any **work** knowing or having to reason to know of such conflict, the **Contractor** must be responsible for that performance.

3. **Permits:** All required construction permits must be secured and their fees including inspection costs must be paid by the **Contractor**. The time incurred by the **Contractor** in obtaining construction permits must constitute time required to complete the **work** and does not justify any increased to the Contract time or Price, except when revisions to the drawings and/or Specifications required by the permitting authority cause the Delays. The **Contractor** must pay all charges of Public Utilities for connections to the **work**, unless otherwise provided by Cash Allowances specific to those connections. The project is not in a critical dune area, MDEQ permit not required.
4. **Taxes:** The **Contractor** must pay all Michigan sales and use taxes and any other similar taxes covering the **work** that are currently imposed by legislative enactment and as administered by the Michigan Department of Treasury, Revenue Division. If the **Contractor** is not required to pay or bear the burden or obtains a refund of any taxes deemed to have been included in the Bid and Contract Price, the Contract Price must be reduced by a like amount and that amount, whether as a refund or otherwise, must ensure solely to the benefit of the Owner.
5. **Safety and Protection:** The **Contractor** and its Subcontractors/Suppliers must comply with all applicable Federal, State and Local laws governing the safety and protection of persons or property, including, but not limited to the Michigan Occupational Safety and Health act (MIOSHA), 1974 PA 154, as amended, MCL 408.1001 et seq., and all rules promulgated under the Act. The **Contractor** is responsible for all damages, injury or loss to the **work**, materials, equipment, fines, and penalties as a result of any violation of such Laws, except when it's due to the fault of the Drawings or Specifications or to the Act, error or omission of the **Owner** or **Professional**. The **Contractor** is solely responsible for initiating, maintaining and supervising all safety precautions and programs and such responsibility must continue until such time as the **Professional** is satisfied that the **work**, or **work** inspected, is completed and ready for final payment. In doing the **work** and/or in the event of using explosives, the **Contractor** must take all necessary safeguards and provide the necessary protection to prevent damage, injury or loss to: (a) all employees on the **work** and other persons who may be affected by the **work**, (b) all the **work** and materials and equipment to be incorporated into the **work**, whether stored on or off the site, and (c) other property at or adjacent to the site, including trees, shrubs, lawns, walks, pavements, roadways, piers, structures, utilities, and Underground Utilities not designated for removal, relocation or replacement. In the event of severe weather, the **Contractor** must inspect the work and the site and take all reasonably necessary actions and precautions to protect the **work** and ensure that public access and safety are maintained.

6. **Michigan Right to Know Law:** The **Contractor** and its Subcontractors/Supplies must comply with MIOSHA, Michigan Right-to-Know Law, Public Act 80 of 1986 (ACT) and the rules promulgated under it. The act places certain requirements of employers to develop a communication program designed to safeguard the handling of hazardous chemicals through labeling of chemical containers and development and availability of Material Safety Data Sheets (MSDS), and to provide training for employees who **work** with these chemicals and develop a written hazard communications program. The Act also provides for specific employee rights, including the right to be notified of the location of MSDS and to be notified at the site of new revised MSDS within five Business Days after receipt and to request MSDS copies from their employers. The **Contractor**, employer or Subcontractor must post and update these notices at the site.
7. **Environmental Requirements:** The **Contractor** and its subcontractors/suppliers must comply with all applicable Federal, State and Local environmental Laws, standards, orders or requirements including but not limited to the National Environmental Policy Act of 1969, as amended, Michigan Natural Resources and Environmental protection Act. P.A. 4561 or 1994, and amended, the Clean Air Act, as amended, Pollution Prevention Act, as amended, Resource Conservation and Recovery Act, as amended, National Historic Preservation Act, as amended and Energy Policy and Conservation Act.
8. **Nondiscrimination:** For all contracts in amount of \$5,000.00 or more, or for Contracts entered into with parties employing three or more employees; in connection with the performance of **work** under this Contract, the **Contractor** and its Subcontractors and Supplies must comply with the following requirements:
 - a. Not to discriminate against any employee or applicant for employment because of race, color, religion, national origin, age, sex, height, weight or marital status and take affirmative action to ensure that applicants are employed and the employees are not subject to such discrimination. Such action must include, but is not to be limited to, the following: employment, upgrading, demotion or transfer; recruitment advertising; layoff termination; rates of pay or other forms of compensation; and selection for training.

REFERENCES

SECTION 01 0900

1.1. GENERAL

- A. References will be made in an abbreviated alpha numeric form to specific standard specifications, reference publication and building codes of federal or State agencies, manufacturers, associations or trade organizations. Such references will be identified by the alphabetic affrication which identifies the government agency, the association or organization followed by the rule, section or detail number that are to form a part of

these specifications, the same as if fully set forth herein, and must be of latest issued date in effect three months prior to the bid opening date shown on the Proposal and Contract. The abbreviations used are as follows:

<u>Abbreviation</u>	<u>Agency, Association or Organization</u>
ACI	American Concrete Institute
AISC	American Institute of Steel Construction, Inc.
ANSI	American National Standards Institute, Inc.
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society of Testing & Materials
AWS	American Welding Society
AWWA	American Water Works Association
BOCA	Building Officials & Code
CDA	Copper Development Assn., Inc.
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard
F/M	Factory Mutual Research Corporation
FS	Federal Specifications
HEW	United States Department of Health Education & Welfare
MDOT	Michigan Department of Transportation
MDEQ	Michigan Department of Environmental Quality
NEC	National Electric Code
NFPA	National Fire Protection Agency
NSF	National Sanitation Foundation Testing laboratory, Inc.
NSWMA	National Solid Waste Management Association
PCA	Portland Cement Association
UL	Underwriters Laboratories, Inc.
USACOE	United States Army Corp of Engineers
USBM	United States Bureau of Mines
USDC	United States Department of Commerce

SPECIAL PROJECT PROCEDURES

SECTION 01 1000

1.1. GENERAL

- A. It is the intent, that for the duration of the project, the **Contractor** will be responsible for all construction barricades and enclosures, traffic control, construction signage, job site security measures, and relevant site restoration work. In the event that unforeseen, excessive or beyond typical damage is caused by the **Contractor**, the **Professional** reserves the right to apportion incurred costs for associated work at their own discretion and at no cost to the **Owner**. This includes needed extension times for barricades, traffic control, security measures, etc. due to extended delays by the **Contractor**.
- B. The **Contractor** must post appropriate construction signs to advise the occupants and visitors of occupied facilities of the limits of construction **work** areas, hardhat areas, excavations, construction parking and staging areas, etc. The **Contractor** must

maintain safe and adequate pedestrian and vehicular access to fire hydrants, commercial and industrial establishments, churches, schools, parking lots, hospitals, fire and police station and like establishments. The **Contractor** must obtain written approval from the **Owner** ten Calendar Days before connecting to existing facilities or interrupting the services on site.

C. Barriers and Enclosures:

1. The **Contractor** must furnish, install and maintain as long as necessary and remove when no longer required adequate barriers, warning signs or lights at all dangerous points throughout the **work** for protection of property, workers and the public. The **Contractor** must hold the City of the Village of Douglas harmless from damage or claims arising out of any injury or damage that may be sustained by any person or persons as a result of the **work** under the Contract.

D. Traffic Control and Barricades:

1. If needed, traffic control work shall be in accordance with the requirements of Section 812 of the 2012 MDOT Standard Specifications for Construction and as herein specified. The Contractor is advised that the current Michigan Manual of Uniform Traffic Control Devices (MMUTCD) is hereby established as governing all work in connection with traffic control devices, barricade lighting, etc., required on this project. Necessary emergency work performed by the City or any other emergency service due to non-compliance of the approved traffic control plan will be billed against the Contractor
2. The Contractor shall maintain local traffic on all local streets at all times. Walks, driveway and entrances to buildings shall not be unnecessarily blocked. Vehicular access shall be maintained to all State, public and commercial properties designated by the Professional at all times. Construction shall be completed in such a manner as to maintain the required entrance width for traffic at all times.
3. Existing street name signs, stop signs and other existing traffic signs removed by the Contractor due to construction activity shall be reset temporarily by the Contractor where required. Salvaged signs to be incorporated into the new construction will be reinstalled by the Contractor as soon as final grading and work is completed in the section involved.

E. Construction Aids:

1. The **Contractor** must furnish, install and maintain as long as necessary and remove when no longer required, safe and adequate scaffolding, ladders, staging, platforms, railings, hoisting equipment, etc., as required for proper execution of the work. All construction aids must conform to Federal, State, and local codes or Laws for protection of workers and the public.
2. Pumping and Drainage: The **Contractor** must provide all pumping necessary to

keep excavations and trenches free from water the entire period of **work** on the Contract. The **Contractor** must construct and maintain any necessary surface drainage systems on the **work** site so as to prevent water entering existing structures or to flow onto public or private property adjacent to the Agency's land, except for existing drainage courses or into existing drainage systems. The **Contractor** must prevent erosion of soils and blockage of any existing drainage system.

DEMOLITION/REMOVAL PROCEDURES

SECTION 01 1100

a. GENERAL

- A. Furnish all equipment, materials, labor, services and transportation necessary to complete all demolition, removal and legal disposal required in connection with the existing park's structures and systems sections to be removed as needed for execution of this contract work.
- B. The **Contractor** and the Subcontractors for the various trades shall remove the materials related to their respective trades as required to permit the construction of the new **work** as shown.
- C. Preparation: Protect all existing **work** that is to remain and restore in an approved manner any such **work** that becomes damaged.
 - 1. Rubbish and debris resulting from the **work** shall be removed immediately from the site and legally disposed of by the **Contractor**.
 - 2. The **Contractor** should coordinate with the **Owner** prior to work to identify items within or nearby work area that shall be salvaged. All salvaged material should be stockpiled on site at the location chosen by the **Owner**. Any items being reused shall be stockpiled safely away from all construction activity and protected from any damage that may harm these items or deem them unusable.
- D. Coordination: Demolition **work**, in connection with any new unit of **work**, shall not be commenced until all new materials required for completion of that new item of **work** are at hand.

PROJECT MEETINGS

SECTION 01 2000

1.1. GENERAL

- A. **Pre-Construction Conferences:** The **Professional** will schedule a pre-construction conference to be attended by the **Professional**, **Owner**, and the **Contractors**. A project procedure will be established for the **work** during the pre-construction meeting. When no organizational meeting is called, the **Contractor**, before beginning any **work**,

must meet with the **Professional** and arrange a **work** schedule for the Project. Once the Project has been started, the **Contractor** must carry it to completion without delay.

- B. Progress Meetings: The **Professional** will schedule bi-weekly progress meetings to be held on the job site to supply information necessary to prevent job interruptions, to observe the **work** or to inspect completed **work**. The **Contractor** must be represented at each progress meeting by persons with full authority to act for the **Contractor** in regard to all portions of the **work**.

SUBMITTALS

SECTION 01 3000

1.1. GENERAL

Shop Drawings, Samples and Technical Data: Within 20 days of notice of award of contract and prior to the delivery of any material or equipment to the job site, the **Contractor** must submit to the **Professional**, a complete list of material suppliers, Subcontractors, and brand names of all materials required by the Contract Documents. Each submittal must be stamped/certified to indicate that the **Contractor** has satisfied the requirement of the Contract Documents and all trade construction Submittals must be coordinated, reviewed and stamped/approved by the **Contractor** before submission to the **Professional**. Before each submission, the **Contractor** must (a) determine and verify all field measurements, quantities, dimensions, instructions for installation and handling of equipment and systems, installation requirements (including location, dimensions, access, fit, completeness, etc.), materials, color, catalog numbers, and other similar data as to correctness and completeness, and (b) have reviewed and coordinated that technical Submittal with other technical submittals and the requirements of the Contract Documents. The **Contractor** must give the **Professional** specific written notice of any variation from the requirements of the Contract Documents. Neither the **Owner's** authority to review any of the Submittals by the **Contractor**, nor the **Owner's** decision to raise or not to raise any objections about the Submittals, creates or poses any duty or responsibility on the **Owner** to exercise any such authority or decision for the benefit of the **Contractor/Subcontractor/Supplier**, any surety to any of them or any other third party. The **Contractor** is not relieved of responsibility for errors or omissions in shop drawings, product data, samples, or similar submittals just because the **Professional** approved them. The finalized As-Built/Record Documents and approved Submittals must be required for processing final payment to the **Contractor**. Thereafter, the **Contractor** must submit to the **Professional** with such promptness as to cause no delay in the **work**, a electronic format (pdf) of shop drawings, product data catalogs, material schedules, safety data sheets, etc. Following examination by the **Professional**, the **Contractor** will be responsible for distribution of pdf documents to respective subcontractors. The Closeout documents require **Contractor** to furnish electronic (pdf) format and one hard copy of the approved submittals. The required submittals are listed in respective Sections of the Project specifications. It is the **Contractor's** responsibility to fully review contract documents and understand the submittal requirements for the projects and it's components.

- A. Submit the following information printed on each and every sheet of shop drawings and on the cover page of each and every specification, catalog or pamphlet.
- Name and location of the Project
 - Drawing No.
 - Date of Drawing
 - **Contractor's** signature and approval stamp indicating that the information is accurate and complete and conforms to the intent of the drawings and specifications.
 - A 3-inch wide by 3-inch high clear space for the **Professional** submittal approval stamp.

MOBILIZATION

SECTION 01 3100

PART 1 – GENERAL

1.1 SUMMARY

- A. The section describes work to be done with regard to mobilization for the **Contractor**.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The contractor shall refer to MDOT standard Specifications for Construction 2012 Section 150.

PART 3 - EXECUTION

3.1 GENERAL

Bidders shall examine the site and make their own estimates of the work specified herein. **Contractor** is responsible for coordination among subcontractors.

PART 4 – METHOD OF MEASUREMENT

- A. The MOBILIZATION and other general requirements shall be measured on a LUMP SUM basis for payment.

PART 5 – BASIS OF PAYMENT

- A. The LUMP SUM price for the MOBILIZATION and other general requirements found in this specification shall include all materials, equipment, design, and supervision for mobilization as described herein and any incidentals necessary for completion of the work specified herein and as shown on the Contract drawings or as directed by the Owner.

Payment will be made under:

ITEM NO.	ITEM
010000.01	Mobilization & General Conditions

PAY UNIT
Lump Sum

SURVEY AND LAYOUT DATA

SECTION 01 3300

1.1 GENERAL

- A. The **Contractor** is responsible for establishing and maintaining all lines and levels required for laying out and construction the **work**. The **Contractor** agrees to assume all responsibility due to inaccuracy of any **work** of the surveyor, and including incorrect bench marks, their loss or disturbance. **Contractor** shall notify the project **Professional** when staking so that the project **Professional** may review stakeout prior to construction **work** being done. Upon completion of the **Project** the **Contractor** must submit two copies of site layout drawings prepared for the **Project** and certified by the surveyor.
- B. Any discrepancies between proposed plan location control points and actual locations of built elements shall be identified and brought to the attention of the **Professional** prior to placement or construction of said elements. In instances of discrepancies, layout dimensions on plans shall govern placement of project elements.

QUALITY CONTROL

SECTION 01 4000

1.1. GENERAL

- A. **Testing Services:** The following general classifications of work require submission of test reports and/or Certificates of Inspection. Additional submissions may be requested by the **Professional** at any time.

<u>ITEM OF WORK</u>	<u>TYPE OF INFORMATION</u>	<u>SECTION NUMBER</u>
Soil	Compaction	31 2000
Concrete	Strength	03 3000

- B. Paving Materials: Before placement of any pavement, the **Contractor** must submit to the **Professional's** approval complete data on proposed mixes.
- C. Typical Note: **Contractor** must prepare and submit for approval and usage.
- Submittal Register Listing all Submittals Required
 - Quality Control Inspection Program for all **work** Items
 - Construction Schedule

These must be submitted and approved well in advance of the start of construction.
See drawings, project documentation and specification manual.

CONSTRUCTION FACILITIES AND TEMP. CONTROLS

SECTION 01 5000

1.1. GENERAL

- A. The **Contractor** must furnish and install all temporary facilities, utilities and controls required by the **work**, must remove them from Sands Park property upon completion of the **work**, and the grounds and existing facilities must be restored to their original condition.
- B. If water and electricity is available in the area where **work** will be performed, the **Contractor** will not be charged for reasonable use of these services for construction operation. The **Contractor** must pay costs for installation and removal of any temporary connections including necessary safety devices and controls. Use of services must not disrupt or interfere with operations of the Owner.
- C. Temporary Sanitary Facilities:
 - 1. Portable Toilets: The **Contractor** must provide and maintain portable temporary toilets in locations approved by the **Owner**. There must be sufficient number of the **work** force and they must comply with all federal, State and local code requirements. The **Contractor** must maintain the temporary toilets in a sanitary condition at all times and must remove them when the **work** under this contract is complete. The **Contractor's** employees are not allowed to use any existing **Owner** toilet facility without prior permission.
 - 2. Public Toilets: If available, the **Owner** will designate a permanent toilet facility on the premises for use by personnel employed in the **work**. The **Contractor** must repair any damage to the toilet facility caused by their employees and maintain it in a clean and sanitary condition.
- D. Field Office:
 - 1. **On Site Trailer**: At the beginning of the **work**, the **Contractor** may provide a field office with temporary storage building at the site in a location acceptable to the **Owner**. The building may be a trailer. The **Contractor** must provide such other temporary buildings as he may require for the use of workers and safe storage for tools and materials. Job signs with **Contractor's** name, logos, specialty, etc., are not allowed.
 - 2. Coordinate placement locations with **Owner**.

SOIL EROSION AND SEDIMENTATION CONTROL

SECTION 01 5650

1.1. GENERAL

- A. All **work** under this Contract must comply with the typical storm water management requirements of the Project and comply with the applicable Soil Erosion and

Sedimentation Control (SESC) rules and regulations. The SESC permit is not required.

MATERIALS AND EQUIPMENT

SECTION 01 6000

1.1. GENERAL

- A. The **Contractor** must furnish and be reasonable for all materials, equipment, facilities, tools, supplies and utilities necessary for completing the **work**. All materials and equipment must be provided as described in the Contract Documents and of good quality, free of defect and new and must be applied, installed, connected, erected, used, cleaned and conditioned following the manufacturer's and Supplier' instructions.

Delivery, storage, and Handling: All materials and equipment delivered to and used in the **work** must be suitably stored and protected from elements that will cause material damage or an undesirable product. The areas used for storage must only be those approved by the **Owner**. The **Owner** assumes no responsibility for stored material. The ownership and title to materials will not be vested in the **Owner** before materials are incorporated in the **work**, unless payment is made by the **Owner** for stored materials and equipment as specified in Section 008100. After delivery, before and after installation, the **Contractor** must protect materials and equipment against theft, injury or damage from all causes.

1. Bulk materials subject to deterioration because of dampness, the weather or contamination must be covered and protected while in storage. Materials in containers must be kept in original sealed containers, unopened, with labels plainly indicating manufacturer's name, brand, type and grad of material. Containers that are broken, opened, watermarked and/or contain caked, lumpy or otherwise damaged materials are unacceptable and must be immediately removed from the **work** site.
2. Equipment susceptible to water damage and stored outdoors must be kept form contact with the ground, away from areas subject to flooding and covered with weatherproof plastic sheeting or tarpaulins.
3. The **Contractor** must certify that any martials stored off-site are:
 - a. Store on property owned or leased by the **Contractor** or owned by the Owner.
 - b. Insured against loss by fire, theft, flood or other hazards.
 - c. Properly stored and protected against loss or damage.
 - d. In compliance with the plans and specifications.
 - e. Specifically allotted, identified and reserved for the project.
 - f. Itemized for tracking and payment.

- g. Subject to these conditions until the items are delivered to the project site.

STORAGE AND PROTECTION

SECTION 01 6200

1.1. GENERAL

- A. Except as otherwise approved by the **Professional**, determine and comply with manufacturer's recommendations on product handling, storage, and protection.
- B. Packaging:
 - 1. Deliver products to the job site in their manufacture's original container, with labels intact and legible.
 - 2. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 3. Promptly remove damaged material and unsuitable items from job site, and promptly replace with material meeting the specified requirements, at no additional cost to the **Owner**.
 - 4. The **Professional** may reject as non-complying such material and products that do not bear identification satisfactory to the **Professional** as to manufacturer, grade, quality, and other pertinent information.
- C. Protection:
 - 1. Provide protection for finished surfaces in vehicle or foot traffic areas prior to allowing equipment or materials to be moved over such surfaces.
 - 2. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the **Owner**.

FACILITY START UP

SECTION 01 6500

1.1. GENERAL

- A. **Tests:** The complete installation consisting of the several parts of equipment and systems installed according to the requirements of the Contract Documents must be ready in all respects for use by the **Owner** and must be subjected to a test at full operating conditions and pressures for normal conditions of use.
- B. **Adjustments:** **Contractor** must adjust and replace the **work** which is necessary to fulfill the requirements of the Contract Documents and to comply with the directions and

recommendations of the manufacturer of the several parts of equipment, and to comply with all provisions of **Professional's** drawings/specifications and all codes and regulations which may apply to the entire installation.

- C. **Demonstrate: Contractor** must provide an on-site demonstration and training of all systems operations to the **Owner** when it is substantially completed.

CONTRACT CLOSE OUT

SECTION 01 7000

1.1. GENERAL

- A. Substantial Completion:

The **Contractor** must notify the **Professional**, when the **work** will be substantially complete and ready for inspection and preparation of a list of minor replacement, correction and adjustment items. The **Contractor** must be represented on the job site at the time this inspection is made and thereafter must complete all **work** by the date set for final acceptance by the **Owner**.

- B. Cleaning:

1. Regular Cleaning: The **Contractor** must remove all scrap or removed material, debris or rubbish from the project **work** site at the end of each working day and more frequently whenever the **Owner** and/or Field Representative deems such material to be a hazard. The **Contractor** cannot discard materials on the grounds of the **Owner** without the express permission. No salvage or surplus material may be sold on the premises of the **Owner**. No burning of debris or rubbish is allowed. Any recycled materials must be recycled and the **Contractor** will be required to provide recycling plan.
2. Final Cleaning: Just before final acceptance by the **Owner**, the **Contractor** must clean all of the **work** and existing surfaces, dock elements and contents that were dirtied by their operations and make repairs for any damage or blemish that was caused by the **work**.

PROJECT RECORD DOCUMENTS

SECTION 01 7200

1.1. GENERAL

- A. The **Contractor** must furnish to the Owner, along with their request for final payment, reproducible drawings of plans, and any section or details necessary, clearly showing the actual as-builts, utilities and equipment installed in the project. Plans must be drawn at a scale of $\frac{1}{4}'' = 1'-0''$ or larger.
- B. The **Contractor** shall provide copies of approved shop drawings and other submittals of relevant product data, finishes materials / colors information, warranties, contact

information for suppliers, maintenance and operation manuals, stock materials for paint and stains, and wall tiles, sign copy of any conducted training / demonstration for the **Owner's** park operations staff.

WARRANTIES AND BONDS

SECTION 01 7400

1.1. GENERAL

- A. The **Contractor** must obtain and forward to the **Owner** any special warranties or requirements of the contract documents. All required material must accompany **Contractor's** request for final payment, including all operation and maintenance data required by the contract documents.

END OF SECTION

CONTRACT SPECIFICATIONS

SECTION 00 09 00

1. COORDINATION

- A. It shall be the full responsibility of the General Contractor to coordinate and expedite all project's work, including work of his subcontractors. All other trades, subcontractors and/or separate contractors shall cooperate fully with the General Contractor.
- B. It shall be the full responsibility of the Contractor to coordinate all of his work with the Owner and to provide sufficient notice to the Owner for relocation of items that the Owner will be required to relocate.
- C. The General Contractor shall be kept informed of the progress of all his subcontractors, including separate contractors and shall notify the Architect of any lack of progress immediately.
- D. Total completion of this project is the responsibility of the General Contractor. The General Contractor shall coordinate the work of the various contractors and subcontractors and shall notify them when portions of construction have reached the state requiring installation of their work or when materials are to be furnished and/or installed by them.
- E. The General Contractor shall give his personal supervision to work or provide a General Superintendent acceptable to the Owner and Architect. The Contractor shall be responsible for basic layout work and for materials, workmanship, transportation, scaffolding, tools, utensils, etc., for the complete and substantial erection of everything shown and described and shall be responsible for obstructions to streets, drives, etc. Subcontractors shall provide adequate number of Foreman or Assistant superintendents to supervise their subdivisions of work. Such men shall be thoroughly experienced and capable of handling the crafts and type of work under their supervision.
- F. The General Contractor shall provide and maintain his own scaffoldings, ladders, and the like for access to various parts and levels as necessary for erection and completion of this work and the work of his subcontractors and other contractors.

2. FIELD ENGINEERING

CONTRACTOR and SUB-CONTRACTOR Responsibilities:

- A. CONTRACTORS shall visit the site of the work, compare the drawings and specifications with any work in the place, and inform themselves of all conditions, including other work, if any, being performed. Failure to visit the site will in no way relieve the CONTRACTOR from the necessity of furnishing any material or performing any work that may be required to complete the work in accordance with the Contract Documents.
- B. CONTRACTORS shall be responsible for the correct installation of their work to comply with the construction drawings and specifications.

- C. CONTRACTORS shall notify the Architect of any discrepancies in the Contract Documents prior to performing the work.
- D. CONTRACTORS shall have a copy of the Contract Documents on the site at all times during the performance of the work.
- E. CONTRACTORS shall immediately locate all general reference points and take such action as is necessary to prevent their destruction; lay out their work and be responsible for all lines, elevations and measurements of buildings, grading, paving, utilities and other work executed by him under the Contract. He must exercise proper precaution to verify figures shown on drawings before laying out work and will be held responsible for any error resulting from his failure to exercise such precaution. He shall maintain at the work site at all times.
- F. CONTRACTORS shall verify grades, lines, levels, locations, volumes and dimensions as shown on the drawings and report any errors or inconsistencies to the ENGINEER before commencing work. Starting of work by the CONTRACTOR shall signify his acceptance.

3. SUBMITTALS

- A. The CONTRACTOR is to inform the Architect on the morning of each day that work will not be performed on site because of inclement of threatening weather and shall keep a detailed log of days worked. This information will be used to determine possible extensions of time, if applicable.
- B. The CONTRACTOR is responsible for all submittals required by the contract documents.

4. CONSTRUCTION FACILITIES & TEMPORARY STORAGE

A. TEMPORARY ELECTRICAL SERVICE

The General Contractor shall provide temporary electrical service for use of all trades and any necessary lighting or power incidental to the construction and pay for same.

The necessary extension cords required in addition to the above wiring shall be provided by each Contractor or Subcontractor requiring the same.

B. TEMPORARY LIGHTING

Do not reuse materials used for temporary service in permanent installation unless specifically approved by the Architect. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work.

C. TEMPORARY SANITARY FACILITIES

The CONTRACTOR shall provide and maintain a State Board of Health approved chemical toilet for the use of all workmen of all trades. The toilet shall be placed in an inconspicuous place, kept clean and removed when no longer needed.

D. TEMPORARY FIRST AID FACILITIES

All CONTRACTORS shall comply with the requirements of the "Manual of Accident Prevention in Construction", Associated General Sub-contractors of America, Inc., latest

edition, Section 2, First Aid, and have on the site a first aid kit, dustproof, protected from heat and moisture and containing, as a minimum, the first aid items listed according to the number of employees.

E. MATERIAL STORAGE

If materials likely to be damaged by the weather are to be stored at the site, the Contractor shall provide on the premises where directed, suitable watertight storage shelters of sufficient size, having floors raised at least 6" above the ground on heavy joists or sleepers, in which he shall store all materials required on the site at one time.

The storage area is to be in a location that will not interfere with the construction operations or owner access to facilities. Should the area available not be sufficient for full storage of his materials and equipment, the Contractor will be required to provide arrangements elsewhere at his own expense, and adequately covered by insurance.

The Contractor is fully responsible for the security of their respective materials and equipment.

F. FENCES

Existing fences which interfere with the work shall be removed by the CONTRACTOR and restored to their original condition when the work is completed, unless the Contract Documents indicate otherwise.

G. TREE AND PLANT PROTECTION

It is the responsibility of the CONTRACTOR to protect all trees, shrubs, lawns, etc. not specifically designated for removal by the OWNER or Architect.

H. BARRIERS AND ENCLOSURES

- a. The CONTRACTOR shall provide all temporary sidewalks, barricades and safeguards together with sufficient lighting during periods when the work is not in progress. Such protection shall be subject to approval of the OWNER or ENGINEER. However, failure of the OWNER or ENGINEER to supervise such protection shall in no way relieve the CONTRACTOR of his responsibility according to the laws of this State and OSHA.
- b. The CONTRACTOR shall be responsible for the erection and maintenance of all barricades, guard rails, lights and sign necessary for public safety and convenience. All hazards within the limits of the work or detour around the work must be marked with well-painted well-maintained barricades, lanterns, torches, flares, reflectors, electric lights, flashers, or caution, warning and directional signs in sufficient quantity and size to adequately protect life and property. These safeguards shall be moved, changed, increased or removed as required during the progress of the work to meet changing conditions.
- c. Barricades shall be placed in front of and around all excavations, obstructions or construction areas so as to clearly define such areas to both drivers of vehicles and pedestrians. Whenever practical, the barricades shall be placed within three to six feet of the excavation or obstruction, and so placed that headlight beams of approaching vehicles will strike the barricades and reflecting devices head on.

- d. The CONTRACTOR shall also comply with "Occupational Safety and Health Act" requirements issued by the Federal Government and/or adopted by the State, and local laws, rules and regulations, as they apply.
- e. The OWNER reserves the right to remedy any neglect on the part of the CONTRACTOR as regards the protection of the work and public after twenty-four hours notice in writing except in case of emergency when it shall have the right to remedy any neglect without due notice and in either case to deduct the cost of such remedy from any money due or to become due the CONTRACTOR.

I. PROTECTION OF WORK & PROPERTY

The OWNER will not be responsible for security on the site of the work. Each CONTRACTOR will be held responsible for loss or injury to persons or property where his work is involved and shall provide (if he deems it necessary) such watchmen and take such other precautionary measures as he may deem necessary to protect his own interests.

J. STORAGE AND PROTECTION

The CONTRACTOR shall provide protection against vandalism, rain, wind, storms, cold or heat so as to maintain all work, materials, apparatus, equipment, and fixtures incorporated in the work or stored on the site, free from injury or damage. At the end of the day's work, the CONTRACTOR shall cover all new work likely to be damaged. Items, which require dry storage, such as electrical controls and motors, shall be stored in a dry building and not under tarps.

END OF SECTION 00 9000

OPERATION AND MAINTENANCE DATA

SECTION 01 9200

PART 1 - GENERAL

1.01 SUMMARY

- A. To aid the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding products incorporated into the work, furnish and deliver the data described in this section and in pertinent other sections of these Specifications
- B. Related work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, Sections in Division 1 of these Specifications.
 - 2. Required contents of submittals also may be amplified in pertinent other sections of these Specifications.

1.02 SUBMITTALS

- A. Comply with pertinent provisions of Division 1 – Section 01300.
- B. Unless otherwise directed in the pertinent other sections, or in writing by the Professional, submit two hard copies and one digital of the final manual to the Professional prior to indoctrination of operation and maintenance personnel and other Owner representatives.

1.03 QUALITY ASSURANCE

- A. In preparing data required by this section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in technical writing to the extent needed for communicating the essential data.

PART 2 - PRODUCTS

2.01 INSTRUCTION MANUALS

- A. Where instruction manuals are required to be submitted under other sections of these Specifications, prepare in accordance with the provisions of this section.

B. Format:

- 1. Size: 8-1/2" x 11"
- 2. Paper: White bond, at least 20 lb. weight
- 3. Text: Neatly written or printed
- 4. Drawings: 11" in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and

provide a drawing pocket inside rear cover or bind in with text.

5. Flysheets: Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
 6. Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the Manual; 3-ring binders will be acceptable; all binding is subject to the Professional's approval.
 7. Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs, and cfm; where items may be expected to be measured within ten years in accordance with metric formulae, provide additional measurements in the "International System of Units" (SI).
- C. Provide front and back covers for each Manual, using durable material approved by the Professional, and clearly identified on or through the cover with at least the following information.

OPERATING AND MAINTENANCE INSTRUCTIONS

()
(Name and address of Work)
(Name of **Contractor**)
(General subject of this Manual)
(Space for signature of the)
(Professional and approval date)

- D. Contents: Include at least the following:
1. Neatly typewritten index near the front of the manual, giving immediate information as to location within the manual of all emergency data regarding the installation.
 2. Complete instructions regarding operation and maintenance of all equipment involved, including lubrication, disassembly, re-assembly, fuel, mechanical including water, sanitary, electrical systems, start-ups, operations, and winter shutdown procedures.
 3. List of **subcontractor** and major suppliers, names, addresses and phone numbers.
 4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor/supplier, and all other pertinent data regarding procurement procedure.
 5. Copy of all guarantees and warranties issued. Provide a separate clearly stated list of warranties/guarantees that extend beyond the basic one year overall warranty for equipment, materials, and systems specifically identified the stated list.
 6. For all items and equipment installed as required per project submittal, copies of manufacturers' bulletins, catalog cuts, and descriptive data, where pertinent clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data with which the installation is not concerned.

7. Written instructions for winter shut down and spring start up instructions for all systems written specifically for this project.
8. Copies of test results including bacteriological, pressure testing, gradation, compaction and concrete test results. Copies of building code agency final inspection approvals/Certificate of Occupancy, including building, mechanical, fuel, plumbing, electrical, and other required approvals.
9. Copies of all systems operational demonstration sign-in sheets.
10. Such other data as required in pertinent other sections of these Specifications.

PART 3 - EXECUTION

3.01 INSTRUCTION MANUALS

- A. Preliminary:
 1. Prepare a preliminary draft of each proposed manual.
 2. Show general arrangement, nature of contents in each portion, probably number of drawings and their size, and proposed method of binding and covering.
 3. Secure the Professional's approval prior to proceeding with final.
- B. Final: Complete the Manuals in strict accordance with the approved preliminary drafts and the Professional's review comments.
- C. Revisions:
 1. Following the indoctrination and instruction of operation and maintenance personnel, review all proposed revisions of the manual with the Professional.
 2. If the **contractor** is required by the Professional to revise previously approved manuals, compensation will be made as provided for under "Changes" in the General Conditions.
- D. Approved Manual: After final approval is given by the Professional, submit two (2) hard copy manuals and one (1) digital to the Professional who will forward to the Owner.

END OF SECTION

SECTION 03 2000 - CONCRETE REINFORCING

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:
 - 1. Steel reinforcement bars.
 - 2. Welded-wire reinforcement.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of steel reinforcement.
 - 2. Zinc repair material.
 - 3. Bar supports.
- B. Shop Drawings: Comply with ACI SP-066:
 - 1. Include placing drawings that detail fabrication, bending, and placement.
 - 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
 - 1. Location of construction joints is subject to approval of the Architect.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Statements: For testing and inspection agency.
- B. Welding certificates.
 - 1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M
- C. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, **Grade 60 (Grade 420)**.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, **Grade 60 (Grade 420)**, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
- a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- C. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than **0.0508 inch (1.2908 mm)** in diameter.

2.3 FABRICATING REINFORCEMENT

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

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than **1 inch (25 mm)**, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with **ACI 318 (ACI 318M)**.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 36 bar diameters at splices, or **24 inches (610 mm)**, whichever is greater.
 - 2. Stagger splices in accordance with **ACI 318 (ACI 318M)**.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed **12 inches (305 mm)**.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus **2 inches (50 mm)** for plain wire and **8 inches (200 mm)** for deformed wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.

4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement.
 2. Continue reinforcement across construction joints unless otherwise indicated.
 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with **ACI 117** (**ACI 117M**).

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 1. Steel-reinforcement placement.

END OF SECTION 032000

CAST-IN-PLACE CONCRETE

SECTION 03 3000

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 cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
 - 1. Footings.
 - 2. Foundation walls.
 - 3. Slab-on-grade.
- B. Related Requirements:
 - 1. Section 31 1000 "Earth Moving" for excavation and fill under footings and slabs-on-grade.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Recycled Content Product Data: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
 - 2. Design Mixtures: For each concrete mixture containing fly ash as a replacement for portland cement or other portland cement replacements, and for equivalent concrete mixtures that do not contain portland cement replacements.
- C. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- D. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar

diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

- E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

- 1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and for Testing agency.
- B. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and accessories.
 - 3. Curing compounds.
- C. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to the Owner or Owner's representative qualified according to ASTM C 1077 and ASTM E 329 for concrete installation testing.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform materials evaluation tests and to design concrete mixtures.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301.
 2. ACI 117.

2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
 3. Overlaid Finnish birch plywood.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

- D. Chamfer Strips: If design indicates chamfers , use wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25%.
- B. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- C. Steel Bar Mats: ASTM A 184, fabricated from ASTM A 615, Grade 60, deformed bars, assembled with clips.
- D. Plain-Steel Wire: ASTM A 1064.
- E. Deformed-Steel Wire: ASTM A 1064.
- F. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064, plain, fabricated from as-drawn steel wire into flat sheets.
- G. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064, flat sheet.
- H. Epoxy-Coated Rebar (where indicated): ASTM A 775/A.

2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
 1. Portland Cement: ASTM C 150/C 150M, Type I, gray, unless otherwise noted.
 2. Fly Ash: ASTM C 618, Class f or C.
- C. Normal-Weight Aggregates: ASTM C 33, Class 3 coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 1. Maximum Coarse-Aggregate Size: 1/3 slab thickness, nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 1. Water-Reducing Admixture: ASTM C 494, Type A.
 2. Retarding Admixture: ASTM C 494, Type B.
 3. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.
- F. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
 1. Products:
 - a. Grace construction Products, W.R.Grace & Co.; DCI.
 - b. Master Builders, Inc.; Rheoconcrete CNI.
 - c. Euclid Chemical Co.;
 - d. Or approved equal.
- G. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
 1. Products:
 - a. Grace construction Products, W.R.Grace & Co.; DCI-S.
 - b. Master Builders, Inc.; Rheoconcrete 222+.
 - c. Sika Corp.; FerroGard 901.
 - d. Or approved equal.

2.6 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. Products:
 - a. Fortifiber Building Systems Group; Moistop Ultra 15.
 - b. Raven Industries Inc.; Vapor Block 15.
 - c. Reef Industries, Inc.; Griffolyn 15 mil Green
 - d. Or approved equal.
- B. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick.

2.7 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating. Use limited to exterior slabs.

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1752, cork or self-expanding cork.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 according to ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types I and II, nonload bearing for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
 3. Ground Granulated Blast-furnace Slag Cement: 50 percent.
 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-furnace Slag Cement: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Normal-weight concrete.
1. Minimum Compressive Strength: 3500 psi at 28 days.
 2. Maximum W/C Ratio: See ACI 318.

3. Slump Limit: 4 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
4. Air Content: to be determined in accordance with ASTM C173.

B. Foundation Walls: Normal-weight concrete.

1. Minimum Compressive Strength: 3500 psi at 28 days.
2. Maximum W/C Ratio: See ACI 318.
3. Slump Limit: 4 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
4. Air Content: to be determined in accordance with ASTM C173.

C. Slabs-on-Grade: Normal-weight concrete.

1. Minimum Compressive Strength: 3500 psi at 28 days.
2. Maximum W/C Ratio: See ACI 318.
3. Minimum Cementitious Materials Content: 470 lb/cu. yd.
4. Slump Limit: 4 inches, plus or minus 1 inch.
5. Air Content: To be determined in accordance with ASTM C 173.
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.12 FABRICATING REINFORCEMENT

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

2.13 CONCRETE MIXING

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

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
1. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.

- E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. When indicated on design details, chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
- M. Trench footing: Trench footing (earth formed) in place of formed footings and foundation walls will not be allowed.

3.2 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR-RETARDER INSTALLATION

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

3.5 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect during review of shop drawings.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or derbies to form a uniform and open-textured surface plane before excess bleed water appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1.

- F. Hot-Weather Placement: Comply with ACI 301.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 20; and of levelness, F(L) 15; with minimum local values of flatness, F(F) 15; and of levelness, F(L) 10; for slab-on- grade.
- C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - a. Use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 LIQUID FLOOR TREATMENT APPLICATION

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 2. Do not apply to concrete that is less than 14 days' old.
 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1-part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 - 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 - 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose

particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

- A. Special Inspections: Contractor will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Steel reinforcement welding.
 - 3. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

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CONCRETE UNIT MASONRY

SECTION 04 2200

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:
 - 1. Concrete masonry units, including bullnose profile units at interior walls outside corners.
 - 2. Ground-face (burnished) concrete masonry units at base of building's perimeter.
 - 3. Mortar and grout.
 - 4. Steel reinforcing bars.
 - 5. Masonry-joint reinforcement.
 - 6. Ties and anchors.
 - 7. Embedded flashing.
 - 8. Stone trim units (where indicated on drawings).
 - 9. Miscellaneous masonry accessories.
- B. Products Installed but not Furnished under This Section:
 - 1. Steel shelf angles for supporting unit masonry to be coordinated with structural drawings lintel schedule.
- C. Related Requirements:
 - 1. Section 05 5000 "Metal Fabrications" for installing steel lintels.

1.3 DEFINITIONS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
 - 1. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
 - 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.

3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications as needed for complete installation of masonry work.
- C. Samples for Verification: For each type and color of the following:
1. BCMU(s), in the form of small-scale units.
 2. Pigmented mortar.
 3. Accessories embedded in masonry.

1.5 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Material Certificates: For each type and size of the following:
1. Masonry units.
 - a. Include data on material properties.
 2. Integral water repellent used in BCMUs. Masonry wall sealer.
 3. Cementitious materials. Include name of manufacturer, brand name, and type.
 4. Mortar admixtures.
 5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 6. Grout mixes. Include description of type and proportions of ingredients.
 7. Joint reinforcement.
 8. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide bullnose units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C 90.
1. Density Classification: Normal weight.
 2. Size (nominal): As indicated on drawings. Manufactured to dimensions 3/8 inch less than nominal dimensions.
 3. Density Classification: normal weight, load bearing capacity weight.
 4. Size (nominal):
 - a. Building Exterior – New Walls Base and Perimeter Wall extensions: 8" wide x 8" high x 16" long, all nominal dimensions.
 - b. Interior – 8" wide and 6" wide x 8" high x 16" long, all nominal dimensions.
 - c. Interior –partition: bullnose at outside corners, 4" wide x 8" high x 16" long, all nominal dimensions.
- C. Ground-face (Burnished) concrete masonry unit at base of building's perimeter/ pilasters.
1. ASTM C 90, hollow, load-bearing.
 2. Size (nominal): 4" thick x 8" high x 16" long.
 3. Grade N, 2-core, typ.
 4. Basis – of - Design: Units as manufactured by Consumers Concrete Corp., color to be selected by Architect from manufacturer's standard products colors.
 5. Or equal as approved by Architect prior to bid.

2.3 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse Type M grout. Provide minimum 4" bearing for openings less than 6'-0" wide, and 8" bearing for wider openings. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 MORTAR AND GROUT MATERIALS

- A. General: Do not use admixtures, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated:

1. Do not use calcium chloride in mortar or grout.
 2. Use masonry cement mortar unless otherwise indicated.
- B. Masonry Cement: ASTM C 91.
- C. Mortar Cement: ASTM C 1329.
- D. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Aggregate for Grout: ASTM C 404.
- F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- G. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996, Grade 60.
- B. Masonry-Joint Reinforcement, General: ASTM A 951.
1. Interior Walls: Hot-dip galvanized carbon steel.
 2. Exterior Walls: Hot-dip galvanized carbon steel.
 3. Wire Size for Side Rods: 0.187-inch diameter.
 4. Wire Size for Cross Rods: 0.187-inch diameter.
 5. Wire Size for Veneer Ties: 0.187-inch diameter.
 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
 7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.
- C. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.

2.6 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82, with ASTM A 153, Class B-2 coating.

- C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.075-inch-thick steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete.

2.7 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 - 1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016-inch-thick – at top of 10" wide BCMU wall (Building's Exterior Base).
 - 2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 - 3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
 - 4. Solder metal items at corners.
- B. Flexible Flashing: Use one of the following unless otherwise indicated:
 - 1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Dayton Superior Corp.; Dur-O-Wall Division; Dur-O-Barrier Thru-Wall Flashing.
 - 2) Grace Construction Products, W.R. Grace & Co.; Perm-A-Barrier Wall Flashing.
 - 3) W.R. Meadows, Inc.; Air-Shield Thru-Wall Flashing.
 - 4) Wire Bond; Aqua Flash 500, 40 mil.
 - 5) Or approved equal.
 - b. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
- C. Application: Unless otherwise indicated, use the following:
 - 1. Where flashing is indicated to receive counterflashing, use metal flashing.
 - 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
 - 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing or flexible flashing with a metal drip edge. Where flashing is fully concealed, use flexible flashing.
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- E. Termination Bars for Flexible Flashing: Use type recommended by Flexible Flashing manufacturer.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).
- B. Weep/Cavity Vent Products: Use one of the following unless otherwise indicated:
 - 1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Heckman Building Products, Inc.; No.85 Cell vent.
 - b. Hohmann and Barnard, Inc.; QV Quadro-Vent.
 - c. Advance Building Products, Inc.; Mortar Maze cell Vent.
 - d. Or approved equal.
- C. Pan flashing: Use pan flashing with an integral weep spouts and integrated edge flanges; 7" x 14" drainage mats.
 - 1. Products: BlockFlash by Mortar Net Solutions or approved equivalent product.

2.9 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
- B. Products: Subject to compliance with requirements, provide available offering product from one of the following manufacturers:
 - 1. ProSoCo, Inc.; Sureklean 600.
 - 2. Deitrich Technologies, Inc.
 - 3. EaCo Chem, Inc.
 - 4. Or approved equal.

2.10 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use masonry cement mortar unless otherwise indicated.
 - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type S.
 3. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 4. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Thickness: masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

3.2 TOLERANCES

- A. Dimensions and Locations of Elements:
 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2-inch total.
- B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond with accent pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build not load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Joint Firestopping material.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- C. Cut joints flush where indicated to receive cavity wall insulation and air barriers unless otherwise indicated.

3.5 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

3.6 ANCHORING MASONRY TO STRUCTURAL CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 1 inch wide between masonry and concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally.

3.7 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 1. Install preformed control-joint gaskets designed to fit standard sash block.

3.8 LINTELS

- A. Install steel lintels at openings where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.
- D. Grout all masonry lintels solid.

3.9 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams. Provide pre-molded plastic weeps in the head joints of the same course of masonry.
 3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 4. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

3.10 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 60 inches.

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level 1 Special Inspections according to the "International Building Code".
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 4. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
 - 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 04 2200

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METAL FABRICATIONS

SECTION 05 5000

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:
 - 1. Loose steel lintels furnished but not installed under this section.
 - 2. Galvanized steel tube posts at Changing Stalls.
 - 3. Galvanized steel frames for Changing Stalls wall panels.
 - 4. Galvanized steel screen / mesh panels at Changing Stalls wall panels (upper sections).
 - 5. Galvanized steel wall mounted brackets for benches at Changing Stalls.
 - 6. Items 2. through 5. shall be fabricated per configuration shown on Construction Documents drawings. Installation is under this section work.
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
 - 2. Section 042200 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Paint products.
- B. Shop Drawings: Show fabrication and installation for following:
 - 1. Loose steel lintels. Include anchorage and accessory items information.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53, Standard Weight (Schedule 40) unless otherwise indicated.

2.2 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A, with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

2.3 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.4 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

2.5 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize and prime shelf angles located in exterior walls.
- D. Prime shelf angles located in exterior walls with zinc-rich primer.

2.6 LOOSE STEEL LINTELS

- A. All lintels, tubes and structural and other structural steel – conform to ASTM A36.
- B. Fabricate loose steel lintels from shapes of sizes indicated for the openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to for a single unit where indicated.
- C. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.

2.7 STEEL WALL PANELS FRAMES, TUBULAR POSTS AND BENCH BRACKETS

- A. All steel angles, tubular posts and bench brackets other structural steel – conform to ASTM A36.
- B. Fabricate Changing Stalls wall panels frames, tubular posts and benches brackets from shapes of sizes indicated on the Construction Documents drawings. Weld adjoining members together to form a single unit.
- C. Size miscellaneous elements of Changing Stalls wall panels framing to provide secure attachment of wall paneling and bench seat materials. Provide for attachment of galvanized screen/ mesh section at the upper part of walls' panels.
- D. Galvanize all loose steel elements to be used for framing Changing Stalls.

2.8 STEEL FINISHES

- E. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153 for steel and iron hardware and with ASTM A 123 for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- F. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

3.2 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 5000

ROUGH CARPENTRY

SECTION 06 1000

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:
 - 1. Framing with dimension lumber.
 - 2. Wood blocking and nailers.
 - 3. Wood furring and grounds.
 - 4. Plywood backing panels.
- B. Related Requirements:
 - 1. Section 061600 "Sheathing" for sheathing.
 - 2. Section 061753 "Shop-Fabricated Wood Trusses" for wood trusses made from dimensional lumber.

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA: National Lumber Grades Authority.
 - 2. SPIB: The Southern Pine Inspection Bureau .
 - 3. WWPAA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 3. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat all rough carpentry unless otherwise indicated.

2.3 DIMENSION LUMBER FRAMING

- A. Joists, Rafters, Wall Framing and Other Framing Not Listed Above: Construction or No. 2 grade.
 - 1. Species:
 - a. Hem-fir (north); NLGA.
 - b. Southern pine; SPIB.
 - c. Douglas fir-larch; WCLIB or WWPA.
 - d. Southern pine or mixed southern pine; SPIB.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Furring.
 - 4. Grounds.
 - 5. Utility shelving.
- B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any of the following species:
 - 1. Hem-fir (north); NLGA.
 - 2. Mixed southern pine or southern pine; SPIB.
 - 3. Eastern softwoods; NeLMA.
- C. Utility Shelving: Lumber with 19 percent maximum moisture content of any of the following species and grades:
 - 1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 - 2. Mixed southern pine or southern pine; No. 2 grade; SPIB.
 - 3. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
- D. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:
 - 1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
 - 2. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.

- E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: ICC-ES AC70.
- D. Wood Screws: ASME B18.6.1.
- E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers.

2.7 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- C. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
- D. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 1. Use inorganic boron for items that are continuously protected from liquid water.
 2. Use copper naphthenate for items not continuously protected from liquid water.
- F. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. Table 2304.9.1, "Fastening Schedule," in Michigan Building Code currently adopted edition.
 2. ICC-ES evaluation report for fastener.
- H. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1000

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SHEATHING

SECTION 06 1600

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:
 - 1. Wall sheathing.
 - 2. Interior wall sheathing.
 - 3. Roof sheathing.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for lumber framing, plywood backing panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 2. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

- A. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- B. Factory mark panels to indicate compliance with applicable standard.

2.3 WALL SHEATHING

- A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2 sheathing.
 - 1. Span Rating: Not less than 16/0.
 - 2. Nominal Thickness: Not less than 1/2 inch.
- B. Oriented-Strand-Board Sheathing: DOC PS 2 sheathing.
 - 1. Span Rating: Not less than 16/0.
 - 2. Nominal Thickness: Not less than 1/2 inch.

2.4 INTERIOR WALL SHEATHING – PANELING:

- A. Plywood to be interior Grade A-D sheathing, one-side exposure.
 - 1. Span Rating: Not less than 24/0.
 - 2. Nominal Thickness: Not less than 5/8 inch.
 - 3. Species: 5/8" Rough-sawn Douglas-Fir Face plywood.
 - 4. Finish: To be stained.

2.5 ROOF SHEATHING

- A. Plywood Sheathing : DOC PS 1, Exposure 1.
 - 1. Nominal thickness : no less than 5/8".

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A153M or Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Sheathing to Wood Framing: ASTM C 1002.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the Michigan Building Code, current adopted edition.
 - 2. ICC-ES evaluation report for fastener.
- D. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL SHEATHING INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:

1. Wall and Roof Sheathing:
 - a. Nail or staple to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
 - b. Space panels 1/8 inch apart at edges and ends.

3.3 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation , installation testing and inspections under ABAA's Quality Assurance Program.

END OF SECTION 061600

SHOP- FABRICATED WOOD TRUSSES

SECTION 06 1753

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:
 - 1. Wood roof trusses.
 - 2. Metal- Plate- Connected Truss bracing as required for sustaining roof structure design loads.

1.3 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
- B. Shop Drawings: Show fabrication and installation details for trusses.
 - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
 - 2. Indicate sizes, stress grades, and species of lumber.
 - 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
 - 6. Show splice details and bearing details.
- C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For **metal connector-plate manufacturer, professional engineer and fabricator.**
- B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.
- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.
- D. Evaluation Reports: For the following, from ICC-ES:
 - 1. Metal-plate connectors.
 - 2. Metal truss accessories.

1.6 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
 - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction and is certified for chain of custody by an FSC-accredited certification body.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
 - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
 - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
 - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, to design metal-plate-connected wood trusses as needed for this project's roof design loads compliance.
- B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
 - 1. Design Loads: As indicated.
 - 2. Maximum Deflection under Design Loads:
 - a. Roof Trusses: Vertical deflection of **1/180** [total load] 1/240 [snow load] of span.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Provide dressed lumber, S4S.
 - 4. Provide dry lumber with **19** percent maximum moisture content at time of dressing.
- B. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

2.3 METAL CONNECTOR PLATES

- A. Fabricate connector plates to comply with TPI 1.
- B. Hot-Dip Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for interior locations unless otherwise indicated.

2.4 FASTENERS

- A. Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
- B. Nails, Brads, and Staples: ASTM F1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Allowable design loads, as published by manufacturer, shall comply with or exceed those **of basis-of-design products**. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 (Z180) coating designation.
 1. Use for interior locations unless otherwise indicated.
- C. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, as indicated on plans.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.7 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

2.8 SOURCE QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.
 - 1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
 - 2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.
- B. Correct deficiencies in Work that special inspections indicate do not comply with the Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses **as indicated**; adjust and align trusses in location before permanently fastening.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

- 1. Install bracing to comply with Section 061000 "Rough Carpentry."
- J. Install wood trusses within installation tolerances in TPI 1.
- K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- L. Replace wood trusses that are damaged or do not comply with requirements.
 - 1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

- A. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Repair damaged galvanized coatings on exposed surfaces according to ASTM A780/A780M and manufacturer's written instructions.

END OF SECTION 06 1753

GLUED-LAMINATED CONSTRUCTION

SECTION 06 1800

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 framing using structural glued-laminated timber.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for dimension lumber items associated with structural glued-laminated timber.
 - 2. Section 061600 "Sheathing".

1.3 DEFINITIONS

- A. Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives and with the grain of the laminations approximately parallel longitudinally.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data on lumber, adhesives, fabrication, and protection.
 - 2. For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
 - 3. For connectors. Include installation instructions.
- B. Shop Drawings:
 - 1. Show layout of structural glued-laminated timber system and full dimensions of each member.
 - 2. Indicate species and laminating combination.
 - 3. Include large-scale details of connections.
- C. Samples: A sample showing the range of variation to be expected in appearance of structural glued-laminated timber.
 - 1. Apply specified factory finish to of each Sample.

- D. Delegated-Design Submittal: For structural glued-laminated timber and timber connectors structural calculations and design shall be provided by the glued-laminated timber manufacturer.

1.5 INFORMATIONAL SUBMITTALS

- A. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.
- B. Material Certificates: For preservative-treated wood products, from manufacturer. Indicate type of preservative used and net amount of preservative retained.
- C. Research/Evaluation Reports: For structural glued-laminated timber and timber connectors from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An AITC- or APA-EWS-licensed firm.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with provisions in AITC 111.
- B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

- A. Delegated Design: Engage a qualified professional engineer to design structural glued-laminated timber and connectors.
- B. Structural Performance: Structural glued-laminated timber and connectors shall withstand the effects of structural loads shown on Drawings without exceeding allowable design working stresses listed in AITC 117 or determined according to ASTM D 3737 and acceptable to authorities having jurisdiction.

2.2 STRUCTURAL GLUED-LAMINATED TIMBER

- A. General: Provide structural glued-laminated timber that complies with AITC A190.1 and AITC 117 or research/evaluation reports acceptable to authorities having jurisdiction.
 - 1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that are not exposed in the completed Work.
 - 2. Provide structural glued-laminated timber made from single species.
 - 3. Provide structural glued-laminated timber made from solid lumber laminations; do not use laminated veneer lumber.
 - 4. Provide structural glued-laminated timber made with wet-use (waterproof) adhesive complying with AITC A190.1.

- B. Species and Grades for Structural Glued-Laminated Timber: Southern pine in grades needed to comply with "Performance Requirements" Article.
- C. Species and Grades for Beam and Purlins and Truss Members:
 - 1. Species and Beam Stress Classification: Southern pine, 24F-1.8E
 - 2. Lay-up: Either balanced or unbalanced.
- D. Appearance Grade: Architectural, complying with AITC 110.
 - 1. For Premium and Architectural appearance grades, fill voids as required by AITC 110.
- E. Glued-laminated timber manufacturer shall be a firm with at least 5 years of continuous operation and be licensed by AITC or APA-EWS or firm approved by Architect prior to bidding.
 - 1. Base -of - Design: glued-laminated structures as fabricated by Unit Structures, LLC and factory finished with stain in color selected by Architect from fabricator's standard chart.

2.3 PRESERVATIVE TREATMENT

- A. Preservative Treatment: Where preservative-treated structural glued-laminated timber is indicated, comply with AWPA U1, Use Category 3A.
 - 1. Use preservative solution without substances that might interfere with application of indicated finishes.
 - 2. Do not incise structural glued-laminated timber or wood used to produce structural glued-laminated timber.
- B. Preservative:
 - 1. Pentachlorophenol in light petroleum solvent.
 - 2. Use 0.3 retention (0.6 retention for all in contact with water) pressure treatment prior to gluing.
- C. After dressing members, apply a copper naphthenate field-treatment preservative to comply with AWPA M4 to surfaces cut to a depth of more than **1/16 inch (1.5 mm)**.

2.4 TIMBER CONNECTORS

- A. Fabricate timber seats from steel per glued-laminated timber manufacturer's structural engineer's design with bearing plates, long deformed bar anchors, and side plates.
- B. Fabricate connectors, straps from steel per glued-laminated timber manufacturer's structural engineer's design.
- C. Fabricate tie rods from round steel bars with upset threads connected with forged-steel turnbuckles complying with ASTM A 668/A 668M.
- D. Provide bolts, **3/4 inch (19 mm)** unless otherwise indicated, complying with **ASTM A 307, Grade A**; nuts complying with **ASTM A 563**; and, where indicated, flat washers.
- E. Provide shear plates complying with ASTM D 5933.

- F. Materials: Unless otherwise indicated, fabricate from the following materials:
1. Structural-steel shapes, plates, and flat bars complying with ASTM A 36/A 36M.
 2. Round steel bars complying with ASTM A 575, Grade M 1020.
 3. Hot-rolled steel sheet complying with ASTM A 1011/A 1011M, Structural Steel, Type SS, Grade 33.
- G. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil (0.05-mm) dry film thickness.
- H. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A 123/A 123M or ASTM A 153/A 153M.
- I. Connectors, Plates Finish: Except as otherwise indicated, finish steel with rust-inhibitive primer and paint. Paint color to be selected by Architect.

2.5 MISCELLANEOUS MATERIALS

- A. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
- B. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated factory applied stain finish. Color of stain to be selected by Architect.

2.6 FABRICATION

- A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.
1. Dress exposed surfaces as needed to remove planing and surfacing marks.
- B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.
- C. Where preservative-treated members are indicated, fabricate (cut, drill, surface, and sand) before treatment to greatest extent possible. Where fabrication must be done after treatment, apply a field-treatment preservative to comply with AWWA M4.
1. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
 2. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.
- D. End-Cut Sealing: Immediately after end cutting each member to final length, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.
- E. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit except for preservative-treated wood where treatment included a water repellent.

2.7 FACTORY FINISHING

- A. Wiped Stain Finish: Manufacturer's standard, dry-appearance, penetrating acrylic stain and sealer; oven dried and resistant to mildew and fungus.
 - 1. Color: As selected by Architect from manufacturer's full range.
- B. Clear Finish: Manufacturer's standard, two-coat, clear varnish finish; resistant to mildew and fungus.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Erect structural glued-laminated timber true and plumb and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
 - 1. Handle and temporarily support glued-laminated timber to prevent surface damage, compression, and other effects that might interfere with indicated finish.
- B. Framing Built into Masonry: Provide 1/2-inch (13-mm) clearance at tops, sides, and ends of members built into masonry; bevel cut ends 3 inches (76 mm); and do not embed more than 4 inches (102 mm) unless otherwise indicated.
- C. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.
- D. Fit structural glued-laminated timber by cutting and restoring exposed surfaces to match specified surfacing and finishing.
 - 1. Predrill for fasteners using timber connectors as templates.
 - 2. Finish exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.
 - 3. Coat cross cuts with end sealer.
 - 4. Where preservative-treated members must be cut during erection, apply a field-treatment preservative to comply with AWWA M4.
 - a. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
 - b. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.

- E. Install timber connectors as indicated.
 - 1. Unless otherwise indicated, install bolts with same orientation within each connection and in similar connections.
 - 2. Install bolts with orientation as indicated or, if not indicated, as directed by Architect.

3.3 ADJUSTING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Architect.

3.4 PROTECTION

- A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose, including protection from weather, sunlight, soiling, and damage from work of other trades.
 - 1. Coordinate wrapping removal with finishing work. Retain wrapping where it can serve as a painting shield.
 - 2. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

END OF SECTION 06 1800

EXTERIOR FINISH CARPENTRY

SECTION 06 2013

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:
 - 1. Exterior wood siding
 - 2. Exterior wood trim.
 - 3. Exterior wood: 2 x10 wood cedar at roof trusses top cord/ rafters extensions.
 - 4. Exterior T & G : 1 x 6 wood cedar soffit material.
- B. Related Requirements:
 - 1. Section 06100 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
 - 2. Section 07 2713 "Modified Bituminous Sheet Air Barrier" for air barrier material.

1.3 SUBMITTALS

- A. Product Data: For each type of product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
- B. Samples for Initial Selection: siding material.

1.4 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

- B. Softwood Plywood: DOC PS 1.

2.2 EXTERIOR WOOD TRIM

- A. Lumber Trim for Semitransparent-Stained Finish Applications:
 - 1. Species and Grade: Western red cedar, Grade A; NLGA, WCLIB, or WWPA.
 - 2. Maximum Moisture Content: 19 percent.
 - 3. Finger Jointing: Not allowed.
 - 4. Face Surface: smooth.
 - 5. Size: 1" x , as indicated on drawings.
- B. Lumber Trim for Opaque-Stained or Painted Finish:
 - 1. Species and Grade: Western red cedar, Grade A; NLGA, WCLIB, or WWPA.
 - 2. Maximum Moisture Content: 19 percent.
 - 3. Face Surfaces: smooth.
 - 4. Size: 1" x , as indicated on drawings for running trim.
 - 5. Size: 2x10 , as indicated on drawings for "wraps" at trusses top cord extensions.

2.3 WOOD SIDING MATERIAL

- A. Siding material shall be: Western Red Cedar siding.
 - 1. Species and Grade: Western Red Cedar, Select grade or better.
 - 2. Kiln dried: moisture content not to exceed 19 percent.
 - 3. Finger Jointing: Not allowed.
 - 4. Face Surface: smooth (resawn back).
 - 5. Profile: beveled.
 - 6. Size: 1" x 8", 1"x 6" and 1" x 4", see drawings for layout.
 - 7. Finish: Opaque- Stained or Painted Finish; see exterior elevations drawings.

2.4 WOOD SOFFIT MATERIAL

- A. Soffit material shall be: Western Red Cedar.
 - 1. Species and Grade: Western Red Cedar, Select grade or better.
 - 2. Kiln dried: moisture content not to exceed 19 percent.
 - 3. Finger Jointing: Not allowed.
 - 4. Face Surface: smooth (resawn back).
 - 5. Profile: T & G
 - 6. Size: 1" x 6"
 - 7. Finish: Transparent Stain; see exterior elevations drawings.

2.5 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate or as recommended for the specific substrate material.
 - 1. For face-fastening, provide ringed-shank siding nails or hot-dip galvanized-steel trim nails unless otherwise indicated.

2. For cedar, provide non-corroding nails such as stainless steel or high-quality hot-dip galvanized-steel fasteners.
 3. For prefinished items, provide matching prefinished aluminum fasteners where face fastening is required.
 4. For applications not otherwise indicated, provide hot-dip galvanized-steel fasteners.
- B. Wood Glue: When required to complete installation, use waterproof resorcinol glue recommended by manufacturer for exterior carpentry use.
- C. Sealants: Latex, complying with ASTM C 834 and with applicable requirements in Section 079200 "Joint Sealants," recommended by sealant manufacturer and manufacturer of substrates for intended application.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation; AC-20+.
 - b. Tremco, Inc.; Tremflex 834.
 - c. Or approved equal.

2.6 FABRICATION

- A. Back out or kerf backs of standing and running trim wider than 5 inches, except members with ends exposed in finished work.
- B. Ease edges of lumber less than 1-inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed. Cut to required lengths and prime ends. Comply with requirements in Section 09 9130 "Exterior Painting."

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
- B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 - 2. Coordinate exterior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.
 - 3. Care should be taken not to overdrive nails as splitting or cupping of siding material may result. All end butt joint must fall over furring blocking or stud.
 - 4. All joints between siding and trim shall be caulked.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install flat-grain lumber with smooth side exposed to weather.
- B. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long except where necessary.
 - 1. Use scarf joints for end-to-end joints.
 - 2. Stagger end joints in adjacent and related members.
- C. Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.
- D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
- E. Finish: Apply finish within two weeks of installation.

3.5 ADJUSTING

- A. Replace exterior finish carpentry that is damaged or does not comply with requirements. Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.6 CLEANING

- A. Clean exterior finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

END OF SECTION 06 2013

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INTERIOR ARCHITECTURAL CASEWORK

SECTION 06 4023

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Solid-surfacing-material vanity countertops.
 - 2. Solid-surfacing- material removable screen panels at vanity countertops.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing casework and concealed within other construction before casework installation.

1.3 DEFINITIONS

- A. Interior architectural casework includes wood furring, blocking, shims, and hanging strips for installing casework items unless concealed within other construction before casework installation.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated, including cabinet hardware and accessories.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 2. Show locations and sizes of cutouts and holes for plumbing fixtures and other items installed in architectural casework.
- C. Samples for Verification:
 - 1. Solid-surfacing materials, 6 inches (150 mm) square.
- D. Sustainable Building Submittals:
 - 1. VOC Product Data: For installation adhesives, including printed statement of VOC content.
 - 2. Urea Formaldehyde Product Data:
 - a. Composite wood manufacturer's product data for each composite wood product used indicating that the bonding agent contains no urea formaldehyde.

- b. For each adhesive used, documentation indicating that the adhesive contains no urea formaldehyde.
- 3. Recycled Content Product Data: For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural casework.
- C. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural casework indicated for construction, finishes, installation, and other requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver casework until painting and similar operations that could damage casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where casework is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating casework without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural casework can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of casework and quality grade specified, unless otherwise indicated.
- B. Wood Products: Comply with the following:
 - 1. Recycled Content of Medium-Density Fiberboard and Particleboard: Provide products with an average recycled content so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than 10 percent.
 - 2. Hardboard: AHA A135.4.
 - 3. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
 - 4. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
 - 5. Softwood Plywood: DOC PS 1.
- C. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
 - 1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semi exposed edges.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by casework quality standard.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:
 - a. Abet Laminati, Inc.
 - b. Arborite; Division of ITW Canada, Inc.
 - c. Formica Corporation.
 - d. Lamin-Art, Inc.
 - e. Nevamar Company, LLC; Decorative Products Div.
 - f. Wilsonart International; Div. of Premark International, Inc.
 - g. Or approved equal.
 - 2. Colors and Patterns: Match Architect's samples.
- E. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Wilsonart International;
 - b. E. I. du Pont de Nemours and Company.
 - c. Formica Corporation.
 - d. Meganite Inc.; a division of the Pyrochem Group.
 - e. Or approved equal.
 - 2. Colors and Patterns: Match Architect's samples.

2.2 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face

of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

- C. Adhesives, General: Do not use adhesives that contain urea formaldehyde.
- D. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Wood Glues: 30 g/L.
 - 2. Contact Adhesive: 250 g/L.
- E. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.3 FABRICATION, GENERAL

- A. Interior Casework Grade: Unless otherwise indicated, provide Custom-grade interior casework complying with referenced quality standard.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate casework to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - 1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members **3/4 Inch (19 mm)** Thick or Less: **1/16 inch (1.5 mm)**.
 - 2. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: **1/16 inch (1.5 mm)**.
- D. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times casework fabrication will be complete.
 - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
- E. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 1. Seal edges of openings in countertops with a coat of varnish.

2.4 FABRICATION, COUNTER TOPS

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 1. Seal edges of openings in countertops with a coat of varnish.

2.5 SOLID-SURFACE-MATERIAL VANITY COUNTERTOPS

- A. Configuration: Provide countertops with the following front and backsplash style:
 1. Front: 1-1/2-inch (38-mm) laminated bullnose.
 2. Backsplash: Straight, slightly eased at corner.
 3. Endsplash: Matching backsplash.
 4. Removable screen panels, see details on drawings.
- B. Countertops: 1/2-inch- (12.7-mm-) thick, solid surface material with front edge built up with same material.
- C. Backsplashes: 1/2-inch- (12.7-mm-) thick, solid surface material.
- D. Fabrication: Fabricate tops in one piece with shop-applied edges unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 1. Fabricate with loose backsplashes for field assembly.
- E. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:
 1. Match Architect's sample.
 - a. SS-1: Corian, Terra Collection "Cocoa Brown", or approved equal.
 - b. SS-2: Corian, Terra Collection "Shale", or approved equal.
 - c. SS-3: Corian, "Abalone", or approved equal.
- F. Vanity Countertop Wall Mounting Brackets:
 1. Furnish prefabricated steel wall mounted brackets of configuration required for vanity countertop having removable screen "front" panel and end panel at counter's end not abutting the wall. The ADA vanity brackets shall be steel, primed material.
 2. The prefabricated steel brackets to be product of A & M Hardware, Inc., www.AandMhardware.com, (888-647-0200) or approved by Architect equivalent product.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition casework and countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install casework and countertops to comply with requirements for the same grade specified in Part 2 for fabrication of type of casework involved.
- B. Install casework level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)**.
- C. Scribe and cut casework to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- D. Anchor casework to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with casework and matching final finish if transparent finish is indicated.
- E. Countertops, Solid Surface: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Align adjacent solid-surfacing-material vanity tops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - 2. Install countertops with no more than **1/8 inch in 96-inch (3 mm in 2400-mm)** sag, bow, or other variation from a straight line.
 - 3. Secure backsplashes to walls with adhesive.
 - 4. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."
 - 5. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
 - 6. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 7. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - 8. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer
- F. Touch up finishing work specified in this Section after installation of casework. Fill nail holes with matching filler where exposed.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective casework, where possible, to eliminate functional and visual defects; where not possible to repair, replace casework. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean casework on exposed and semi exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 4023

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WOOD TRIM - INTERIOR

SECTION 06 4600

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:
 - 1. Interior standing and running trim: 1x4 or as indicated on drawings.
 - 2. Interior wood ceiling and wall : 1x6 T&G decking material.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for wood furring, blocking, and shims required for installing wood trim and concealed within other construction before wood trim installation.
 - 2. Section 06 1600 "Sheathing" for interior exposed face plywood wall sheathing.
 - 3. Section 08 5200 "Wood Windows" for aluminum-clad wood windows installation.
 - 4. Section 09 9123 "Interior Painting" for interior painted finishes.
 - 5. Section 09 9300 "Staining and Transparent Finishing" for stained finishes.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection:
 - 1. Field applied opaque finishes.
- C. Samples for Verification:
 - 1. Lumber and panel products with shop-applied opaque finish, 12" long section for each finish system and color, with one-half of exposed surface finished.
- D. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver wood trim until operations that could damage wood trim have been completed in installation areas. If wood trim must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

- A. Environmental Limitations for Interior Work: Do not deliver or install interior wood trim until building is enclosed, wet work is complete, and interior temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 WOOD TRIM, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of wood trim indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels and/or certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
 - 2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

2.2 INTERIOR STANDING AND RUNNING TRIM

- A. Grade: Sanded face exposed, Premium for stained finish; Economy for painted finish.
- B. Wood Species: Western Red Cedar, sizes as indicated on drawings.

2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of wood trim and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content for Interior Materials: 8 to 13 percent.
- B. Quality Standards: for following woodwork, comply with indicated standards as applicable:
 - 1. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
 - 2. Standing and Running Trim: AWI Section 300.
 - 3. Casework and Countertops: AWI Section 400.
 - 4. Shelving: AWI Section 600.
 - 5. Miscellaneous Work: AWI Section 700.
 - 6. MDF board: ANSI A208.2, Grade MD, no formaldehyde in binder.
 - 7. Particleboard: ANSI A208.2, Grade M-2 Exterior Glue.
 - 8. Softwood Plywood: DOC PS1.
 - 9. Hardboard: AHA A135.4

2.4 HARDWARE AND ACCESSORIES

- A. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

2.5 FABRICATION

- A. Fabricate wood trim to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - 1. Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members except for members with ends exposed in finished work.

2.6 FINISHING

- A. General: Finish wood trim as specified in Section 09 9123 "Interior Painting" and Section 09 9300 "Staining and Transparent Finish". Defer only final touchup, cleaning, and polishing until after installation.
- B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing wood trim, as applicable to each unit of work.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition wood trim to average prevailing humidity conditions in installation areas.

3.2 INSTALLATION

- A. Grade: Install wood trim to comply with same grade as item to be installed.
- B. Assemble wood trim and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install wood trim level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- D. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 96 inches long except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
 - 1. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.
- E. Touch up finishing work specified in this Section after installation of wood trim. Fill nail holes with matching filler where exposed.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective wood trim, where possible, to eliminate functional and visual defects; where not possible to repair, replace wood trim. Adjust joinery for uniform appearance.
- B. Clean wood trim on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 4600

STANDING SEAM METAL ROOF PANELS

SECTION 07 6100

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:
 - 1. Standing-seam metal roof panels and trim.
 - 2. Formed metal caps at exposed top sections of glue-laminated timber.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of the flashing, trim, and anchorage systems.
- C. Samples for Initial Selection: for each of metal panel factory-applied color finish available.
- D. Samples for Verification: For each type of exposed finish required, prepared on samples of size indicated below.
 - 1. Metal Panels: 12 inches long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.
- E. Sample Warranties: For special warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Retain strippable protective covering on metal panels during installation.

1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

- A. Coordinate sizes and locations of roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two (2) years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
 - 1. Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - 1. Wind Loads: 90 mph or as indicated on Drawings.
 - 2. Other Design Loads: Snow load 50 psf or as indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 1680 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft.
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 2.86 lbf/sq. ft.
- D. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
- E. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
 - 1. Uplift Rating: UL 90.
- F. Fire Rating: Class A.

2.2 STANDING-SEAM METAL ROOF PANELS

- A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
 - 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.
- B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels as indicated on Drawings formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.
 - 1. Basis-of-Design Product: McElroy Metal Inc., Medallion-Lok Panel, Flat Pan Profile. Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Drexel Metals
 - b. Firestone
 - c. MBCI; a division of NCI Group, Inc.
 - b. Or approved equal.
 - 2. Metallic-Coated Steel Sheet: aluminum-zinc alloy-coated steel sheet complying with ASTM A 792, Class G90 coating designation; structural quality.
 - a. Nominal Thickness: 24-gauge steel Galvalume substrate, Flat Pan Design.
 - b. Finish: TBD from Manufacture's standard; Kynar 500 system.

3. Clips: One-piece fixed to accommodate thermal movement.
 - a. Material: 16 Ga., ASTM A653, zinc-coated (galvanized) steel sheet, UL-90 clip.
 4. Joint Type: As standard with manufacturer.
 5. Panel Coverage: 12 inches.
 6. Panel Height: 1.75 inches.
- C. Fascias and Trim: Provide fascia formed with drip edge detailing and other metal roofing trim components to complete metal roofing installation at eaves and rakes. Provide material matching that of the metal roof panels specification and finish. Obtain fascia and trim material from the manufacturer of the metal roof panel.
- D. Formed Caps at Top of Glue-Laminated Timber: Provide formed pre-finished metal caps from metal roofing manufacturers' 24 ga. steel sheet goods material; final color and material selection will be by Architect during the shop drawing review. Form caps to extend min. 1" down at all exposed sides of timber unit, unless noted otherwise.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.
 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Residential; a division of Carlisle Construction Materials; WIP 300HT.
 - b. Grace Construction Products; W.R. Grace & Co. -- Conn.; Grace Ice and Water Shield HT.
 - c. Owens Corning; WeatherLock Metal High Temperature Underlayment.
 - d. Or approved equal.
- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.4 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653, G90 coating designation or ASTM A 792, Class AZ50 coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fascias, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or cross-linked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

4. Ridge vent: Provide manufacturer's standard ridge vent assembly. Finish to match roof panel.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- E. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- F. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2-inch-wide and 1/8 inch) thick.
 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide flat panel profile, including major stiffening ribs, if any required, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.6 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

- C. Two-coat Fluoropolymer: AAMA 621 Fluoropolymer finish containing not less than 70% PVDF resin by weight in color coat. prepare, pretreat and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
 - 2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
 - 1. Apply over the roof area indicated below:
 - a. Roof perimeter for a distance up from eaves of 36 inches beyond interior wall line.
 - b. Valleys, from lowest point to highest point, for a distance on each side of 24 inches. Overlap ends of sheets not less than 6 inches.
 - c. Rake edges for a distance of 18 inches.
 - d. Hips and ridges for a distance on each side of 18 inches.
 - e. Around dormers and other penetrating elements for a distance from element of 18 inches.
- B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.

3.3 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
- B. Fasteners:

1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
 1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of

metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 6100

JOINT SEALANTS

SECTION 07 9000

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Latex joint sealants.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch -wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Field-Adhesion Test Reports: For each sealant application tested.
- B. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion for weatherseal and non-staining of silicone sealants.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.

- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 790.
 - b. Sika Corporation, Construction Products Division; SikaSil-C990.
 - c. Tremco Incorporated; Spectrem 1.
 - d. Or approved equal.
- B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 786 Mildew Resistant.
 - b. GE Advanced Materials - Silicones; Sanitary SCS1700.
 - c. Tremco Incorporated; Tremsil 200 Sanitary.
 - d. Or approved equal.

2.3 URETHANE JOINT SEALANTS

- A. Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Sonolastic NP 2.
 - b. Pecora Corporation; Dynatred.
 - c. Sika Corporation, Construction Products Division; Sikaflex - 2c EZ Mix.
 - d. Tremco Incorporated; Vulkem 227.
 - e. Or approved equal.
- B. Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use T.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Sonolastic NP1.
 - b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
 - c. Tremco Incorporated; Vulkem 116.
 - d. Or approved equal.

2.4 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Sonolac.
 - b. Pecora Corporation; AC-20+.
 - c. Tremco Incorporated; Tremflex 834.
 - d. Or approved equal.

2.5 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed, and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
 - b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 - 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered

satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces JS-1.
 - 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - 2. Urethane Joint Sealant: Single component, nonsag, traffic grade.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces JS-2.
 - 1. Joint Locations:
 - a. Joints between plant-precast architectural concrete units.
 - b. Control and expansion joints in unit masonry.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of doors, windows and louvers.
 - 2. Urethane Joint Sealant: Multicomponent, nonsag, Class 25.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces JS-3.
 - 1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Vertical joints on exposed surfaces of concrete.
 - d. Isolation joints in cast-in-place concrete slabs.
 - 2. Urethane Joint Sealant: Single component, nonsag, traffic grade Class 25.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces JS-4.
1. Joint Locations:
 - a. Vertical joints on exposed surfaces of gypsum board.
 - b. Perimeter joints between interior gypsum board surfaces and frames of interior doors, and windows.
 2. Joint Sealant: Latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces JS-5.
1. Joint Sealant Location:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 9000

HOLLOW METAL DOORS AND FRAMES
PART 1 - GENERAL

SECTION 08 1113

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section includes hollow-metal work.
- B. Related Requirements:
 - 1. Section 08 7000 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of anchorages, joints, field splices, and connections.
 - 7. Details of accessories.
 - 8. Details of moldings, removable stops, and glazing.
 - 9. Details of conduit and preparations for power, signal, and control systems.
- C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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. Ceco Door Products; an Assa Abloy Group company.
 - 2. Curries Company; an Assa Abloy Group company.
 - 3. Republic Doors and Frames.
 - 4. Steelcraft; an Ingersoll-Rand company.
 - 5. Or approved equal.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Where indicated to be provided, furnish product complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

2.3 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.
 - 1. Physical Performance: Level A according to SDI A250.4.
 - 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, 16 ga. with minimum A40 coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Core: Polystyrene.
 - 1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
 - f. Glazing: 1" insulated, tempered glazing.
 - 3. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, 16 ga. with minimum A40 coating.
- b. Construction: Full profile welded.
- 4. Exposed Finish: Prime.

2.4 INTERIOR HOLLOW-METAL DOORS AND FRAMES – NOT APPLICABLE

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.
 - 1. Physical Performance: Level A according to SDI A250.4.
 - 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, 16 ga. with minimum A40 coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Core: Polystyrene.
 - 1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
 - 3. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, 16 ga. with minimum A40 coating.
 - b. Construction: Full profile welded.
 - 4. Exposed Finish: Prime.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.6 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Hot-Rolled Steel Sheet: ASTM A 1011, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

- D. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B.
- E. Frame Anchors: ASTM A 879, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008 or ASTM A 1011, hot-dip galvanized according to ASTM A 153, Class B.
- F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153.
- G. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- H. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143.
- I. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.7 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.
 - 2. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.
 - 3. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
 - 4. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 2. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 3. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 - 4. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

5. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 1. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
 3. Provide raceways through doors for cabling, where scheduled for electric/electronic hardware devices.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted hairline joints.
 1. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 2. Provide loose stops and moldings on inside of hollow-metal work.
 3. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post installed expansion anchors.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 4. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
 - c. At Bottom of Door: 3/4 inch plus or minus 1/32 inch.
 - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.

END OF SECTION 08 1113

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WOOD WINDOWS

SECTION 08 5200

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 aluminum-clad wood windows.
 - 1. Awning. Project-out.
 - 2. Including screens and hardware for all operable units.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for wood windows.
- B. Shop Drawings: For wood windows.
 - 1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples: For each exposed product and for each color specified, **2 by 4 inches (50 by 100 mm)** in size.
- D. Samples for Initial Selection: Color samples for units with factory-applied finishes.
- E. Product Schedule: For wood windows. Use same designations indicated on Drawings.
- F. Sample Warranties: For manufacturer's warranties.

1.4 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, and air infiltration.
 - c. Faulty operation of movable sash and hardware.

- d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
2. Warranty Period:
- a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: 20 years from date of Substantial Completion.
 - c. Aluminum-Cladding Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wood windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
- 1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
- 1. Minimum Performance Class: LC
 - 2. Minimum Performance Grade: 25.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of **0.30 Btu/sq. ft. x h x deg F (1.71 W/sq. m x K)**.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.27.
- E. Windborne-Debris-Impact Resistance: Capable of resisting impact from windborne debris based on testing glazed windows identical to those specified, according to ASTM E 1886 and testing information in ASTM E 1996 and requirements of authorities having jurisdiction.

2.3 WOOD WINDOWS

- A. Aluminum-Clad Wood Windows Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1. Marvin Window and Doors Co.
 - 2. Pella Corp.
 - 3. Andersen
 - 4. Or approved equal by Architect prior to bidding.
- B. Operating Types: Provide the following operating types in locations indicated on Drawings:
- 1. Awning: Project out.

- C. Frames and Sashes: Fine-grained wood lumber complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than **1/32 inch (0.8 mm)** deep by **2 inches (51 mm)** wide; water-repellent preservative treated.
1. Exterior Finish: Aluminum-clad wood.
 - a. Aluminum Finish: Manufacturer's standard finish.
 - b. Color: As selected by Architect from manufacturer's full range.
 2. Interior Finish: Manufacturer's standard factory-prime coat.
 - a. Color: As selected by Architect from manufacturer's full range.
- D. Windborne-Debris-Impact-Resistant Insulating-Glass Units: ASTM E 2190.
1. Glass: ASTM C 1036, Type 1, Class 1, q3.
 - a. Tint: Clear.
 - b. Kind: Fully tempered exterior lite.
 2. Lites: Two.
 3. Filling: Fill space between glass lites with argon.
 4. Low-E Coating: Sputtered on second or third surface.
 5. Integral Muntins: Color selected from glass manufacturer's standard options, located in space between glass lites.
- E. Glazing System: Manufacturer's standard insulated glass factory-glazing system that produces weathertight seal.
- F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- G. Projected Window Hardware:
1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E 405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
 - a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.
 2. Hinges: Manufacturer's standard type for sash weight and size indicated.
 3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one arm on sashes up to **29 inches (735 mm)** tall and two arms on taller sashes.
- H. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

- I. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
 - 1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 ACCESSORIES

- A. Dividers (False Muntins): Provide divider grilles in designs indicated for each sash lite.
 - 1. Quantity and Type: One permanently located between insulating-glass lites.
 - 2. Material: As selected from Manufacturer's standard.
 - 3. Pattern: As indicated on Drawings.
 - 4. Profile: As selected by Architect from manufacturer's full range.
 - 5. Color: As selected by Architect from manufacturer's full range.

2.5 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
 - 1. Type and Location: Full, inside for project-out sashes.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 - 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
 - 2. Finish for Exterior Screens: Matching color and finish of cladding.
- C. Aluminum Wire Fabric: 18-by-16 (1.1-by-1.3-mm) mesh of 0.011-inch- (0.28-mm-) diameter, coated aluminum wire.
 - 1. Wire-Fabric Finish: Charcoal gray or as selected by Architect from manufacturer's standard.

2.6 FABRICATION

- A. Fabricate wood windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze wood windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

- E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
 - 1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 08 5200

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DOOR HARDWARE

SECTION 08 7000

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:
 - 1. Mechanical door hardware for the following:
 - a. Swinging doors.
 - 2. Cylinder's types for interior overhead coiling grille shall be coordinated with the Owner's facility manager.
- B. Related Sections:
 - 1. Section 08 1113 "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Submit door hardware schedule concurrent with submissions of Product Data, Samples, and shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
 - a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - 2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
 - 1. For door hardware, an Architectural Hardware Consultant (AHC).
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer.
- D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- E. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.
- F. Electrified Door Hardware: Where electrified door hardware is required, provide listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- G. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- H. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.
 - 1. 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
 - 2. 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 3. 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2- inch high.
 - 4. 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.8 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Three (3) years from date of Substantial Completion, unless otherwise indicated.
 - a. Exit Devices: Two (2) years from date of Substantial Completion
 - b. Manual Closers: Ten (10) years from date of Substantial Completion.

1.10 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.

- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.

2.2 HINGES

- I. A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 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. Stanley
 - b. Hager Companies
 - c. McKinney Products Compan

2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
 - 2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
 - 3. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- C. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

2.5 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
 - 1. Manufacturer: Same manufacturer as for locking devices.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are interchangeable; face finished to match lockset.
- C. Construction Cores: Provide construction cores that are replaceable by permanent cores.

2.6 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
 - 1. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
 - 2. Keyed Alike: Key all cylinders to same change key.

2.7 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 - 2. 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. Dorma 8900
 - b. Norton Door Controls 7500
 - c. LCN 4040XP

2.8 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.
 - 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. Trimco
 - b. Rockwood Manufacturing Company (ROC).
 - c. Stanley Commercial Hardware; Div. of The Stanley Works (STA).
 - d. Or approved equal.

2.9 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 - 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 Guard Products, Inc.
 - b. Pemko Manufacturing Co.; an ASSA ABLOY Group company (PEM).
 - c. Reese Enterprises, Inc. (RE).
 - d. Zero International (ZE).
 - e. Or approved equal.

2.10 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

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 Guard Products, Inc.
 - b. Hager Companies (HAG).
 - c. Pemko Manufacturing Co.; an ASSA ABLOY Group company (PEM).
 - d. Reese Enterprises, Inc. (RE).
 - e. Zero International (ZE).
 - f. Or approved equal.

2.11 FABRICATION

- A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
 5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.12 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.
- C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 9200 "Joint Sealants."
- E. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

3.3 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 - 2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Final Adjustment: Wherever hardware installation is done more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and

finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

- C. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

3.4 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.5 DOOR HARDWARE SCHEDULE

HARDWARE SET NO. 1:

Door No. 100, two sets (main entry)

2ea	Continuous Hinge	662 HD x1"LDH	AL	Stanley
1 ea	Removable Mullion	KR 822 x 96" x MCS	689	PR
1 set	Astragal Seal	9125A(set)		Nat. Guard
2 ea	Exit Panic Device 7700 Series		US32D	CAL-ROYAL
1 ea	Lockset to coordinate w/ panic device by KWI			SALTO System
1 ea	Pull lever / trim to match Salto lever/ trim			US32D Schlage
2 ea	Closer	4111 SHCUSH	689	LCN
2 ea	Threshold	425-36"	Alum	Nat. Guard
2 ea	Kick plate	10 x 34 x .050	US32D	Rockwood
1 set	Weatherseal	160V	Alum	Nat. Guard
2 ea	Door Sweep	D608A-36"	Alum	Nat. Guard
2 ea	Door Overhead Stop	906S		GlynnJohnson

HARDWARE SET NO. 2:

Door No. 101 (Storage)

1 ea	Continuous Hinge	662HD	AL	Stanley
1 ea	Cylindrical Lock/ Handset	by KWI		SALTO System
1 ea	Closer	4111 SHCUSH	689	LCN
1 ea	Kick Plate	10 x 34 x .050	US32D	Trimco
1 ea	Threshold	425-36"	Alum	Nat. Guard
1 set	Weatherseal	700AV	Alum	Nat. Guard
1 ea	Door Sweep	D608A-36"	Alum	Nat. Guard
1 ea	Door Overhead Stop w/Hold Open	906H		GlynnJohnson

HARDWARE SET NO. 3

Door No. 102 (Family Toilet Room)

1 ea.	Continous Hinge	662HD	AL	Stanley
1 ea.	Cylindrical Lock / Handset by KWI			SALTO System
1 ea.	Closer	4111 H Hold Open	689	LCN
1 ea.	Kick Plate	10 x 34 x .050	US32D	Trimco
1 ea.	Wall Stop	1298	626	Trimco
1 ea.	Door Overhead Stop	906H		GlynnJohnson

NOTE:

The Hardware sets components are listed for bidding purposes.

The Owner's contracted Knight Watch (KWI) is the SALTO System vendor responsible for furnishing and installing all SALTO System wireless access control system components. The door hardware supplier is to coordinate compatibility details with KWI during the hardware submittal preparation.

Contact Person at Knight Watch Inc.:
Andy Pullen, Sales Engineer
O: (616) 235-2100 x 1124
E: apullen@knightwatch.net

END OF SECTION 08 7000

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RESILIENT BASE AND ACCESSORIES

SECTION 09 6513

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: Resilient base.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Color Selection: For each type of product indicated.
- C. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.5 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.

PART 2 - PRODUCTS

2.1 VINYL BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Johnsonite; A Tarkett Company.
 - 3. Roppe Corporation, USA.
 - 4. Or approved equal.
- B. Product Standard: ASTM F 1861, Type TV (vinyl, thermoplastic).

1. Group: I (solid, homogeneous).
2. Style and Location:
 - a. Style: Cove.
- C. Minimum Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Colors and Patterns: As selected by Architect from full range of manufacturer's standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Do not install resilient products until they are the same temperature as the space where they are to be installed for at least 48 hours in advance of installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Do not stretch resilient base during installation.
- C. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Before retaining "Floor Polish" Paragraph below, verify resilient stair-tread manufacturer's written instructions for floor polish. Floor polish is used with most vinyl products.

END OF SECTION 09 6513

RESINOUS FLOORING

SECTION 09 6723

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. High-performance resinous flooring systems.
 - 2. 4" high integral Cove Base – system recommended by resinous flooring manufacturer.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Installer Certificates for Qualification: Signed by manufacturer stating that installers comply with specified requirements.
- C. Material Certificates: For each resinous flooring component, from manufacturer.
- D. Maintenance Data: For maintenance manuals.
- E. Samples: Submit two 6" X 6" samples of each resinous flooring system applied to a rigid backing. Provide sample which is a true representation of proposed field applied finish. Provide sample color and texture for approval from Owner in writing or approved by General Contractor prior to installation.
- F. Product Schedule: For resinous flooring.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.
 - 1. Engage an installer who is approved in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
 - 2. Installer Letter of Qualification: Installer to provide letter stating that they have been in business for at least 5 years and listing 5 projects in the last 2 years of similar scope. For each project provide: project name, location, date of installation, contact information, size of project, and manufacturer of materials with system information.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- C. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Do not cover up mockup area.
 - 1. Apply full-thickness mockups on 4 square foot floor area selected by Architect.
 - 2. Finish surfaces for verification of products, color, texture, and sheen.
 - 3. Simulate finished lighting conditions for Architect's review of mockups.
 - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 - 5. Mockup shall demonstrate desired slip resistance for review and approval by Owner's representative in writing.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements for Base-of-Design products by:

- 1. The Sherwin Williams Company, Cleveland, OH. Representative Contact: Kyle Workman (616-293-0415) kyle.r.workman@sherwin.com or Michael Starner (484) 624-2360 michael.starner@sherwin.com .

- B. Resuflor Deco Flake BC, 20-30 mils nominal thickness.**

- 1. Primer: Resuprime 3579 at 200-300 sq. ft. per gallon.
 - 2. Body Coat: Resuflor 3746 at 200-300 sq. ft. per gallon.
 - 3. Broadcast: Decorative Flakes 6750 or 6755 to excess at 100-200 lbs. per 1,000 sq. ft.
 - 4. Grout Coat: Resuflor 3746 at 160-250 sq. ft. per gallon.
 - 5. Seal Coat: Resutile 4686 at 250-400 sq. ft. per gallon.

2.2 MATERIALS

- A. VOC Content of Resinous Flooring: Provide resinous flooring systems, for use inside the weatherproofing system, that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24)].
 - 1. Resinous Flooring: 100 g/L.

2.3 HIGH-PERFORMANCE RESINOUS FLOORING

- A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, high-performance, resin-based, monolithic floor surfacing designed to produce a seamless floor.
- B. System Characteristics:
 - 1. Color and Pattern: **"Pyrite" 1/8" flake** from S-W manufacturer listed above.
 - 2. Slip Resistance: Provide slip resistant finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Inspection: Prior to commencing Work, thoroughly examine all underlying and adjoining work, surfaces and conditions upon which Work is in any way dependent for perfect results. Report all conditions which affect Work. No "waiver of responsibility" for incomplete, inadequate or defective underlaying and adjoining work, surfaces and conditions will be considered, unless notice of such unsatisfactory conditions has been filed and agreed to in writing before Work begins. Commencement of Work constitutes acceptance of surfaces.
- B. Surface Preparation: Remove all surface contamination, loose or weakly adherent particles, laitance, grease, oil, curing compounds, paint, dust and debris by blast track method or approved mechanical means (acid etch not allowed). If surface is questionable try a test patch. Create a minimum surface profile for the system specified in accordance with the methods described in ICRI No. 03732 to achieve profile numbers as follows:
 - C.
 - 1. **Thin film, to 10 mils** **CSP-1 to CSP-3**
 - 2. Thin and medium films, 10 to 40 mils CSP-3 to CSP-5
 - 3. Self-leveling mortars, to 3/16" CSP-4 to CSP-6
 - 4. Mortars and laminates, to 1/4" or more CSP-5 to CSP-10
- D. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - 1. Moisture Testing: Perform tests indicated below.
 - a. Calcium Chloride Test: Perform anhydrous calcium chloride test per ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours. Perform tests so that each test area does not exceed 1000 sq. ft. and perform 3 tests for the first 1000 sq. ft. and one additional test for every additional 1000 sq ft.
 - b. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative-humidity-level measurement.

3.2 ENVIRONMENTAL CONDITIONS

- A. All applicators and all other personnel in the area of the RF installation shall take all required and necessary safety precautions. All manufacturers' installation instructions shall be implicitly instructions shall be implicitly followed.
- B. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
- C. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- E. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- F. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

3.3 APPLICATIONS

- A. Install resinous floor over properly prepared concrete surface in strict accordance with the manufacturer's directions.
 - 1. Install the primer and/or base coats over thoroughly cleaned and prepared concrete.
 - 2. Install topcoat over flooring after excess aggregate has been removed.
 - 3. Maintain a slab temperature of 60°F to 80°F for 24 hours minimum before applying floor topping, or as instructed by manufacturer.
- B. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- C. Sealant: Saw cut resinous floor topping at expansion joints in concrete slab. Fill sawcuts with sealant prior to final seal coat application. Follow manufacturer's written recommendations.
- D. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- E. Slip Resistant Finish: Provide grit for slip resistance.
- F. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.4 COMPLETED WORK

- A. Cleaning: Upon completion of the Work, clean up and remove from the premises surplus materials, tools, appliances, empty cans, cartons and rubbish resulting from the Work. Clean off all spattering and drippings, and all resulting stains.
- B. Protection: Protect Work in accordance with manufacturer's directions from damage and wear during the remainder of the construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.
- C. Contractor shall insure that coating is protected from any traffic until it is fully cured to the satisfaction of the coating manufacturer.

END OF SECTION 09 6723

EXTERIOR PAINTING

SECTION 09 9113

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 surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Steel and iron.
 - 2. Wood.
- B. Related Requirements:
 - 1. Section 09 9123 "Interior Painting" for interior painting.

1.3 DEFINITIONS

- A. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

1.4 SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- C. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 3. VOC content.

1.5 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. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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. Benjamin Moore & Co.
 - 2. PPG Architectural Finishes, Inc.
 - 3. Sherwin-Williams Company (The).
 - 4. Or approved equal.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
- D. Colors: Match Architect's initial selection as indicated in a color schedule.

2.3 PRIMERS/SEALERS

- A. Primer, Bonding, Water Based: MPI #17. Or #6
 - 1. Benjamin Moore & Co.; Fresh Start, 100% Acrylic Superior Primer, 046/K046, E3.

2. PPG Architectural Finishes, Inc.; Seal Grip, Interior/Exterior Acrylic Universal Primer/Sealer, 17-921, E2.
3. Sherwin-Williams Company (The); Adhesion Primer, B51W8050, E3.

2.4 METAL PRIMERS

- A. Primer, Galvanized, Water Based: MPI #134.
 1. Benjamin Moore & Co.; Super Spec HP, Acrylic Metal Primer, P04/KP04, E3.
 2. PPG Architectural Finishes, Inc.; Int/Ext WB Industrial Primer, 90-912, E3.
 3. Sherwin-Williams Company (The); Pro Industrial, Pro-Cryl Universal Primer, B66W310, E3.

2.5 WATER-BASED PAINTS

- A. Latex, Exterior Semi-Gloss (Gloss Level 5): MPI #11.
 1. Benjamin Moore & Co.; Ben, 100% Acrylic Exterior Semi-Gloss Finish, 543/K543, E3.
 2. PPG Architectural Finishes, Inc.; Speedhide Exterior 100% Acrylic Latex Semi-Gloss, 6-900XI Line, E3.
 3. Sherwin-Williams Company (The); A-100, Exterior Latex Gloss, A08W00151/A08WQ0151, E3.
- B. Light Industrial Coating, Exterior, Water Based, Semi-Gloss (Gloss Level 5): MPI #163.
 1. Benjamin Moore & Co.; Super Spec High Performance, DTM Acrylic Semi Gloss, P29/KP29, E2.
 2. PPG Architectural Finishes, Inc.; Pitt-Tech® Plus, Pitt-Tech Plus Int/Ext Semi-Gloss DTM Industrial Enamel, 90-1210, E3.
 3. Sherwin-Williams Company (The); All Surface Enamel, Zero VOC Acrylic Semi-Gloss, A41WQ8051, E3.

2.6 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 2. Testing agency will perform tests for compliance with product requirements.
 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- G. Wood Substrates:
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - 5.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Steel Substrates:
 - 1. Water-Based Light Industrial Coating System:
 - a. Prime Coat: Shop primed, when indicated - Or -
 - b. Prime Coat: Primer, water based, rust inhibitive, MPI #107.
 - c. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - d. Topcoat: Light industrial coating, exterior, water based, semi-gloss (Gloss Level 5), MPI #163.
- B. Galvanized-Metal Substrates:
 - 1. Water-Based Light Industrial Coating System:
 - a. Prime Coat (touch up): Primer, galvanized, water based, MPI #134.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (Gloss Level 5), MPI #163.
- C. Painted Wood Trim and Soffit Substrates, when indicated:
 - 1. Latex over Latex Primer System:
 - a. Prime Coat: Primer, latex for exterior wood, MPI #6.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior semi-gloss (Gloss Level 5), MPI #11.
- D. Stained Wood Trim and Plywood panels, when indicated:
 - 1. Solid-Color, Water-Based Stain System:
 - a. Prime Coat: Primer, alkyd for exterior wood, MPI #5.
 - b. Intermediate Coat: Stain, exterior, water based, solid hide, matching topcoat.
 - c. Top Coat: Stain, exterior, water based, solid hide, MPI #16.

END OF SECTION 09 9113

INTERIOR PAINTING

SECTION 09 9123

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 1. Concrete masonry units (CMU).
 2. Steel.
 3. Gypsum board.
- B. Related Requirements:
 1. Section 09 9600 "High-Performance Coatings" for high-performance and special-use coatings.
 2. Section 09 9113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

1.3 DEFINITIONS

- A. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Sustainable Building Submittals:
 1. Product Data for Credit EQ 4.2: For paints and coatings, including printed statement of VOC content.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 2. Step coats on Samples to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

1.5 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. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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. Benjamin Moore & Co.
 2. PPG Architectural Finishes, Inc.
 3. Sherwin-Williams Company (The).
 4. Or approved equal.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
1. Flat Paints and Coatings: 51 g/L.
 2. Nonflat Paints and Coatings: 51 g/L.
 3. Primers, Sealers, and Undercoaters: 51 g/L.
 4. Paints Applied to Ferrous Metals: 450 g/L.
 5. Primers Applied to Ferrous Metals: 351 g/L.
- D. Colors: Match Architect's samples.

2.3 BLOCK FILLERS

- A. Block Filler, Latex, Interior/Exterior: MPI #4.
1. Benjamin Moore & Co.; Super Spec, High Build Interior/Exterior Block Filler, 206/K206, E3.
 2. PPG Architectural Finishes, Inc.; Pittsburgh Paints, Speedhide Int/Ext Acrylic Masonry Block Filler, 6-15, E3.
 3. Sherwin-Williams Company (The); PrepRite, Int/Ext Block Filler, B25W25, E3.

2.4 PRIMERS/SEALERS

- A. Primer Sealer, Latex, Interior: MPI #50.
1. Benjamin Moore & Co.; Ben, Premium Interior Latex Primer, W624/K624, E3.
 2. PPG Architectural Finishes, Inc.; Speedhide, Interior Latex Sealer Quick-Drying, 6-2, E3.
 3. Sherwin-Williams Company (The); ProGreen 200, Interior Latex Primer, B28W00600/B28WQ8600, E3.

2.5 METAL PRIMERS

- A. Primer, Alkyd, Quick Dry, for Metal: MPI #76.
1. PPG Architectural Finishes, Inc.; Multiprime, Fast Dry 2.8 VOC, 94-258/269, E3.
 2. Sherwin-Williams Company (The); Kem Bond HS Universal Alkyd Primer, B50WZ0004, E3.

2.6 WATER-BASED PAINTS

- A. Latex, Interior, (Gloss Level 3): MPI #52.
1. Benjamin Moore & Co.; Eco Spec WB, Interior Latex Eggshell, N374/F374, E3.
 2. PPG Architectural Finishes, Inc.; Speedhide, Interior Satin Acrylic Latex, 6-3511, E3.
 3. Sherwin-Williams Company (The); ProGreen 200, Low Odor Low VOC Interior Eg-Shel, B20W00651/B20WQ8651, E3.

2.7 SOLVENT-BASED PAINTS

- A. Alkyd, Quick Dry, Semi-Gloss (Gloss Level 5): MPI #81.
 - 1. Benjamin Moore & Co.; Super Spec HP, D.T.M. Alkyd Semi-Gloss, P24/KP24, E2.
 - 2. PPG Architectural Finishes, Inc.; High Performance, Industrial Semi-Gloss Oil, 7-844, E3.
 - 3. Sherwin-Williams Company (The); Industrial & Marine, Industrial Enamel, B54 Series, E2.

2.8 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.
 - 5. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - a. Mechanical Work:
 - 1) Uninsulated metal piping.
 - 2) Uninsulated plastic piping.
 - 3) Pipe hangers and supports.
 - 4) Tanks that do not have factory-applied final finishes.

- 5) Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - 6) Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material that are exposed to view in occupied spaces.
 - 7) Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- b. Electrical Work:
- 1) Switchgear.
 - 2) Panelboards.
 - 3) Conduit and boxes that are exposed to view in occupied spaces.
 - 4) Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
1. Latex System:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, (Gloss Level 3), MPI #52.
- B. CMU Substrates:
1. Latex System:
 - a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
 - b. Intermediate Coat: Latex, interior, matching topcoat.

- c. Topcoat: Latex, interior, (Gloss Level 3), MPI #52.

C. Steel Substrates:

1. Quick-Drying Enamel System:

- a. Prime Coat: Primer, alkyd, quick dry, for metal, MPI #76.
- b. Intermediate Coat: Alkyd, quick dry, matching topcoat.
- c. Topcoat: Alkyd, quick dry, semi-gloss (Gloss Level 5), MPI #81.

D. Gypsum Board Substrates:

1. Latex System:

- a. Prime Coat: Primer sealer, latex, interior, MPI #50.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior, (Gloss Level 3), MPI #52.

3.7 INTERIOR PAINTING COLOR SCHEDULE: to be determined during shop drawing review.

END OF SECTION 09 9123

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STAINING AND TRANSPARENT FINISHING

SECTION 09 9300

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 surface preparation and application of wood finishes on the following substrates:
 - 1. Wood Substrates:
 - a. Exposed glued-laminated trusses, beams and wood trim.
 - b. Exposed T & G wood decking and wall paneling.
 - c. Dressed lumber (finish carpentry).
- B. Related Requirements:
 - 1. Section 09 9113 "Exterior Painting" and Section 09 9123 "Interior Painting" for painting finishes.

1.3 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- D. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- E. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Product List: For each product indicated, include the following:

1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Stains and Transparent Finishes: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of stain color selections will be based on mockups.
 - a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply finishes when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Provided listed product or as approved by Architect prior to bids.

2.2 MATERIALS, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.
- B. Stain Colors: As selected by Architect from manufacturer's full range to match existing.

2.3 PENETRATING OIL FINISH

- A. Rosewood Oil:
 - 1. Penofin Verde by Performance Coatings Inc. Architect to select color from manufacturer's standard colors chart / samples.
 - 2. Or approved by Architect equivalent product.

2.4 ACCESSORY

- A. Stripper (Contractor to verify existing finish and submit accordingly):
 - 1. Penofin Pro-Tech Wood Stripper for oil finishes
 - 2. Chemical stripper for other finishes.
- B. Cleaner:
 - 1. Penofin Pro-Tech Cleaner
- C. Brightner:
 - 1. Penofin Pro-Tech Brightener

2.5 INTERIOR STAIN SYSTEM:

- A. Wood Stain System (trim, T & G wood wall paneling, T & G wood ceiling):
 - 1. 1st Coat – Primer Coat: apply before staining as recommended per manufacturer
 - 2. 2nd Coat – Stain Coat: Interior wood stain.
 - 3. 3rd Coat – Top Coat: Interior satin finish coat.

2.6 EXTERIOR STAIN SYSTEM:

- A. Wood Stain System (trim, T & G wood soffit):
 - 1. 1st Coat – Primer Coat: apply before staining as recommended per manufacturer
 - 2. 2nd Coat – Stain Coat: Exterior wood stain.
 - 3. 3rd Coat – Top Coat: Exterior satin finish coat.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Interior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with finish application only after unsatisfactory conditions have been corrected.
 - 1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
 - 1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
 - 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
- D. Interior Wood Substrates:
 - 1. Scrape and clean knots and apply coat of knot sealer before applying primer.

2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
3. Remove existing finish or varnish which will inhibit the penetration of the new penetrating oil. Strip with chemical stripper. Sand surfaces as required.
4. Clean and brighten existing wood per manufacturer's written instructions.

3.3 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 1. Use applicators and techniques suited for finish and substrate indicated.
 2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
 3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

END OF SECTION 09 9300

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ROOM IDENTIFICATION PANEL SIGNAGE

SECTION 10 1423

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:
 - 1. Barrier- Free Accessibility signage for the (1) Men's and (1) Women's Toilets and (1) x Family Toilet Rooms.

1.3 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

1.4 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
 - 1. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size. Show attachment method information.
- C. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
 - 1. Barrier- Free Accessibility signage for Men's and Women's Toilets: Full-size Sample.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities for signs.

2.2 SIGNS

- A. Manufacturer: Subject to compliance with requirements, provide die-raised aluminum signage, as manufactured by one of the following:
 - 1. The Supersine Company
 - 2. A.R.K. Ramos
 - 3. Or approved equal.
 - 4. Basis-of-Design Product: Signs to be made of die-raised aluminum with baked enamel finish.

5. Sign panel: smooth finish with raised pictogram barrier-free symbol and name designation of: MEN, WOMEN, FAMILY in 1 1/2" high Helvetica type and Grade 2 Braille.
 - a. Color(s): As selected by Architect from manufacturer's full range.
6. Sign-Panel Perimeter: Finish edges smooth, Square cut.
7. Mounting: Surface mounted with anchorage into a face brick veneer.
8. Text and Typeface: Accessible raised characters and Braille typeface as selected by Architect from manufacturer's full range, and variable content as scheduled. Finish raised characters to contrast with background color, and finish Braille to match background color.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

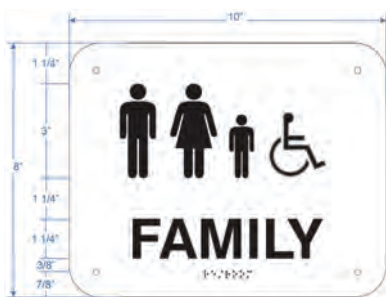
3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

3.4 EXAMPLES OF SINAGE LAYOUTS:



END OF SECTION 10 1423

SECTION 10 2113 – PLASTIC TOILET PARTITIONS

PART 1 - GENERAL

1.1 REFERENCE STANDARDS:

- A. Provide solid toilet partitions and urinal screens as shown on the drawings and as specified herein.
- B. Related work specified elsewhere.
 - 1. Toilet Accessories Section 10800.

1.2 SUBMITTALS:

- A. Submit shop drawings before ordering, fabricating or installing the work of this section.
- B. Submit color samples and catalog cuts from manufacturer's standard colors.

1.3 QUALITY ASSURANCE

- A. Acceptable manufacturers - Capitol, Santana or prior approved equal - subject to compliance of qualities listed below.
- B. Submittals - Provide shop drawings indicating plans, elevations, details of construction, anchoring details, protective coatings, finishes, colors, hardware and accessories, field work required for installation, and coordination with other trades.
- C. Standards - Consumer Products Safety Commission (16CFR Part 201) and ANSI Z 97.1, and The Americans With Disabilities Act.

PART 2 - PRODUCTS

2.1 TYPE:

- A. Compartments shall be overhead braced.

2.2 MATERIALS:

- A. Panels - Doors, partitions, pilasters and screens shall be nominal 1" thick, Poly-Pro-Plus, solid Polymer Resin. Color selected by Architect.
- B. Headrail - 1/4" wide by minimum 1/2" high, extruded aluminum with anti-grip top. Extend full length of installation and over end compartment and fasten to wall. Cap exposed ends.
- C. Floor Anchors - 1/8" Aluminum angle brackets adjustments.
- D. Pilaster Trim - 4" high, type 302 stainless steel, polished finish, with concealed fastenings.
- E. Brackets - Anodized extruded aluminum continuous brackets for anchoring panel to pilaster and panel to wall.
- F. Hinges - Doors shall be hung on continuous contact piano-type hinges, made of bright anodized extruded aluminum and shall weigh not less than 1.5 pounds per foot. Knuckles shall have nylon separators. Pivot pin shall be 1/4" type 304 stainless steel.

- G. Door latches - Strike-keeper and throw latch shall be heavy extruded bright anodized type 6463T5 aluminum.
- H. Coat Hook and Bumper - Chrome plated metal with rubber bumper. At barrier-free stalls, provide same coat less bumper: mount 40" above floor and provide separate rubber bumper to stop outswinging door.
- I. Fittings and Fasteners - Fittings, all brackets shall be heavy extruded bright anodized type 6463T5 aluminum. Floor and wall fasteners shall be #14 x 1, 3/4" "Pro-Star" tamper-proof screws with conical plastic anchors. All other fasteners shall be 5/8" stainless steel "Pro-Star" tamper-proof screws. Headrail brackets shall be 20 gauge type 304 stainless steel with a brushed finish.

2.3 FABRICATION

- A. Dimensions:
 - 1. Bottom of partitions, panels, doors, and urinal shields - 12" above floor.
 - 2. Top of partitions, panels, and doors - 5'-10" above floor.
 - 3. Depth of Compartments - 5'-0" or as dimensioned on Drawings.
 - 4. Width of Compartments - As dimensioned on drawings except barrier-free stalls 5'-0" wide minimum, ambulatory stalls 3'-0" minimum.
 - 5. Doors - 24' wide minimum in-swing except barrier-free stalls require 34" wide minimum outswing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Erect compartments and related items in a rigid substantial manner, straight and plumb, and with all horizontal lines level.
All drilling, cutting and fitting to room finish shall be concealed in the finish work.

Clearance at vertical edges of doors shall be in uniform from top to bottom and shall not exceed 3/16".

3.2 ADJUSTING

- A. Adjust hardware for proper working order.
- B. Adjust hinges to hold doors open at approximately 30 degrees.

3.3 PATCHING

- A. Field touch-up of scratches will be subject to the Architect's and Owner's acceptance. Replace defective or rejected materials with new materials.

3.4 CLEANING

- A. Remove all protective masking and clean surfaces, leaving them free of soil and imperfections.

END OF SECTION 10 2113

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TOILET, BATH AND LAUNDRY ACCESSORIES

SECTION 10 8000

PART 1 - GENERAL

1.1 NOTICE

The General Conditions, Supplementary General Conditions and Special Conditions are part of this section.

1.2 DESCRIPTION OF WORK

- A. The work in this section consists of furnishing all labor, material and equipment to execute toilet accessory work for this project.

1.3 SUBMITTAL

- A. Submit catalog cuts on all items.
- B. Deliver materials to job site in original sealed containers bearing manufacturer's labels.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Bobrick, Bradley Co., American Specialties, McKinney or equal, as approved by Architect prior to bid.

Part numbers listed below are those of Bobrick Washroom Equipment, Inc.

2.2 SCHEDULE

- A. Grab bars: Horizontal and vertical grab bars with concealed mounting, 18-gauge, type-304 stainless steel, peened non-slip gripping surface with satin finish flange and end of bar.
- B. Toilet Tissue Dispenser: Bobrick B-2888, 22-gauge, type 304 stainless steel, surface mounted.
- C. Sanitary Napkin Disposal: Bobrick B-270, 22-gauge, type 304 stainless steel, satin finish.
- D. Coat Hook: Bobrick B-212, coat hook with bumper (at Toilet stalls and at Family Toilet Rooms).
- E. Hand Soap Dispenser: provided installed by Owner .
- F. Mirror: Bobrick B-165 1836, one-piece channel frame with bright polished finish and mitered corners.
- G. Hand Dryer: NO EXCEPTIONS TAKEN; Manufactured by Excel – Thin Air, TA-W ; surface mounted, no-touch control, metal cover with white finish,
- H. Wall Protection Panel: product by Excel _ Microban Antimicrobial Wall Guard 89W (White) per each hand dryer .
- I. Baby Changing Station: Koala Kare; KB200-SS Koala, horizontal, stainless steel. Color: Grey

(01).

- J. Barrier-Free Signage: Provide Barrier-Free accessibility signage for the handicapped stalls doors; acrylic sign with a pictogram.
- K. Adult Changing Station: Base of Design: VersaMax Powered Adult Restroom Changing Table, manual fold, operates at 24V / 1 amp via 120 v wall outlet, weight capacity: 440 lbs, as manufactured by MAX-Ability, Inc., 800-577-1555, info@max-ability.com, web: max-ability.com.



- L. Or equivalent approved prior to bids.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install items in accordance with manufacturer's instructions.
Locate items as indicated on drawings, or if not indicated as directed by Architect.

END OF SECTION 10 8000

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT SECTION 22 0529

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Thermal-hanger shield inserts.
 - 4. Fastener systems.
 - 5. Equipment supports.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Welding certificates.

1.3 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 THERMAL-HANGER SHIELD INSERTS

- A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig, ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: 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.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.6 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, 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.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. 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 A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. 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.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- G. 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.
- H. Install lateral bracing with pipe hangers and supports to prevent swaying.
- I. 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.
- J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- K. 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.
- L. 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.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
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.
5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. 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.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.
- F. Use padded hangers for piping that is subject to scratching.
- G. Use thermal-hanger shield inserts for insulated piping and tubing.
- H. Horizontal-Piping Hangers and Supports: 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. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 - 4. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 5. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 - 6. 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.
 - 7. 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.
 - 8. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.

9. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
- I. 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.
- J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
- K. Building Attachments: 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. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
- L. Saddles and Shields: 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.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- M. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.

2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
 3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
- N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- O. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
- P. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 22 0529

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IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

SECTION 22 0553

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.

1.2 SUBMITTAL

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch, Stainless steel, 0.025-inch, Aluminum, 0.032-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Black.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Red.
- C. Background Color: White.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semi rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Pipe Label Color Schedule:
 - 1. Domestic Water Piping:
 - a. Background Color: Black.
 - b. Letter Color: Yellow.
 - 2. Sanitary Waste and Storm Drainage Piping:
 - a. Background Color: Black.
 - b. Letter Color: White.

END OF SECTION 220553

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PLUMBING INSULATION

SECTION 22 0700

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Insulation Materials:
 - a. Flexible elastomeric.
 - b. Mineral fiber.
 - c. Polyolefin.
2. Insulating cements.
3. Adhesives.
4. Mastics.
5. Sealants.
6. Factory-applied jackets.
7. Field-applied fabric-reinforcing mesh.
8. Field-applied jackets.
9. Tapes.
10. Securements.
11. Corner angles.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.
4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties, equipment connections, and access panels.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.

C. Field quality-control reports.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics:** Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA Inc.; Aerocel.
 - b. Armacell LLC; AP Armaflex.
 - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
- G. High-Temperature, Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type V, without factory-applied jacket.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; HTB 23 Spin-Glas.
 - b. Owens Corning; High Temperature Flexible Batt Insulations.
- H. High-Temperature, Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type III, without factory-applied jacket.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fibrex Insulations Inc.; FBX.
 - b. Johns Manville; 1000 Series Spin-Glas.
 - c. Owens Corning; High Temperature Industrial Board Insulations.
 - d. Rock Wool Manufacturing Company; Delta Board.
 - e. Roxul Inc.; Roxul RW.
 - f. Thermafiber; Thermafiber Industrial Felt.
- I. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fibrex Insulations Inc.; Coreplus 1200.
 - b. Johns Manville; Micro-Lok.
 - c. Knauf Insulation; 1000 Pipe Insulation.
 - d. Manson Insulation Inc.; Alley-K.
 - e. Owens Corning; Fiberglas Pipe Insulation.
 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- J. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; CrimpWrap.
 - b. Johns Manville; MicroFlex.
 - c. Knauf Insulation; Pipe and Tank Insulation.
 - d. Manson Insulation Inc.; AK Flex.
 - e. Owens Corning; Fiberglas Pipe and Tank Insulation.
 - K. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials and Type II, Grade 1 for sheet materials.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Armacell LLC; Tubolit.
 - b. Nomaco Inc.; IMCOLOCK, IMCOSHEET, NOMALOCK, and NOMAPLY.
 - c. RBX Corporation; Therma-cell.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Insulco, Division of MFS, Inc.; SmoothKote.
 - b. P. K. Insulation Mfg. Co., Inc.; PK No. 127, and Quik-Cote.
 - c. Rock Wool Manufacturing Company; Delta One Shot.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA Inc.; Aeroseal.
 - b. Armacell LCC; 520 Adhesive.
 - c. Foster Products Corporation, H. B. Fuller Company; 85-75.
 - d. RBX Corporation; Rubatex Contact Adhesive.
 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Chemical Company (The); 739, Dow Silicone.
 - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Speedline Corporation; Speedline Vinyl Adhesive.
 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-35.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-90.
 - c. ITW TACC, Division of Illinois Tool Works; CB-50.
 - d. Marathon Industries, Inc.; 590.
 - e. Mon-Eco Industries, Inc.; 55-40.
 - f. Vimasco Corporation; 749.
 - 2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
 - 5. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-10.
 - b. Foster Products Corporation, H. B. Fuller Company; 35-00.
 - c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
 - d. Marathon Industries, Inc.; 550.
 - e. Mon-Eco Industries, Inc.; 55-50.
 - f. Vimasco Corporation; WC-1/WC-5.
 - 2. Water-Vapor Permeance: ASTM F 1249, 3 perms at 0.0625-inch dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 200 deg F.
 - 4. Solids Content: 63 percent by volume and 73 percent by weight.
 - 5. Color: White.

2.5 SEALANTS

- A. Joint Sealants:
 - 1. Joint Sealants for Cellular-Glass Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-76.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Pittsburgh Corning Corporation; Pittseal 444.
 - f. Vimasco Corporation; 750.
 - 2. Joint Sealants for Polystyrene Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-70.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45/30-46.
 - c. Marathon Industries, Inc.; 405.

- d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - 3. Materials shall be compatible with insulation materials, jackets, and substrates.
 - 4. Permanently flexible, elastomeric sealant.
 - 5. Service Temperature Range: Minus 100 to plus 300 deg F.
 - 6. Color: White or gray.
 - 7. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. FSK and Metal Jacket Flashing Sealants:
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-76-8.
 - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - 2. Materials shall be compatible with insulation materials, jackets, and substrates.
 - 3. Fire- and water-resistant, flexible, elastomeric sealant.
 - 4. Service Temperature Range: Minus 40 to plus 250 deg F.
 - 5. Color: Aluminum.
 - 6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-76.
 - 2. Materials shall be compatible with insulation materials, jackets, and substrates.
 - 3. Fire- and water-resistant, flexible, elastomeric sealant.
 - 4. Service Temperature Range: Minus 40 to plus 250 deg F.
 - 5. Color: White.
 - 6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
- 1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
 - 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 - 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
 - 4. PVDC Jacket for Indoor Applications: 4-mil-thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perms when tested according to ASTM E 96 and with a

flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.

a. Products: Subject to compliance with requirements, provide one of the following:

- 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

5. PVDC Jacket for Outdoor Applications: 6-mil-thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.

a. Products: Subject to compliance with requirements, provide one of the following:

- 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

6. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.

a. Products: Subject to compliance with requirements, provide one of the following:

- 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. inch, in a Leno weave, for equipment and pipe.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Foster Products Corporation, H. B. Fuller Company; Mast-A-Fab.
- b. Vimasco Corporation; Elastafab 894.

2.8 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Johns Manville; Zeston.
- b. P.I.C. Plastics, Inc.; FG Series.
- c. Proto PVC Corporation; LoSmoke.
- d. Speedline Corporation; SmokeSafe.

2. Adhesive: As recommended by jacket material manufacturer.

3. Color: White.

4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
 5. Factory-fabricated tank heads and tank side panels.
- C. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105 or 5005, Temper H-14.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; Metal Jacketing Systems.
 - b. PABCO Metals Corporation; Surefit.
 - c. RPR Products, Inc.; Insul-Mate.
 2. Sheet and roll stock ready for shop or field sizing.
 3. Finish and thickness are indicated in field-applied jacket schedules.
 4. Moisture Barrier for Indoor Applications: 1-mil-thick, heat-bonded polyethylene and kraft paper.
 5. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
 6. Factory-Fabricated Fitting Covers:
 - a. Same material, finish, and thickness as jacket.
 - b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - c. Tee covers.
 - d. Flange and union covers.
 - e. End caps.
 - f. Beveled collars.
 - g. Valve covers.
 - h. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- D. Underground Direct-Buried Jacket: 125-mil-thick vapor barrier and waterproofing membrane consisting of a rubberized bituminous resin reinforced with a woven-glass fiber or polyester scrim and laminated aluminum foil.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pittsburgh Corning Corporation; Pittwrap.
 - b. Polyguard; Insulrap No Torch 125.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
 - b. Compac Corp.; 110 and 111.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
 - d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
 - b. Compac Corp.; 130.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
 - d. Venture Tape; 1506 CW NS.
 2. Width: 2 inches.
 3. Thickness: 6 mils.
 4. Adhesion: 64 ounces force/inch in width.
 5. Elongation: 500 percent.
 6. Tensile Strength: 18 lbf/inch in width.
- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
 - b. Compac Corp.; 120.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
 - d. Venture Tape; 3520 CW.
 2. Width: 2 inches.
 3. Thickness: 3.7 mils.
 4. Adhesion: 100 ounces force/inch in width.
 5. Elongation: 5 percent.
 6. Tensile Strength: 34 lbf/inch in width.

- E. PVDC Tape: White vapor-retarder PVDC tape with acrylic adhesive.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Chemical Company (The); Saran 540 Vapor Retarder Tape.
 - 2. Width: 3 inches.
 - 3. Film Thickness: 4 mils.
 - 4. Adhesive Thickness: 1.5 mils.
 - 5. Elongation at Break: 145 percent.
 - 6. Tensile Strength: 55 lbf/inch in width.

2.10 SECUREMENTS

- A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing or closed seal.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products; Bands.
 - b. PABCO Metals Corporation; Bands.
 - c. RPR Products, Inc.; Bands.
- B. Insulation Pins and Hangers:
 - 1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
 - 2) GEMCO; Perforated Base.
 - 3) Midwest Fasteners, Inc.; Spindle.
 - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Copper- or zinc-coated, low carbon steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
 - 2. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) GEMCO; Nylon Hangers.
 - 2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.

- b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
 - c. Spindle: Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
- 3. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series TSA.
 - 2) GEMCO; Press and Peel.
 - 3) Midwest Fasteners, Inc.; Self Stick.
 - b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Copper- or zinc-coated, low carbon steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive-backed base with a peel-off protective cover.
- 4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; RC-150.
 - 2) GEMCO; R-150.
 - 3) Midwest Fasteners, Inc.; WA-150.
 - 4) Nelson Stud Welding; Speed Clips.
 - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
- 5. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) GEMCO.
 - 2) Midwest Fasteners, Inc.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- D. Wire: 0.080-inch nickel-copper alloy.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C & F Wire.
 - b. Childers Products.
 - c. PABCO Metals Corporation.

- d. RPR Products, Inc.

2.11 CORNER ANGLES

- A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105 or 5005; Temper H-14.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
1. Draw jacket tight and smooth.
 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Manholes.
 5. Handholes.
 6. Cleanouts.

3.3 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
- F. Insulation Installation at Floor Penetrations:
1. Pipe: Install insulation continuously through floor penetrations.

3.4 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe

- insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.5 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
 - 1. Install pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
 - 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
 - 1. Install mitered sections of pipe insulation.
 - 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
 - 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 - 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 - 3. Install insulation to flanges as specified for flange insulation application.
 - 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 MINERAL-FIBER INSULATION INSTALLATION

- A. Insulation Installation on Straight Pipes and Tubes:
 - 1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
 - 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
 - 3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
 - 4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Flanges:
 - 1. Install preformed pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 POLYOLEFIN INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Seal split-tube longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyolefin sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of polyolefin pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install cut sections of polyolefin pipe and sheet insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.8 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

D. Where PVDC jackets are indicated, install as follows:

1. Apply three separate wraps of filament tape per insulation section to secure pipe insulation to pipe prior to installation of PVDC jacket.
2. Wrap factory-presized jackets around individual pipe insulation sections with one end overlapping the previously installed sheet. Install presized jacket with an approximate overlap at butt joint of 2 inches over the previous section. Adhere lap seal using adhesive or SSL, and then apply 1-1/4 circumferences of appropriate PVDC tape around overlapped butt joint.
3. Continuous jacket can be spiral wrapped around a length of pipe insulation. Apply adhesive or PVDC tape at overlapped spiral edge. When electing to use adhesives, refer to manufacturer's written instructions for application of adhesives along this spiral edge to maintain a permanent bond.
4. Jacket can be wrapped in cigarette fashion along length of roll for insulation systems with an outer circumference of 33-1/2 inches or less. The 33-1/2-inch-circumference limit allows for 2-inch-overlap seal. Using the length of roll allows for longer sections of jacket to be installed at one time. Use adhesive on the lap seal. Visually inspect lap seal for "fishmouthing," and use PVDC tape along lap seal to secure joint.
5. Repair holes or tears in PVDC jacket by placing PVDC tape over the hole or tear and wrapping a minimum of 1-1/4 circumferences to avoid damage to tape edges.

3.9 FINISHES

A. Equipment and Pipe Insulation with ASJ or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.11 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 1. Drainage piping located in crawl spaces.
 2. Underground piping.
 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.12 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold, Hot, Hot and Recirculated Hot Water: Insulation shall be one of the following:
 1. Flexible Elastomeric: 1 inch thick.
 2. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
 3. Polyolefin: 1 inch thick.
- B. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities: Insulation shall be one of the following:

1. Flexible Elastomeric: 1 inch thick.
2. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
3. Polyolefin: 1 inch thick.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
 1. None.
 2. PVC: 20 mils thick.
 3. Aluminum, Smooth: 0.016 inch thick.
- D. Piping, Exposed:
 1. None.
 2. PVC: 20 mils thick.
 3. Aluminum, Smooth: 0.016 inch thick.

END OF SECTION 22 0700

DOMESTIC WATER PIPING

SECTION 22 1116

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
2. Specialty valves.
3. Flexible connectors.

1.2 SUBMITTALS

- A. Product Data:** For each type of product indicated.

1.3 QUALITY ASSURANCE

- A.** Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B.** Comply with NSF 14 for plastic, potable domestic water piping and components. Include marking "NSF-pw" on piping.
- C.** Comply with NSF 61 for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A.** Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

- A.** Hard Copper Tube: ASTM B 88, Type L and ASTM B 88, Type M water tube, drawn temper.
1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
 2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
 3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
 4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
 5. Copper Pressure-Seal-Joint Fittings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Elkhart Products Corporation; Industrial Division.

- 2) NIBCO INC.
 - 3) Viega; Plumbing and Heating Systems.
 - b. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
 - c. NPS 2-1/2 to NPS 4: Cast-bronze or wrought-copper fitting with EPDM-rubber O-ring seal in each end.
- 6. Copper Push-on-Joint Fittings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) NVent LLC.
 - b. Description: Cast-copper fitting complying with ASME B16.18 or wrought-copper fitting complying with ASME B 16.22; with stainless-steel teeth and EPDM-rubber O-ring seal in each end instead of solder-joint ends.
- B. Soft Copper Tube: ASTM B 88, Type K and ASTM B 88, Type L water tube, annealed temper.
 - 1. Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
 - 2. Copper Pressure-Seal-Joint Fittings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Elkhart Products Corporation; Industrial Division.
 - 2) NIBCO INC.
 - 3) Viega; Plumbing and Heating Systems.
 - b. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
 - c. NPS 3 and NPS 4: Cast-bronze or wrought-copper fitting with EPDM-rubber O-ring seal in each end.

2.3 PVC PIPE AND FITTINGS

- A. PVC Pipe: ASTM D 1785, Schedule 40 and Schedule 80.
 - 1. PVC Socket Fittings: ASTM D 2466 for Schedule 40 and ASTM D 2467 for Schedule 80.

2.4 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
- E. Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493.
 - 1. Use CPVC solvent cement that has a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 1. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- G. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.5 SPECIALTY VALVES

A. PVC Union Ball Valves:

- 1. Description:
 - a. Standard: MSS SP-122.
 - b. Pressure Rating: 125 psig at 73 deg F.
 - c. Body Material: PVC.
 - d. Body Design: Union type.
 - e. End Connections for Valves NPS 2 and Smaller: Detachable, socket.
 - f. Ball: PVC; full port.
 - g. Seals: PTFE or EPDM-rubber O-rings.
 - h. Handle: Tee shaped.

B. PVC Gate Valves:

- 1. Description:
 - a. Pressure Rating: 125 psig at 73 deg F.
 - b. Body Material: PVC.
 - c. Body Design: Nonrising stem.
 - d. End Connections for Valves NPS 2 and Smaller: Socket.
 - e. Gate and Stem: Plastic.
 - f. Seals: EPDM rubber.
 - g. Handle: Wheel.

2.6 TRANSITION FITTINGS

- A. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- B. Sleeve-Type Transition Coupling: AWWA C219.

C. Plastic-to-Metal Transition Fittings:

1. Description: CPVC or PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert and one solvent-cement-socket or threaded end.

D. Plastic-to-Metal Transition Unions:

1. Description: CPVC or PVC four-part union. Include brass or stainless-steel threaded end, solvent-cement-joint plastic end, rubber O-ring, and union nut.

2.7 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

B. Dielectric Unions:

1. Description:
 - a. Pressure Rating: 150 psig at 180 deg F.
 - b. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Description:
 - a. Factory-fabricated, bolted, companion-flange assembly.
 - b. Pressure Rating: 150 psig.
 - c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:

1. Description:
 - a. Nonconducting materials for field assembly of companion flanges.
 - b. Pressure Rating: 150 psig.
 - c. Gasket: Neoprene or phenolic.
 - d. Bolt Sleeves: Phenolic or polyethylene.
 - e. Washers: Phenolic with steel backing washers.

E. Dielectric Couplings:

1. Description:
 - a. Galvanized-steel coupling.
 - b. Pressure Rating: 300 psig at 225 deg F.
 - c. End Connections: Female threaded.
 - d. Lining: Inert and noncorrosive, thermoplastic.

F. Dielectric Nipples:

1. Description:

- a. Electroplated steel nipple complying with ASTM F 1545.
- b. Pressure Rating: 300 psig at 225 deg F.
- c. End Connections: Male threaded or grooved.
- d. Lining: Inert and noncorrosive, propylene.

2.8 FLEXIBLE CONNECTORS

- A. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
 - 1. Working-Pressure Rating: Minimum 200 psig.
 - 2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
 - 3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.
- B. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.
 - 1. Working-Pressure Rating: Minimum 200 psig.
 - 2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
 - 3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance.
- E. Install shutoff valve immediately upstream of each dielectric fitting.
- F. Install water-pressure-reducing valves downstream from shutoff valves.
- G. Install domestic water piping level without pitch and plumb.
- H. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- I. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

- K. Install piping adjacent to equipment and specialties to allow service and maintenance.
- L. Install piping to permit valve servicing.
- M. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.
- N. Install piping free of sags and bends.
- O. Install fittings for changes in direction and branch connections.
- P. Install PEX piping with loop at each change of direction of more than 90 degrees.
- Q. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- R. Install pressure gages on suction and discharge piping from each plumbing pump and packaged booster pump.
- S. Install thermostats in hot-water circulation piping.
- T. Install thermometers on inlet and outlet piping from each water heater.
- U. Install sleeves for piping penetrations of walls, ceilings, and floors.
- V. Install sleeve seals for piping penetrations of concrete walls and slabs.
- W. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.2 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. 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.
- D. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter.
- E. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.

- G. Copper-Tubing, Push-on Joints: Clean end of tube. Measure insertion depth with manufacturer's depth gage. Join copper tube and push-on-joint fittings by inserting tube to measured depth.
- H. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
 - 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 3. PVC Piping: Join according to ASTM D 2855.
- J. PEX Piping Joints: Join according to ASTM F 1807.
- K. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.3 VALVE INSTALLATION

- A. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.
- B. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.
 - 1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
 - 2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.
- C. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger.

3.4 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. NPS 1-1/2 and Smaller: Fitting-type coupling.
 - 2. NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.5 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.

3.6 FLEXIBLE CONNECTOR INSTALLATION

- A. Install flexible connectors in suction and discharge piping connections to each domestic water pump and in suction and discharge manifold connections to each domestic water booster pump.
- B. Install bronze-hose flexible connectors in copper domestic water tubing.
- C. Install stainless-steel-hose flexible connectors in steel domestic water piping.

3.7 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - 3. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 4. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - 5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
 - 6. NPS 6: 10 feet with 5/8-inch rod.
- E. Install supports for vertical copper tubing every 10 feet.
- F. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
 - 2. NPS 1-1/2: 108 inches with 3/8-inch rod.
 - 3. NPS 2: 10 feet with 3/8-inch rod.
 - 4. NPS 2-1/2: 11 feet with 1/2-inch rod.
 - 5. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
 - 6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
 - 7. NPS 6: 12 feet with 3/4-inch rod.
- G. Install supports for vertical steel piping every 15 feet.

- H. Install vinyl-coated hangers for CPVC piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1 and Smaller: 36 inches with 3/8-inch rod.
 - 2. NPS 1-1/4 to NPS 2: 48 inches with 3/8-inch rod.
- I. Install supports for vertical CPVC piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.
- J. Install vinyl-coated hangers for PEX piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1 and Smaller: 32 inches with 3/8-inch rod.
- K. Install hangers for vertical PEX piping every 48 inches.
- L. Install vinyl-coated hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 2 and Smaller: 48 inches with 3/8-inch rod.
 - 2. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
 - 3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
 - 4. NPS 6: 48 inches with 3/4-inch rod.
- M. Install supports for vertical PVC piping every 48 inches.
- N. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.8 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
 - 2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 3. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
 - 4. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.9 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.
- B. Label pressure piping with system operating pressure.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Piping Inspections:
 - 1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - 2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 - 3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
 - 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- C. Piping Tests:
 - 1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - 2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - 3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - 5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
 - 6. Prepare reports for tests and for corrective action required.
- D. Domestic water piping will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.11 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Under-building-slab, domestic water, building service piping, NPS 3 and smaller, shall be one of the following:

1. Soft copper tube, ASTM B 88, Type K; wrought-copper solder-joint fittings; copper pressure-seal fittings; and pressure-sealed joints.

D. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:

1. Hard copper tube, ASTM B 88, Type L; wrought- copper solder-joint fittings; and soldered joints.
2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.
3. Hard copper tube, ASTM B 88, Type L; copper push-on-joint fittings; and push-on joints.
4. CPVC Tubing System: CPVC tube; CPVC socket fittings; and solvent-cemented joints.
5. PEX Tube, NPS 1 and smaller; fittings for PEX tube; and crimped joints.

3.13 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller.

2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller.
 3. Hot-Water Circulation Piping, Balancing Duty: Memory-stop balancing valves.
 4. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.
- C. Iron grooved-end valves may be used with grooved-end piping.
- D. CPVC and PVC valves matching piping materials may be used.

END OF SECTION 221116

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Pipe, tube, and fittings.
 - 2. Specialty pipe fittings.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS**2.1 PIPING MATERIALS**

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. CISPI, Hubless-Piping Couplings:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ANACO-Husky.
 - b. Dallas Specialty & Mfg. Co.
 - c. Fernco Inc.
 - d. Matco-Norca, Inc.
 - e. MIFAB, Inc.
 - f. Mission Rubber Company; a division of MCP Industries, Inc.
 - g. Stant.
 - h. Tyler Pipe.

2. Standards: ASTM C 1277 and CISPI 310.
3. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

C. Heavy-Duty, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ANACO-Husky.
 - b. Clamp-All Corp.
 - c. Dallas Specialty & Mfg. Co.
 - d. MIFAB, Inc.
 - e. Mission Rubber Company; a division of MCP Industries, Inc.
 - f. Stant.
 - g. Tyler Pipe.
2. Standards: ASTM C 1277 and ASTM C 1540.
3. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.3 PVC PIPE AND FITTINGS

- A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.
- B. Cellular-Core PVC Pipe: ASTM F 891, Schedule 40.
- C. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- D. Adhesive Primer: ASTM F 656.
 1. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Solvent Cement: ASTM D 2564.
 1. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 SPECIALTY PIPE FITTINGS

- A. Transition Couplings:
 1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
 2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
 3. Unshielded, Nonpressure Transition Couplings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1) Dallas Specialty & Mfg. Co.
 - 2) Fernco Inc.
 - 3) Mission Rubber Company; a division of MCP Industries, Inc.
 - 4) Plastic Oddities; a division of Diverse Corporate Technologies, Inc.
- b. Standard: ASTM C 1173.
 - c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - d. Sleeve Materials:
 - 1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - 2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - 3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
4. Shielded, Nonpressure Transition Couplings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cascade Waterworks Mfg. Co.
 - 2) Mission Rubber Company; a division of MCP Industries, Inc.
 - b. Standard: ASTM C 1460.
 - c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping at indicated slopes.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.

- H. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- I. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- J. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:
 - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
 - 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- K. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- L. Install aboveground PVC piping according to ASTM D 2665.
- M. Install underground PVC piping according to ASTM D 2321.
- N. Plumbing Specialties:
 - 1. Install backwater valves in sanitary waste gravity-flow piping.
 - 2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping.
 - 3. Install drains in sanitary drainage gravity-flow piping.
- O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- P. Install sleeves for piping penetrations of walls, ceilings, and floors.
- Q. Install sleeve seals for piping penetrations of concrete walls and slabs.
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.2 JOINT CONSTRUCTION

- A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- B. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

- C. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.
- D. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.
- E. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

3.3 SPECIALTY PIPE FITTING INSTALLATION

- A. Transition Couplings:
 - 1. Install transition couplings at joints of piping with small differences in OD's.
 - 2. In Drainage Piping: Shielded, nonpressure transition couplings.

3.4 VALVE INSTALLATION

- A. Backwater Valves: Install backwater valves in piping subject to backflow.
 - 1. Horizontal Piping: Horizontal backwater valves. Use normally closed type unless otherwise indicated.
 - 2. Floor Drains: Drain outlet backwater valves unless drain has integral backwater valve.
 - 3. Install backwater valves in accessible locations.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger and support devices and installation specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
 - 2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
 - 3. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
 - 4. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 5. Install individual, straight, horizontal piping runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 - 6. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 7. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
- C. Support vertical piping and tubing at base and at each floor.

- D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
 - 2. NPS 3: 60 inches with 1/2-inch rod.
 - 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
 - 4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
 - 5. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.
- F. Install supports for vertical cast-iron soil piping every 15 feet.
- G. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 3. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - 4. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.
 - 5. NPS 6: 10 feet with 5/8-inch rod.
 - 6. NPS 8: 10 feet with 3/4-inch rod.
- H. Install supports for vertical copper tubing every 10 feet.
- I. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 48 inches (1200 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 3 (DN 80): 48 inches (1200 mm) with 1/2-inch (13-mm) rod.
 - 3. NPS 4 and NPS 5 (DN 100 and DN 125): 48 inches (1200 mm) with 5/8-inch (16-mm) rod.
 - 4. NPS 6 and NPS 8 (DN 150 and DN 200): 48 inches (1200 mm) with 3/4-inch (19-mm) rod.
- J. Install supports for vertical PVC piping every 48 inches.
- K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:
 - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.

3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
 5. Install horizontal backwater valves with cleanout cover flush with floor.
 6. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections according to the following unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.7 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

3.9 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:
 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
 3. PVC pipe, PVC socket fittings, and solvent-cemented joints.
 4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- C. Aboveground, vent piping NPS 4 and smaller shall be any of the following:
 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
 3. PVC pipe, PVC socket fittings, and solvent-cemented joints.
 4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- D. Underground, soil, waste, and vent piping NPS 4 shall be any of the following:
 1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; cast-iron hubless-piping couplings; and coupled joints.
 3. PVC pipe, PVC socket fittings, and solvent-cemented joints.
 4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

END OF SECTION 22 1316

SANITARY WASTE PIPING SPECIALTIES

SECTION 221319

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following sanitary drainage piping specialties:

1. Cleanouts.
2. Floor drains.
3. Roof flashing assemblies.
4. Miscellaneous sanitary drainage piping specialties.
5. Flashing materials

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for grease interceptors.

1.3 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 CLEANOUTS

- A. Exposed Cast-Iron Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
3. Size: Same as connected drainage piping
4. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

- B. Cast-Iron Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Josam Company; Josam Div.
 - b. Oatey.
 - c. Sioux Chief Manufacturing Company, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Tyler Pipe; Wade Div.
 - f. Watts Drainage Products Inc.
 - g. Zurn Plumbing Products Group; Light Commercial Operation.
2. Standard: ASME A112.36.2M for adjustable housing cleanout.
3. Size: Same as connected branch.
4. Body or Ferrule: Cast iron.
5. Clamping Device: Required.
6. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.

C. Cast-Iron Wall Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
5. Wall Access: Round, nickel-bronze, copper-alloy, or stainless-steel wall-installation frame and cover.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Commercial Enameling Co.
 - b. Josam Company; Josam Div.
 - c. MIFAB, Inc.
 - d. Prier Products, Inc.
 - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - f. Tyler Pipe; Wade Div.
 - g. Watts Drainage Products Inc.
 - h. Zurn Plumbing Products Group; Light Commercial Operation.
2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Seepage Flange: Required.
6. Anchor Flange: Required.
7. Clamping Device: Required.
8. Outlet: Bottom.

9. Top or Strainer Material: Nickel bronze.

2.3 ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acorn Engineering Company; Elmdor/Stoneman Div.
 - b. Thaler Metal Industries Ltd.
- B. Description: Manufactured assembly made of 4.0-lb/sq. ft., 0.0625-inch-thick, lead flashing collar and skirt extending at least 6 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.
 1. Open-Top Vent Cap: Without cap.
 2. Low-Silhouette Vent Cap: With vandal-proof vent cap.
 3. Extended Vent Cap: With field-installed, vandal-proof vent cap.

2.4 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Open Drains:

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping.

B. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
2. Size: Same as connected waste piping.
 - a. NPS 2: 4-inch-minimum water seal.
 - b. NPS 2-1/2 and Larger: 5-inch-minimum water seal.

C. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 side inlet.

D. Air-Gap Fittings:

1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
2. Body: Bronze or cast iron.
3. Inlet: Opening in top of body.
4. Outlet: Larger than inlet.
5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

E. Sleeve Flashing Device:

1. Description: Manufactured, cast-iron fitting, with clamping device, that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 1 inch above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
2. Size: As required for close fit to riser or stack piping.

F. Stack Flashing Fittings:

1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
2. Size: Same as connected stack vent or vent stack.

G. Vent Caps:

1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
2. Size: Same as connected stack vent or vent stack.

2.5 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
2. Vent Pipe Flashing: 3.0-lb/sq. ft., 0.0469-inch thickness.
3. Burning: 6-lb/sq. ft., 0.0938-inch thickness.

B. Fasteners: Metal compatible with material and substrate being fastened.

C. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

D. Solder: ASTM B 32, lead-free alloy.

E. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 - 1. Position floor drains for easy access and maintenance.
 - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
 - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
 - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
 - 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 - 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- E. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- F. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
- G. Assemble open drain fittings and install with top of hub 1 inch above floor.
- H. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- I. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
 - 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 - 2. Size: Same as floor drain inlet.
- J. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- K. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- L. Install vent caps on each vent pipe passing through roof.
- M. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 CONNECTIONS

- A. Install piping adjacent to equipment to allow service and maintenance.
- B. Grease Interceptors: Connect inlet and outlet to unit and connect flow-control fitting and vent to unit inlet piping. Install valve on outlet of automatic drawoff-type unit.

3.3 FLASHING INSTALLATION

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
 - 1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft., 0.0938-inch thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft., 0.0625-inch thickness or thinner.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
 - 1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
 - 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
 - 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.
- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings.
- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

3.4 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each grease interceptor.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.

3.5 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319

ELECTRIC, DOMESTIC-WATER HEATERS

SECTION 223300

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Residential, electric, storage, domestic-water heaters.
2. Domestic-water heater accessories.

1.2 SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated.

1. Product Data for Prerequisite EA 2: Documentation indicating that units comply with ASHRAE/IESNA 90.1, Section 7, "Service Water Heating."

B. Shop Drawings:

1. Wiring Diagrams: For power, signal, and control wiring.

C. Seismic Qualification Certificates: For commercial domestic-water heaters, accessories, and components, from manufacturer.

D. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

E. Source quality-control reports.

F. Field quality-control reports.

G. Operation and maintenance data.

H. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

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. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1. Warranty Periods: From date of Substantial Completion.
 - a. Residential, Electric, Storage, Domestic-Water Heaters:
 - 1) Storage Tank: 10 years.
 - 2) Controls and Other Components: Two years.
 - b. Compression Tanks: Five years.

PART 2 - PRODUCTS

2.1 RESIDENTIAL, ELECTRIC, DOMESTIC-WATER HEATERS

- A. Residential, Electric, Storage, Domestic-Water Heaters:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bradford White Corporation.
 - b. Lochinvar Corporation.
 - c. Rheem Manufacturing Company.
 - d. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.
 2. Standard: UL 174.
 3. Storage-Tank Construction: Steel.
 - a. Tappings: ASME B1.20.1 pipe thread.
 - b. Pressure Rating: 150 psig (1035 kPa).
 - c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.
 4. Factory-Installed Storage-Tank Appurtenances:
 - a. Anode Rod: Replaceable magnesium.
 - b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
 - c. Drain Valve: ASSE 1005.
 - d. Insulation: Comply with ASHRAE 90.2.
 - e. Jacket: Steel, cylindrical, with enameled finish.
 - f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
 - g. Heating Elements: Two; electric, screw-in immersion type; wired for nonsimultaneous operation unless otherwise indicated. Limited to 12 kW total.
 - h. Temperature Control: Adjustable thermostat.
 - i. Safety Control: High-temperature-limit cutoff device or system.
 - j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.

2.2 DOMESTIC-WATER HEATER ACCESSORIES

A. Domestic-Water Compression Tanks:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - a. AMTROL Inc.
 - b. Flexcon Industries.
 - c. Honeywell International Inc.
 - d. Pentair Pump Group (The); Myers.
 - e. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.
 - f. State Industries.
 - g. Taco, Inc.
2. Description: Steel pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
3. Construction:
 - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
 - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - c. Air-Charging Valve: Factory installed.

B. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than **NPS 3/4 (DN 20)** with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.

C. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1.

D. Heat-Trap Fittings: ASHRAE 90.2.

E. Pressure-Reducing Valves: ASSE 1003 for water. Set at **25-psig- (172.5-kPa-)** maximum outlet pressure unless otherwise indicated.

F. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.

G. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than domestic-water heater working-pressure rating.

H. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.

I. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.

J. Domestic-Water Heater Stands: Manufacturer's factory-fabricated steel stand for floor mounting, capable of supporting domestic-water heater and water. Include dimension that will support bottom of domestic-water heater a minimum of **18 inches (457 mm)** above the floor.

K. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water.

2.3 SOURCE QUALITY CONTROL

- A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test domestic-water heaters to minimum of one and one-half times pressure rating before shipment.
- C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Division 01 Section "Quality Requirements" for retesting and reinspecting requirements and Division 01 Section "Execution" for requirements for correcting the Work.
- D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

- A. Residential, Electric, Domestic-Water Heater Mounting: Install residential, electric, domestic-water heaters on floor.
 - 1. Maintain manufacturer's recommended clearances.
 - 2. Arrange units so controls and devices that require servicing are accessible.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 5. Anchor domestic-water heaters to substrate.
- B. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
 - 1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- C. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- D. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Division 22 Section "Domestic Water Piping Specialties."
- E. Install pressure-reducing valve with integral bypass relief valve in electric, domestic-water booster-heater inlet piping and water hammer arrester in booster-heater outlet piping. Set pressure-reducing valve for outlet pressure of 25 psig. Comply with requirements for pressure-reducing valves and water hammer arresters specified in Division 22 Section "Domestic Water Piping Specialties."

- F. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.
- G. Fill electric, domestic-water heaters with water.
- H. Charge domestic-water compression tanks with air.

3.2 CONNECTIONS

- A. Comply with requirements for piping specified in Division 22 Section "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
 - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Division 01 Section "Quality Requirements" for retesting and reinspecting requirements and Division 01 Section "Execution" for requirements for correcting the Work.
- C. Prepare test and inspection reports.

END OF SECTION 22 3300

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PLUMBING FIXTURES

SECTION 22 4000

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Faucets for lavatories and sinks.
 - 2. Toilet seats.
 - 3. Protective shielding guards.
 - 4. Fixture supports.
 - 5. Water closets.
 - 6. Lavatories.
 - 7. Service sinks

1.2 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- C. FRP: Fiberglass-reinforced plastic.
- D. PMMA: Polymethyl methacrylate (acrylic) plastic.
- E. PVC: Polyvinyl chloride plastic.
- F. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.

- C. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- E. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- F. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
 - 1. Plastic Shower Enclosures: ANSI Z124.2.
 - 2. Porcelain-Enameled, Formed-Steel Fixtures: ASME A112.19.4M.
 - 3. Slip-Resistant Bathing Surfaces: ASTM F 462.
 - 4. Solid-Surface-Material Lavatories and Sinks: ANSI/ICPA SS-1.
 - 5. Stainless-Steel Residential Sinks: ASME A112.19.3.
 - 6. Vitreous-China Fixtures: ASME A112.19.2M.
 - 7. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.
- G. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
 - 1. Backflow Protection Devices for Faucets with Side Spray: ASME A112.18.3M.
 - 2. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
 - 3. Diverter Valves for Faucets with Hose Spray: ASSE 1025.
 - 4. Faucets: ASME A112.18.1.
 - 5. Hose-Connection Vacuum Breakers: ASSE 1011.
 - 6. Hose-Coupling Threads: ASME B1.20.7.
 - 7. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
 - 8. NSF Potable-Water Materials: NSF 61.
 - 9. Pipe Threads: ASME B1.20.1.
 - 10. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
 - 11. Supply Fittings: ASME A112.18.1.
 - 12. Brass Waste Fittings: ASME A112.18.2.
- H. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
 - 1. Atmospheric Vacuum Breakers: ASSE 1001.
 - 2. Brass and Copper Supplies: ASME A112.18.1.
 - 3. Dishwasher Air-Gap Fittings: ASSE 1021.
 - 4. Manual-Operation Flushometers: ASSE 1037.
 - 5. Plastic Tubular Fittings: ASTM F 409.
 - 6. Brass Waste Fittings: ASME A112.18.2.
- I. Comply with the following applicable standards and other requirements specified for miscellaneous components:
 - 1. Disposers: ASSE 1008 and UL 430.
 - 2. Dishwasher Air-Gap Fittings: ASSE 1021.
 - 3. Flexible Water Connectors: ASME A112.18.6.
 - 4. Grab Bars: ASTM F 446.
 - 5. Hose-Coupling Threads: ASME B1.20.7.
 - 6. Hot-Water Dispensers: ASSE 1023 and UL 499.
 - 7. Off-Floor Fixture Supports: ASME A112.6.1M.
 - 8. Pipe Threads: ASME B1.20.1.

9. Plastic Toilet Seats: ANSI Z124.5.
10. Supply and Drain Protective Shielding Guards: ICC A117.1.

PART 2 - PRODUCTS

2.1 LAVATORY FAUCETS

- A. Lavatory Faucets:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard Companies, Inc.
 - b. Bradley Corporation.
 - c. Chicago Faucets.
 - d. Delta Faucet Company.
 - e. Eljer.
 - f. Elkay Manufacturing Co.
 - g. Just Manufacturing Company.
 - h. Kohler Co.
 - i. Moen, Inc.
 - j. Royal Brass Mfg. Co.
 - k. Speakman Company.
 - l. T & S Brass and Bronze Works, Inc.
 - m. Zurn Plumbing Products Group; Commercial Brass Operation.

2.2 SINK FAUCETS

- A. Sink Faucets:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard Companies, Inc.
 - b. Bradley Corporation.
 - c. Chicago Faucets.
 - d. Delta Faucet Company.
 - e. Dormont Manufacturing Company.
 - f. Eljer.
 - g. Elkay Manufacturing Co.
 - h. Just Manufacturing Company.
 - i. Kohler Co.
 - j. Moen, Inc.
 - k. Speakman Company.
 - l. T & S Brass and Bronze Works, Inc.
 - m. Zurn Plumbing Products Group; Commercial Brass Operation.

2.3 TOILET SEATS

- A. Toilet Seats:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard Companies, Inc.

- b. Bemis Manufacturing Company.
- c. Centoco Manufacturing Corp.
- d. Church Seats.
- e. Eljer.
- f. Kohler Co.
- g. Olsonite Corp.

2.4 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Pipe Covers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Engineered Brass Co.
 - b. Insul-Tect Products Co.; a Subsidiary of MVG Molded Products.
 - c. McGuire Manufacturing Co., Inc.
 - d. Plumberex Specialty Products Inc.
 - e. TCI Products.
 - f. TRUEBRO, Inc.
 - g. Zurn Plumbing Products Group; Tubular Brass Plumbing Products Operation.

2.5 FIXTURE SUPPORTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Josam Company.
 - 2. MIFAB Manufacturing Inc.
 - 3. Smith, Jay R. Mfg. Co.
 - 4. Tyler Pipe; Wade Div.
 - 5. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
 - 6. Zurn Plumbing Products Group; Specification Drainage Operation.

2.6 WATER CLOSETS

- A. Water Closets:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard Companies, Inc.
 - b. Eljer.
 - c. Gerber Plumbing Fixtures LLC.
 - d. Kohler Co.
 - e. Peerless Pottery, Inc.
 - f. TOTO USA, Inc.

2.7 LAVATORIES

- A. Lavatories:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. American Standard Companies, Inc.
- b. Commercial Enameling Company.
- c. Eljer.
- d. Kohler Co.

2.8 SERVICE SINKS

- A. Service Sink:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard Companies, Inc.
 - b. Eljer.
 - c. Kohler Co.
 - d. Crane Plumbing, L.L.C./Fiat Products.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
 - 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
 - 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
 - 3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-mounting fixtures with tubular waste piping attached to supports.
- F. Install fixtures level and plumb according to roughing-in drawings.
- G. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
- H. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- I. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- J. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- K. Install toilet seats on water closets.

- L. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- M. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- N. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- O. Install shower flow-control fittings with specified maximum flow rates in shower arms.
- P. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
 - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
- Q. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
- R. Install dishwasher air-gap fitting at each sink indicated to have air-gap fitting. Install in sink deck. Connect inlet hose to dishwasher and outlet hose to disposer.
- S. Install hot-water dispensers in back top surface of sink or in countertop with spout over sink.
- T. Install escutcheons at piping wall and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Escutcheons for Plumbing Piping."
- U. Set bathtubs and showers in leveling bed of cement grout.
- V. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.

- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- E. Install fresh batteries in sensor-operated mechanisms.

3.4 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224000

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DRINKING FOUNTAINS AND WATER COOLERS

SECTION 224700

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. EZ Wall Mounted Drinking Fountain

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for fixtures for people with disabilities.
- C. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- D. ARI Standard: Comply with ARI's "Directory of Certified Drinking Water Coolers" for style classifications.
- E. ARI Standard: Comply with ARI 1010, "Self-Contained, Mechanically Refrigerated Drinking-Water Coolers," for water coolers and with ARI's "Directory of Certified Drinking Water Coolers" for type and style classifications.
- F. ASHRAE Standard: Comply with ASHRAE 34, "Designation and Safety Classification of Refrigerants" for water coolers. Provide HFC 134a (tetrafluoroethane) refrigerant unless otherwise indicated.

PART 2 - PRODUCTS

2.1 DRINKING FOUNTAINS

- A. Drinking Fountains:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
 - a. Most Dependable Fountains
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings. See below:
 - a. Most Dependable Fountains

2.2 FIXTURE SUPPORTS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Most Dependable Fountains.
- C. Description: ASME A112.6.1M, water cooler carriers. Include vertical, steel uprights with feet and tie rods and bearing plates with mounting studs matching fixture to be supported.
 1. Type I: Hanger-type carrier with two vertical uprights.
 2. Type II: Bilevel, hanger-type carrier with three vertical uprights.
 3. Supports for Accessible Fixtures: Include rectangular, vertical, steel uprights instead of steel pipe uprights.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Use carrier off-floor supports for wall-mounting fixtures, unless otherwise indicated.
- B. Set freestanding and pedestal drinking fountains on floor.
- C. Use chrome-plated brass or copper tube, fittings, and valves in locations exposed to view.

3.2 INSTALLATION

- A. Install off-floor supports affixed to building substrate and attach wall-mounting fixtures, unless otherwise indicated.
- B. Install fixtures level and plumb. For fixtures indicated for children, install at height required by authorities having jurisdiction.
- C. Install water-supply piping with shutoff valve on supply to each fixture to be connected to water distribution piping. Use ball, gate, or globe valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

- D. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.
- E. Install pipe escutcheons at wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding pipe fittings. Escutcheons are specified in Division 22 Section "Escutcheons for Plumbing Piping."
- F. Seal joints between fixtures and walls and floors using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

3.3 CONNECTIONS

- A. Connect fixtures with water supplies, traps, and risers, and with soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Water Cooler Testing: After electrical circuitry has been energized, test for compliance with requirements. Test and adjust controls and safeties.
 - 1. Remove and replace malfunctioning units and retest as specified above.
 - 2. Report test results in writing.

3.5 ADJUSTING

- A. Adjust fixture flow regulators for proper flow and stream height.
- B. Adjust water cooler temperature settings.

END OF SECTION 22 4700

SECTION 232123 - HYDRONIC PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Close-coupled, in-line centrifugal pumps.

1.2 SUBMITTALS

- A. Product Data: Include certified performance curves and rated capacities, operating characteristics, furnished specialties, final impeller dimensions, and accessories for each type of product indicated. Indicate pump's operating point on curves.
- B. Shop Drawings: Show pump layout and connections. Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. UL Compliance: Comply with UL 778 for motor-operated water pumps.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 CLOSE-COUPLED, IN-LINE CENTRIFUGAL PUMPS

- A. Manufacturers:
 - 1. Armstrong Pumps Inc.
 - 2. Aurora Pump; Division of Pentair Pump Group.
 - 3. Bell & Gossett; Div. of ITT Industries.

4. Burks Pumps; Div. of Crane Pumps & Systems.
 5. Demming Div.; Crane Co.
 6. Flowserve Corporation; Div. of Ingersoll-Dresser Pumps.
 7. Grundfos Pumps Corporation.
 8. Little Giant Pump Co.; Subsidiary of Tecumseh Products Co.
 9. MEPCO (Marshall Engineered Products Co.).
 10. PACO Pumps.
 11. Patterson Pump Co.; a Subsidiary of The Gorman-Rupp Co.
 12. Peerless Pump; a Member of the Sterling Fluid Systems Group.
 13. Taco, Inc.
 14. Thrush Company Inc.
 15. Weinman; Div. of Crane Pumps & Systems.
- B. Description: Factory-assembled and -tested, centrifugal, overhung-impeller, close-coupled, in-line pump as defined in HI 1.1-1.2 and HI 1.3; designed for installation with pump and motor shafts mounted horizontally or vertically. Rate pump for 125-psig (860-kPa) minimum working pressure and a continuous water temperature of 200 deg F (93 deg C).
- C. Pump Construction:
1. Casing: Radially split, cast iron, with replaceable bronze wear rings, threaded gage tappings at inlet and outlet, and threaded companion-flange connections.
 2. Impeller: ASTM B 584, cast bronze; statically and dynamically balanced, keyed to shaft, and secured with a locking cap screw. Trim impeller to match specified performance.
 3. Pump Shaft: Steel, with copper-alloy shaft sleeve.
 4. Mechanical Seal: Carbon rotating ring against a ceramic seat held by a stainless-steel spring, and Buna-N bellows and gasket. Include water slinger on shaft between motor and seal.
 5. Packing Seal: Stuffing box, with a minimum of four rings of graphite-impregnated braided yarn with bronze lantern ring between center two graphite rings, and bronze packing gland.
 6. Pump Bearings: Permanently lubricated ball bearings.

PART 3 - EXECUTION

3.1 PUMP INSTALLATION

- A. Comply with HI 1.4.
- B. Install pumps with access for periodic maintenance including removal of motors, impellers, couplings, and accessories.
- C. Independently support pumps and piping so weight of piping is not supported by pumps and weight of pumps is not supported by piping.
- D. Install continuous-thread hanger rods and elastomeric hangers of sufficient size to support pump weight. Vibration isolation devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Fabricate brackets or supports as required. Hanger and support materials are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- E. Suspend vertically mounted, in-line centrifugal pumps independent of piping. Install pumps with motor and pump shafts vertical. Use continuous-thread hanger rods and elastomeric hangers

of sufficient size to support pump weight. Vibration isolation devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Hanger and support materials are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

3.2 ALIGNMENT

- A. Align pump and motor shafts and piping connections after setting on foundation, grout has been set and foundation bolts have been tightened, and piping connections have been made.
- B. Comply with pump and coupling manufacturers' written instructions.
- C. Adjust pump and motor shafts for angular and offset alignment by methods specified in HI 1.1-1.5, "Centrifugal Pumps for Nomenclature, Definitions, Application and Operation."
- D. After alignment is correct, tighten foundation bolts evenly but not too firmly. Completely fill baseplate with nonshrink, nonmetallic grout while metal blocks and shims or wedges are in place. After grout has cured, fully tighten foundation bolts.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to machine to allow service and maintenance.
- C. Connect piping to pumps. Install valves that are same size as piping connected to pumps.
- D. Install suction and discharge pipe sizes equal to or greater than diameter of pump nozzles.
- E. Install check valve and throttling valve on discharge side of pumps.
- F. Install Y-type strainer and shutoff valve on suction side of pumps.
- G. Install flexible connectors on suction and discharge sides of base-mounted pumps between pump casing and valves.
- H. Install pressure gages on pump suction and discharge, at integral pressure-gage tapping, or install single gage with multiple input selector valve.
- I. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- J. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

END OF SECTION 23 2123

METAL DUCTS

SECTION 23 3113

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rectangular ducts and fittings.
 - 2. Round ducts and fittings.
 - 3. Sheet metal materials.
 - 4. Sealants and gaskets.
 - 5. Hangers and supports.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
 - 3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
- B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
- C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lindab Inc.
 - b. McGill AirFlow LLC.
 - c. SEMCO Incorporated.
 - d. Sheet Metal Connectors, Inc.
 - e. Spiral Manufacturing Co., Inc.
 - f. Universal Spiral Air
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger Than 90 inches in diameter with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 1. Galvanized Coating Designation: G60.
 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.
- D. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- E. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.
- F. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 2. Tape Width: 3 inches.
 3. Sealant: Modified styrene acrylic.
 4. Water resistant.
 5. Mold and mildew resistant.

6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

F. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.5 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

- F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- H. Trapeze and Riser Supports:
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
 - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 ADDITIONAL INSTALLATION REQUIREMENTS FOR COMMERCIAL KITCHEN HOOD EXHAUST DUCT

- A. Install commercial kitchen hood exhaust ducts without dips and traps that may hold grease, and sloped a minimum of 2 percent to drain grease back to the hood.
- B. Install fire-rated access panel assemblies at each change in direction and at maximum intervals of 20 feet in horizontal ducts, and at every floor for vertical ducts, or as indicated on Drawings. Locate access panel on top or sides of duct a minimum of 1-1/2 inches from bottom of duct.
- C. Do not penetrate fire-rated assemblies except as allowed by applicable building codes and authorities having jurisdiction.

3.4 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Outdoor, Supply-Air Ducts: Seal Class A.
 - 3. Outdoor, Exhaust Ducts: Seal Class C.
 - 4. Outdoor, Return-Air Ducts: Seal Class C.
 - 5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
 - 6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
 - 7. Unconditioned Space, Exhaust Ducts: Seal Class C.
 - 8. Unconditioned Space, Return-Air Ducts: Seal Class B.
 - 9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
 - 10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
 - 11. Conditioned Space, Exhaust Ducts: Seal Class B.

12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.6 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.7 DUCT CLEANING

- A. Clean new and existing duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
 - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 23 Section "Air Duct Accessories" for access panels and doors.
 - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 - 3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.8 START UP

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.9 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

1. Underground Ducts: Concrete-encased, PVC-coated, galvanized sheet steel with thicker coating on duct exterior.

B. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
 - a. Pressure Class: Negative 1-inch wg.
 - b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
2. Ducts Connected to Commercial Kitchen Hoods: Comply with NFPA 96.
 - a. Exposed to View: Type 304, stainless-steel sheet, No. 4 finish.
 - b. Concealed: Type 304, stainless-steel sheet, No. 2D finish.
 - c. Welded seams and joints.
 - d. Pressure Class: Positive or negative 2-inch wg.
 - e. Minimum SMACNA Seal Class: Welded seams, joints, and penetrations.
 - f. SMACNA Leakage Class: 3.

C. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel or carbon steel coated with zinc-chromate primer.
2. PVC-Coated Ducts:
 - a. Exposed to Airstream: Match duct material.
 - b. Not Exposed to Airstream: Match duct material.
3. Stainless-Steel Ducts:
 - a. Exposed to Airstream: Match duct material.
 - b. Not Exposed to Airstream: Match duct material.
4. Aluminum Ducts: Aluminum or galvanized sheet steel coated with zinc chromate.

D. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
 - a. Velocity 1000 fpm or Lower:
 - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - 2) Mitered Type RE 4 without vanes.
 - b. Velocity:
 - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
 - c. Velocity 1500 fpm or Higher:
 - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.

- 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
 2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
 3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - 4) Radius-to Diameter Ratio: 1.5.
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 Inches and Larger in Diameter: [Standing seam] [Welded].
- E. Branch Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: Spin in.
 2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1000 fpm or Lower: 90-degree tap.
 - b. Velocity 1000 to 1500 fpm: Conical tap.
 - c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 23 3113

HVAC POWER VENTILATORS

SECTION 23 3423

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Ceiling-mounting ventilators.
 - 2. In-line centrifugal fans.

1.2 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- C. Field quality-control test reports.
- D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.
- C. UL Standard: Power ventilators shall comply with UL 705.

PART 2 - PRODUCTS

2.1 CEILING-MOUNTING VENTILATORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 - 1. American Coolair Corp.
 - 2. Ammerman; General Resource Corp.

3. Breidert Air Products.
 4. Broan Mfg. Co., Inc.
 5. Carnes Company HVAC.
 6. Dayton Electric Manufacturing Co.; a division of W. W. Grainger, Inc.
 7. FloAire.
 8. Greenheck.
 9. JencoFan; Div. of Breidert Air Products.
 10. Loren Cook Company.
 11. NuTone Inc.
 12. Penn Ventilation.
- D. Description: Centrifugal fans designed for installing in ceiling or wall or for concealed in-line applications.
- E. Housing: Steel, lined with acoustical insulation.
- F. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.
- G. Grille: Stainless steel, louvered grille with flange on intake and thumbscrew attachment to fan housing.
- H. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.
- I. Accessories:
1. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light.
 2. Time-Delay Switch: Assembly with single-pole rocker switch, timer, and cover plate.
 3. Motion Sensor: Motion detector with adjustable shutoff timer.
 4. Ceiling Radiation Damper: Fire-rated assembly with ceramic blanket, stainless-steel springs, and fusible link.
 5. Filter: Washable aluminum to fit between fan and grille.
 6. Isolation: Rubber-in-shear vibration isolators.
 7. Manufacturer's standard roof jack or wall cap, and transition fittings.

2.2 IN-LINE CENTRIFUGAL FANS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
1. Acme Engineering & Mfg. Corp.
 2. American Coolair Corp.
 3. Ammerman; General Resource Corp.
 4. Bayley Fans; a division of Lau Industries, Inc.
 5. Breidert Air Products.
 6. Carnes Company HVAC.
 7. FloAire.
 8. Greenheck.

9. Hartzell Fan, Inc.
 10. JencoFan; Div. of Breidert Air Products.
 11. Loren Cook Company.
 12. Madison Manufacturing.
 13. Penn Ventilation.
- D. Description: In-line, direct-driven centrifugal fans consisting of housing, wheel, outlet guide vanes, fan shaft, bearings, motor and disconnect switch, drive assembly, mounting brackets, and accessories.
- E. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.
- F. Direct-Driven Units: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing.
- G. Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.
- H. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.
- I. Accessories:
1. Volume-Control Damper: Manually operated with quadrant lock, located in fan outlet.
 2. Companion Flanges: For inlet and outlet duct connections.
 3. Fan Guards: 1/2- by 1-inch (13- by 25-mm) mesh of galvanized steel in removable frame. Provide guard for inlet or outlet for units not connected to ductwork.
 4. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.

2.3 MOTORS

- A. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
- B. Enclosure Type: Totally enclosed, fan cooled.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install power ventilators level and plumb.
- B. Support units using elastomeric mounts having a static deflection of 1 inch (25 mm). Vibration- and seismic-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
1. Secure vibration and seismic controls to concrete bases using anchor bolts cast in concrete base.
- C. Install floor-mounting units on concrete bases. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."

- D. Secure roof-mounting fans to roof curbs with cadmium-plated hardware. Refer to Division 07 Section "Roof Accessories" for installation of roof curbs.
- E. Ceiling Units: Suspend units from structure; use steel wire or metal straps.
- F. Support suspended units from structure using threaded steel rods and elastomeric hangers having a static deflection of 1 inch (25 mm). Vibration-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- G. Install units with clearances for service and maintenance.
- H. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."
- I. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."
- J. Install ducts adjacent to power ventilators to allow service and maintenance.
- K. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- L. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
 - 5. Adjust belt tension.
 - 6. Adjust damper linkages for proper damper operation.
 - 7. Verify lubrication for bearings and other moving parts.
 - 8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
 - 9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
 - 10. Shut unit down and reconnect automatic temperature-control operators.
 - 11. Remove and replace malfunctioning units and retest as specified above.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION 233423

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DIFFUSERS, REGISTERS, AND GRILLES

SECTION 23 3713

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fixed face grilles.
- B. Related Sections:
 - 1. Division 08 Section "Louvers and Vents" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated, include the following:
 - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

PART 2 - PRODUCTS

2.1 REGISTERS AND GRILLES

- A. Fixed Face Grille:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carnes.
 - b. Hart & Cooley Inc.
 - c. Krueger.
 - d. Nailor Industries Inc.
 - e. Price Industries.
 - f. Titus.
 - g. Tuttle & Bailey.

2.2 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.2 ADJUSTING

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 3713

SECTION 23 5216 - CONDENSING BOILERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes packaged, factory-fabricated and -assembled, gas-fired, condensing boilers, trim, and accessories for generating hot water.

1.2 SUBMITTALS

- A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: For boilers, boiler trim, and accessories. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Source quality-control test reports.
- D. Field quality-control test reports.
- E. Operation and maintenance data.
- F. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.
- C. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."
- D. DOE Compliance: Minimum efficiency shall comply with 10 CFR 430, Subpart B, Appendix N, "Uniform Test Method for Measuring the Energy Consumption of Furnaces and Boilers."
- E. UL Compliance: Test boilers for compliance with UL 795, "Commercial-Industrial Gas Heating Equipment." Boilers shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Fulton Boiler Works, Inc.
 2. Gasmaster Industries Incorporated.
 3. Hydrotherm, Inc.; a division of Mestek, Inc.
 4. AERCO International.
 5. Heat Transfer Products, Inc.
 6. Laars Heating Systems; a division of Waterpik Technologies, Inc.
 7. Lochinvar Corporation.
 8. Viessmann Manufacturing Co. (US) Inc.

2.2 MANUFACTURED UNITS

- A. Description: Factory-fabricated, -assembled, and -tested, fire-tube condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls. Water heating service only.
- B. Heat Exchanger: Nonferrous, corrosion-resistant combustion chamber.
- C. Pressure Vessel: Carbon steel with welded heads and tube connections.
- D. Burner: Propane gas, forced draft.
- E. Blower: Centrifugal fan to operate during each burner firing sequence and to prepurge and postpurge the combustion chamber.
1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
 - a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- F. Gas Train: Combination gas valve with manual shutoff and pressure regulator.
- G. Ignition: Spark ignition with 100 percent main-valve shutoff with electronic flame supervision.
- H. Casing:
1. Jacket: Sheet metal, with snap-in or interlocking closures.
 2. Control Compartment Enclosures: NEMA 250, Type 1A.
 3. Finish: Baked-enamel protective finish.
 4. Insulation: Minimum 2-inch- (50-mm-) thick, polyurethane-foam insulation surrounding the heat exchanger.
 5. Combustion-Air Connections: Inlet and vent duct collars.

2.3 MANUFACTURED UNITS

- A. Description: Factory-fabricated, -assembled, and -tested, water-tube condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls. Water heating service only.
- B. Heat Exchanger: Finned-copper primary and stainless-steel secondary heat exchangers.
- C. Combustion Chamber: Stainless steel, sealed.
- D. Burner: Propane gas, forced draft drawing from gas premixing valve.
- E. Blower: Centrifugal fan to operate during each burner firing sequence and to prepurge and postpurge the combustion chamber.
 - 1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
 - a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- F. Gas Train: Combination gas valve with manual shutoff and pressure regulator.
- G. Ignition: Silicone carbide hot-surface ignition that includes flame safety supervision and 100 percent main-valve shutoff.
- H. Integral Circulator: Cast-iron body and stainless-steel impeller sized for minimum flow required in heat exchanger.
- I. Casing:
 - 1. Jacket: Sheet metal, with snap-in or interlocking closures.
 - 2. Control Compartment Enclosures: NEMA 250, Type 1A.
 - 3. Finish: Textured epoxy.
 - 4. Insulation: Minimum 1-inch- (25-mm-) thick, mineral-fiber insulation surrounding the heat exchanger.
 - 5. Combustion-Air Connections: Inlet and vent duct collars.

2.4 TRIM

- A. Include devices sized to comply with [ANSI B31.1, "Power Piping] [ANSI B31.9, "Building Services Piping]."
- B. Aquastat Controllers: Operating, firing rate and high limit.
- C. Safety Relief Valve: ASME rated.
- D. Pressure and Temperature Gage: Minimum 3-1/2-inch- (89-mm-) diameter, combination water-pressure and -temperature gage. Gages shall have operating-pressure and -temperature ranges so normal operating range is about 50 percent of full range.
- E. Boiler Air Vent: Automatic.

- F. Drain Valve: Minimum NPS 3/4 (DN 20) hose-end gate valve.
- G. Circulation Pump: Non-overloading, in-line pump with split-capacitor motor having thermal-overload protection and lubricated bearings; designed to operate at specified boiler pressures and temperatures.

2.5 ELECTRICAL POWER

- A. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.
- B. Single-Point Field Power Connection: Factory-installed and -wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to boiler.
 - 1. House in NEMA 250, Type 1 enclosure.
 - 2. Wiring shall be numbered and color-coded to match wiring diagram.
 - 3. Install factory wiring outside of an enclosure in a metal raceway.
 - 4. Field power interface shall be to circuit breaker.
 - 5. Provide branch power circuit to each motor and to controls with a disconnect switch or circuit breaker.
 - 6. Provide each motor with overcurrent protection.

2.6 VENTING KITS

- A. Kit: Complete system, ASTM A 959, Type 29-4C stainless steel, pipe, vent terminal, thimble, indoor plate, vent adapter, condensate trap and dilution tank, and sealant.
- B. Combustion-Air Intake: Complete system, stainless steel, pipe, vent terminal with screen, inlet air coupling, and sealant.

2.7 SOURCE QUALITY CONTROL

- A. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency; perform hydrostatic test.
- B. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.

PART 3 - EXECUTION

3.1 BOILER INSTALLATION

- A. Install gas-fired boilers according to NFPA 54.
- B. Assemble and install boiler trim.
- C. Install electrical devices furnished with boiler but not specified to be factory mounted.

- D. Install control wiring to field-mounted electrical devices.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to boiler to allow service and maintenance.
- C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.
- D. Connect piping to boilers, except safety relief valve connections, with flexible connectors of materials suitable for service. Flexible connectors and their installation are specified in Division 23 Section "Common Work Results for HVAC."
- E. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of gas train connection. Provide a reducer if required.
- F. Connect hot-water piping to supply- and return-boiler tapings with shutoff valve and union or flange at each connection.
- G. Install piping from safety relief valves to nearest floor drain.
- H. Boiler Venting:
 - 1. Install flue venting kit and combustion-air intake.
 - 2. Connect full size to boiler connections.
- I. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- J. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. Perform installation and startup checks according to manufacturer's written instructions.
 - 2. Leak Test: Hydrostatic test. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: Start units to confirm proper motor rotation and unit operation. Adjust air-fuel ratio and combustion.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- a. Check and adjust initial operating set points and high- and low-limit safety set points of fuel supply, water level, and water temperature.
 - b. Set field-adjustable switches and circuit-breaker trip ranges as indicated.
- C. Remove and replace malfunctioning units and retest as specified above.
- D. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions.

END OF SECTION 23 5216

SECTION 23 8316 - RADIANT-HEATING HYDRONIC PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes radiant heating piping, including pipes, fittings, and piping specialties.

1.2 SUBMITTALS

- A. Product Data: For each type of radiant heating pipe, fitting, manifold, specialty, and control.
- B. Shop Drawings: Show piping layout and details drawn to scale, including valves, manifolds, controls, and support assemblies, and their attachments to building structure.
- C. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PEX PIPE AND FITTINGS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. FlorHeat Company (The).
 - 2. HeatLink USA Inc.
 - 3. Infloor Radiant Heating Inc.
 - 4. IPEX Inc.
 - 5. REHAU.
 - 6. Slant/Fin Corp.
 - 7. Stadler-Viega.
 - 8. Uponor Wirsbo Co.
 - 9. Vanguard Piping Systems, Inc.
 - 10. Warmboard, Inc.
 - 11. Watts Radiant, Inc.; a division of Watts Water Technologies, Inc.
 - 12. Zurn Plumbing Products Group.
- B. Pipe Material: PEX plastic according to ASTM F 876.
- C. Oxygen Barrier: Limit oxygen diffusion through the tube to maximum 0.10 mg per cu. m/day at 104 deg F (40 deg C) according to DIN 4726.
- D. Fittings: ASTM F 1807, metal insert and copper crimp rings.
- E. Pressure/Temperature Rating: Minimum 100 psig (690 kPa) and 180 deg F (82 deg C).

2.2 DISTRIBUTION MANIFOLDS

- A. Manifold: Minimum NPS 1 (DN 25), brass.
- B. Main Shutoff Valves:
 - 1. Factory installed on supply and return connections.
 - 2. Two-piece body.
 - 3. Body: Brass or bronze.
 - 4. Ball: Chrome-plated bronze.
 - 5. Seals: PTFE.
 - 6. CWP Rating: 150 psig (1035 kPa).
 - 7. Maximum Operating Temperature: 225 deg F (107 deg C).
- C. Manual Air Vents:
 - 1. Body: Bronze.
 - 2. Internal Parts: Nonferrous.
 - 3. Operator: Key furnished with valve, or screwdriver bit.
 - 4. Inlet Connection: NPS 1/2 (DN 15).
 - 5. Discharge Connection: NPS 1/8 (DN 6).
 - 6. CWP Rating: 150 psig (1035 kPa).
 - 7. Maximum Operating Temperature: 225 deg F (107 deg C).
- D. Balancing Valves:
 - 1. Body: Plastic or bronze, ball or plug, or globe cartridge type.
 - 2. Ball or Plug: Brass or stainless steel.
 - 3. Globe Cartridge and Washer: Brass with EPDM composition washer.
 - 4. Seat: PTFE.
 - 5. Visual Flow Indicator: Flowmeter with visible indication in a clear plastic cap at top of valve.
 - 6. Differential Pressure Gage Connections: Integral seals for portable meter to measure loss across calibrated orifice.
 - 7. Handle Style: Lever or knob, with memory stop to retain set position if used for shutoff.
 - 8. CWP Rating: Minimum 125 psig (860 kPa).
 - 9. Maximum Operating Temperature: 250 deg F (121 deg C).
- E. Zone Control Valves:
 - 1. Body: Plastic or bronze, ball or plug, or globe cartridge type.
 - 2. Ball or Plug: Brass or stainless steel.
 - 3. Globe Cartridge and Washer: Brass with EPDM composition washer.
 - 4. Seat: PTFE.
 - 5. Actuator: Replaceable electric motor.
 - 6. CWP Rating: Minimum 125 psig (860 kPa).
 - 7. Maximum Operating Temperature: 250 deg F (121 deg C).
- F. Thermometers:
 - 1. Mount on supply and return connections.
 - 2. Case: Dry type, metal or plastic, 2-inch (50-mm) diameter.
 - 3. Element: Bourdon tube or other type of pressure element.
 - 4. Movement: Mechanical, connecting element and pointer.
 - 5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.

6. Pointer: Black metal.
7. Window: Plastic.
8. Connector: Rigid, back type.
9. Thermal System: Liquid- or mercury-filled bulb in copper-plated steel, aluminum, or brass stem.
10. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

G. Mounting Brackets: Copper, or plastic or copper-clad steel, where in contact with manifold.

2.3 PIPING SPECIALTIES

A. Cable Ties:

1. Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.
2. Minimum Width: 1/8 inch (3 mm).
3. Tensile Strength: 20 lb (9 kg), minimum.
4. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).

B. Floor-Mounting Tracks:

1. Aluminum or plastic channel track with smooth finish, no sharp edges.
2. Minimum Thickness: 1/16 inch (1.6 mm).
3. Slot Width: Snap fit to hold tubing.
4. Slot Spacing: 2-inch (50-mm) intervals.

2.4 CONTROLS

A. Temperature-control devices and sequence of operations are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Danfoss Inc.
2. HeatLink USA Inc.
3. Honeywell.
4. Infloor Radiant Heating Inc.
5. IPEX Inc.
6. REHAU.
7. Slant/Fin Corp.
8. Stadler-Viega.
9. tekmar Control Systems, Ltd.
10. Uponor Wirsbo Co.
11. Vanguard Piping Systems, Inc.
12. Watts Radiant, Inc.; a division of Watts Water Technologies, Inc.
13. Zurn Plumbing Products Group.

D. Wall-Mounting Thermostat:

1. Minimum temperature range from 50 to 90 deg F (10 to 32 deg C).
2. Manually operated with on-off switch.
3. Day and night setback and clock program with minimum four periods per day.
4. Operate pumps or open zone control valves if room temperature falls below the thermostat setting and stop pumps or close zone control valves when room temperature rises above the thermostat setting.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Install the following types of radiant heating piping for the applications described:

1. Piping in Exterior Pavement: PEX.
2. Piping in Interior Reinforced-Concrete Floors: PEX.
3. Piping in Level Fill Concrete Floors (Not Reinforced): PEX.
- 4.

3.2 INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop or Coordination Drawings.
- B. Install radiant heating piping continuous from the manifold through the heated panel and back to the manifold without piping joints in heated panels.
- C. Connect radiant piping to manifold in a reverse-return arrangement.
- D. Do not bend pipes in radii smaller than manufacturer's minimum bend radius dimensions.
- E. Install manifolds in accessible locations, or install access panels to provide maintenance access as required in Division 08 Section "Access Doors and Frames."
- F. Refer to Division 23 Section "Hydronic Piping" for pipes and connections to hydronic systems and for glycol-solution fill requirements.
- G. Fire- and Smoke-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials according to Division 07 Section "Penetration Firestopping."
- H. Piping in Interior Reinforced-Concrete Floors:
1. Secure piping in concrete floors by attaching pipes to reinforcement using cable ties.
 2. Space cable ties a maximum of 18 inches (457 mm) o.c., and at center of turns or bends.
 3. Maintain 2-inch (50-mm) minimum cover.
 4. Install a sleeve of 3/8-inch- (9.5-mm-) thick, foam-type insulation or PE pipe around tubing and extending for a minimum of 10 inches (250 mm) on each side of slab joints to protect the tubing passing through expansion or control joints. Anchor sleeve to slab form at control joints to provide maximum clearance for saw cut.

5. Maintain minimum 40-psig (275-kPa) pressure in piping during concrete placement and continue for 24 hours after placement.

I. Piping in Level Fill Concrete Floors (Not Reinforced):

1. Secure piping in concrete floors by attaching pipes to subfloor using tracks, clamps, or staples.
2. Space tracks, clamps, or staples a maximum of 18 inches (457 mm) o.c., and at center of turns or bends.
3. Maintain 3/4-inch (19-mm) minimum cover.
4. Install a sleeve of 3/8-inch- (9.5-mm-) thick, foam-type insulation or PE pipe around tubing and extending for a minimum of 10 inches (250 mm) on each side of slab joints to protect the tubing passing through expansion or control joints. Anchor sleeve to slab form at control joints to provide maximum clearance for saw cut.
5. Maintain minimum 40-psig (275-kPa) pressure in piping during the concrete pour and continue for 24 hours during curing.

J. Revise locations and elevations from those indicated as required to suit field conditions and ensure integrity of piping and as approved by Architect.

K. After system balancing has been completed, mark balancing valves to permanently indicate final position.

L. Perform the following adjustments before operating the system:

1. Open valves to fully open position.
2. Check operation of zone control valves.
3. Set temperature controls so all zones call for full flow.
4. Purge air from piping.

M. After the concrete or plaster heating panel has cured as recommended by concrete supplier, operate radiant heating system as follows:

1. Start system heating at a maximum of 10 deg F (6 deg C) above the ambient radiant panel temperature, and increase 10 deg F (6 deg C) each following day until design temperature is achieved.
2. For freeze protection, operate at a maximum of 60 deg F (16 deg C) supply-water temperature.

3.3 FIELD QUALITY CONTROL

A. Prepare radiant heating piping for testing as follows:

1. Open all isolation valves and close bypass valves.
2. Open and verify operation of zone control valves.
3. Flush with clean water, and clean strainers.

B. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Subject piping to hydrostatic test pressure that is not less than 1.5 times the design pressure but not more than 100 psig (690 kPa). Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- C. Remove and replace malfunctioning radiant heating piping components that do not pass tests, and retest as specified above.
- D. Prepare a written report of testing.

END OF SECTION 23 8316

BASIC ELECTRICAL REQUIREMENTS

SECTION 26 0500

PART 1 GENERAL

1.01 RELATED SECTIONS

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this Section.

1.02 DESCRIPTION OF WORK

- A. This Section specifies several categories of provisions for electrical work, including:
 - 1. Certain adaptive expansions of requirements specified in Division 1.
 - 2. General performance requirements within the electrical systems as a whole.
 - 3. General work to be performed as electrical work because of its close association.
 - 4. Drawings and Specifications:
 - a. Drawings: Refer to the E-Series Drawings for graphic representations, schedules, and notations showing electrical work.
 - b. Specifications: Refer to the bid categories for the related primary technical specifications of electrical work.
 - c. Drawings and Specifications are intended to supplement each other, and all work specified or indicated in either shall be provided.

1.03 COORDINATION OF ELECTRICAL WORK

- A. General: Refer to the Division 1 sections for general coordination requirements applicable to the entire scope of work. It is recognized that the documents are diagrammatic in showing physical relationships which must be established within the electrical work, and in its interface with other work, including utilities and mechanical work. Such establishment is the exclusive responsibility of the Electrical Contractor.
- B. Advise other trades of openings required in their work for the installation of large electrical equipment.
- C. The Electrical Contractor shall be responsible for all subcontractors and suppliers, and include in his bid all materials, labor, and equipment to other trades involved in accordance with all local customs, rules, regulations, jurisdictional awards, and decisions and secure compliance of all parts of the specifications and drawings regardless of Sectional inclusion in these specifications.
- D. Equipment Clearance:
 - 1. Electrical Contractor to coordinate with the Mechanical Contractor's equipment locations, to insure adequate clearance is maintained, as required by the National Electrical Code, applicable state and local codes, and for future maintenance and operation.
- E. Wall, Floor and Ceiling Openings:
 - 1. E.C. is responsible for preventing water from entering through any exterior wall or floor penetrations via conduits or cracks and/or rough edges of openings made.

1.04 PRODUCT SUBSTITUTIONS

- A. Substitutions requested for review during or after bidding may be reviewed by the WPF Engineering upon request at a fee of \$500.00 per product review. Substitutions for actual fixtures, lamps and poles will not be accepted.

1.05 SUBMITTAL PROCEDURES

- A. General: Refer to Division 1 for general administrative/procedural requirements related to shop drawings. Provide Shop drawings for all equipment as specified in individual specification sections. Provide at a minimum 6 copies of each shop drawing.

1.06 SITE AND PROJECT DOCUMENTATION EXAMINATION

- A. Submission of proposal is considered evidence the Electrical Contractor has visited site, examined drawings and specifications of all trades including Architectural, Structural, Mechanical and Electrical, and fully informed himself with all project and site conditions. It is also evidence that they are proficient, experienced, and knowledgeable of all standards, codes, ordinances, permits, and regulations which affect his completion, cost, and time required, and that all costs are included in the proposal.

- B. Each Electrical Contractor and subcontractor shall examine all drawings and specifications of his trade and work shown on drawings, shop drawings and field layouts of all other trades (including Architectural, Structural, Mechanical and Electrical) working on the project prior to starting his required work, and coordination of all work with other trades.
- C. All schedules on drawings and specifications are only for convenience of the Electrical Contractor. Each Electrical Contractor shall make his own count and, where fixtures or equipment are shown on drawings but not on schedule, provide like equipment or fixtures for like rooms or use.

1.07 QUALITY ASSURANCE, STANDARDS, AND SYMBOLS

- A. General: Refer to Division 1 for general administrative/procedural requirements related to compliance with codes and standards. Specifically, for the electrical work (in addition to standards specified in individual work sections), the following standards are imposed, as applicable to the work in each instance:
 - 1. NEC (NFPA 70), National Electrical Code
 - 2. AWS, American Welding Society, Standards for Welding
 - 3. ANSI C2, National Electrical Safety Code
 - 4. ANSI C73, Dimensions of Attachment Plugs & Receptacles
 - 5. NECA, Standards for Installation
 - 6. NEMA, Standards for Materials and Products
 - 7. ASTM, American Society for Testing Materials
 - 8. ASA, American Standards Association
 - 9. NFPA, National Fire Protection Association
 - 10. UL, Underwriters' Laboratories, Inc.
 - 11. OSHA, Occupational Safety and Health Act
 - 12. ADA, Americans with Disabilities Act
- B. NOTE: ALWAYS REFER TO THE MOST CURRENT STATE ADOPTED CODES AND STANDARDS.
- C. All work to be provided and tested in accordance with all applicable local, county and state laws, ordinances, codes, rules, and regulations.
- D. Where quantities, sizes, or other requirements on drawings or specifications are in excess of code requirements, drawings or specifications govern.
- E. When conflict exists between referenced specifications or standards, more stringent requirements govern. No extra compensation for such compliance requirements shall be allowed.
- F. No work shall be covered or enclosed until tested in accordance with applicable codes and regulations, and successful tests witnessed and approved by authorized inspection authority. Written approvals shall be secured by the Electrical Contractor and submitted to Engineer before final acceptance of work.
- G. In general, all material where applicable shall be labeled or listed by Underwriters' Laboratories, Inc.
- H. Permits and Fees: Give all notices, file all drawings, obtain necessary approvals, obtain all permits, pay all fees, deposits and expenses required for installation of all work under this Contract.

PART 2 PRODUCTS

2.01 PRODUCTS, ELECTRICAL WORK

- A. General: Refer to Division 1 sections for general requirements on products, materials and equipment. The following provisions expand or modify the requirements as applicable to electrical work.
- B. Compatibility: Provide products which are compatible with other products of the electrical work, and with other work requiring interface with the electrical work, including electrical connections and control devices. For exposed electrical work, coordinate colors and finishes with other work.
- C. Standards:

1. All electrical material, equipment and accessories shall be new and conform to all applicable standards, codes and requirements and all applicable local, state and federal specifications.
2. All products shall be of established manufacturers regularly engaged in making type of materials to be provided and complete with all parts, accessories, connections, etc., reasonably incidental thereto as specified in detail or as described in manufacturer's catalog. All properly tested, cleaned, adjusted, lubricated and put in complete working order ready for service.

2.02 EXCAVATION AND BACKFILL FOR ELECTRICAL WORK

- A. Description:
 1. The extent of excavating and backfill work required for electrical work is indicated on the Drawings and by Specifications, and is hereby defined to include whatever excavating and backfilling is necessary to install the electrical work specified in Division 26 of these Specifications.
 2. General: Coordinate the work with other excavating and backfilling in the same area, including dewatering, flood protection provisions and other temporary facilities. Coordinate the work with other work in the same area, including other underground services (existing and new), landscape development, paving and floor slabs on grade. Coordinate with weather conditions and provide temporary facilities needed for protection and proper performance of excavating and backfilling.
- B. The types of electrical work installations requiring excavation and backfill include but are not necessarily limited to the following:
 1. Underground electrical wiring.
 2. Independent (isolated) equipment foundations specified as electrical work.
- C. Materials: Refer to applicable provisions of Division 2 "Excavation and Backfill".
- D. Execution:
 1. General Standards: Except as otherwise indicated, comply with the applicable provisions of Division 2 "Excavation and Backfill" for electrical work excavating and backfilling. Refer instances of uncertain applicability to the Engineer for resolution before proceeding.
 2. Excavation:
 - a. General: Do not excavate for electrical work until the work is ready to proceed without delay, so that the total time lapse from excavation to completion of backfilling will be minimum.
 - b. Excavate with vertical-sided excavations to the greatest extent possible, except where otherwise indicated. Where necessary, provide sheeting and cross-bracing to sustain sides of excavations. Remove sheeting and cross-bracing during backfilling wherever such removal would not endanger the work or other property. Where not removed, cut sheeting off at a sufficient distance below finished grade to not interfere with other work.
 - c. Width: Excavate to provide minimum practical but adequate working clearances.
 - d. Depth for Subbase Support: Where installation of subbase material is indicated, excavate for installation of subbase material in the depth indicated or, if not indicated, 6" below bottom of work to be supported.
 3. Performance and Maintenance:
 - a. Settling: Where settling is measurable or observable at electrical work excavations during the warranty period, remove the surface (pavement, lawn or other finish), add backfill material, compact and replace the surface treatment. Restore the appearance, quality and condition of the surface or finish to match adjacent work, and eliminate evidence of the restoration to the greatest extent possible.
 4. Where it is necessary to remove and replace landscape work, engage the original installer to install the replacement work. Where the work existed prior to the work of this Contract, engage only experienced and expert firms and trades persons to replace the work.

2.03 PAINTING

- A. General Contractor will do all painting of electrical work in finished rooms per Architect's schedule.

- B. All electrical equipment and accessories provided by Electrical Contractor shall have a factory baked enamel finish or as specifically stated otherwise.
- C. Provide all exposed conduit and boxes in finished areas with surface suitable for painting.

2.04 FIRE STOPPING

- A. Sealing of openings between floors, through rated fire and smoke wall, existing or created by the contractor for their work shall be the responsibility of the contractor.
- B. Sealing material and application of this material shall be accomplished in such a manner which is acceptable to the local fire and building authorities having jurisdiction over this work.
- C. Any openings created by or the contractor and left unused shall also be sealed as part of this work.
- D. Refer to architectural Fire Stopping Specification as applicable.

2.05 CLEANING AND REPAIR

- A. All equipment and accessories with baked enamel finish to be touched up with factory matching paint before final acceptance by Owner.
- B. Where surface cannot be repaired by touching up, the entire scratched or marred equipment shall be electrostatically powder coated with finish to match original.

PART 3 EXECUTION

3.01 CERTIFICATE OF INSPECTION

- A. Provide Engineer's office evidence that installation has been inspected and approved by municipal or state inspector having jurisdiction over electrical work involved.

3.02 RECORD DRAWINGS AND OPERATIONAL AND MAINTENANCE MANUALS

- A. Maintain a white-print set of Electrical Contract Drawings and submittals in clean, undamaged condition for mark-up of actual installation on either Electrical Contract Drawings or submittals which vary substantially from the work as shown. Comply with additional Division 1 requirements relative to record drawings.
- B. Contractor to provide copies of all Operational and Maintenance Manuals per specifications. Comply with additional Division 1 requirements relative to operational and maintenance manuals.
- C. Contractor responsible for securing all elevations and locations prior to concealment.

3.03 PLACING SYSTEMS INTO OPERATION

- A. General:
 - 1. Electrical Contractor shall be responsible for all start-up procedures, system checks and phase balancing, coordinating work of other Contractors and Subcontractors.
 - 2. All equipment installed, tested and operated in accordance with manufacturer's recommendations at normal operating conditions.
 - 3. All permanent electrical equipment used during construction periods shall be cleaned, and damaged equipment replaced.
 - 4. Place all systems into operation when weather or other considerations require their use. Perform repair, adjustment and balancing operations as often as required to assure satisfactory operation before final acceptance.

3.04 TESTING

- A. All equipment shall be factory tested using industry standard testing procedures. Refer to individual specification sections for specific testing requirements.

3.05 GUARANTEE

- A. Provide written guarantee for all work performed under this Contract for a period of not less than one year from the date of substantial completion.
- B. Acceptance date of substantial completion shall be the date of Owner occupancy as defined by Architect/Engineer.
- C. Contractor shall make all necessary alterations, repairs, and adjustments, replacements during guarantee period as directed by Architect/Engineer to comply with Drawings and Specifications at no cost to Owner.

- D. Repair or replacements made under guarantee to bear further one year guarantee from date of acceptance of repair or replacement.

3.07 ELECTRICAL WORK CLOSEOUT

- A. General: Refer to the Division 1 Sections for general closeout requirements.
- B. Coordinate closeout operations with closeout of mechanical systems and other power consuming equipment as follows:
 - 1. Test run electrical equipment in coordination with test runs of mechanical systems.
 - 2. Clean and lubricate operational equipment.
 - 3. Instruct Owner's operating personnel thoroughly in the operation, sequencing, maintenance and safety/emergency provisions of the electrical systems.
 - 4. Turn over the operations to the Owner's personnel at the time(s) of substantial completion.
 - 5. Until the time of final acceptance of the total work of the Contract, respond promptly with consultation and services to assist the Owner's personnel with operation of electrical systems.
- C. Conditions of Final Closeout:
 - 1. All completion checklists signed and returned to Engineer.
 - 2. Maintenance manuals submitted and approved.
 - 3. Record drawings submitted and approved.
 - 4. Final certificate of electrical inspection and Contractor's written 1 year warranty submitted and approved.
 - 5. Circuit directory in each panelboard. Electrical component identification complete.
 - 6. Equipment clean-up and final adjustments made.
 - 7. Contractor has instructed Owner's representative in the safe operation and use of the electrical systems.
 - 8. All temporary wiring and facilities have been removed.

END OF SECTION 16010

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BUILDING WIRE AND CABLE

SECTION 26 0519

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wire and cable for 600 volts and less.
- B. Wiring connectors and connections.

1.02 RELATED SECTIONS

- A. Section 024119 Selective Demolition
- B. Section 031100 Site Clearing
- C. Section 031200 Earth Moving
- D. Section 16075 (26 0553) - Electrical Identification.

1.03 REFERENCES

- A. Install per NECA (National Electrical Contractors Association)
- B. Meet NEMA (National Electrical Manufacturers Association) standard requirements
- C. Install per NFPA 70 (National Electrical Code; National Fire Protection Association)

1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience and with service facilities within 100 miles of Project.
- C. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 WIRING REQUIREMENTS

- A. Concealed Dry Interior Locations: Use only building wire with Type THHN/THWN insulation in raceway.
- B. Exposed Dry Interior Locations: Use only building wire with Type THHN/THWN insulation in raceway.
- C. Above Accessible Ceilings: Use only building wire with Type THHN/THWN insulation in raceway.
- D. Wet or Damp Interior Locations: Use only building wire with Type THHN/THWN insulation in raceway.
- E. Exterior Locations: Use only building wire with Type THHN/THWN insulation in raceway.
- F. Underground Installations: Use only building wire with Type THHN/THWN insulation in raceway, unless noted on plan.
- G. Use stranded conductors for control circuits.
- H. Use conductor not smaller than 12 AWG for power and lighting circuits.
- I. Use conductor not smaller than 14 AWG for control circuits.
- J. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.

2.02 WIRE MANUFACTURERS

- A. Cerro Wire & Cable Company: www.cerro.com.
- B. Industrial Wire & Cable, Inc: www.industwire.com.
- C. Southwire Company: www.mysouthwire.com.
- D. Rome Cable Corporation.
- E. Cablec.
- F. Futronix Systems Corp.
- G. Substitutions: See Section 16010 (26 0500) – Basic Electrical Requirements: Product Substitutions.

2.03 BUILDING WIRE

- A. Description: Single conductor insulated wire.

- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: Thermoplastic material rated 90 degrees C.

2.04 SERVICE ENTRANCE CABLE

- A. Description: NFPA 70, Type SE.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: Type NMC.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.
- C. Verify that raceway installation is complete and supported.
- D. Verify that field measurements are as indicated.

3.02 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.03 INSTALLATION

- A. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Route wire and cable as required to meet project conditions.
 - 1. Wire and cable routing indicated is approximate unless dimensioned.
 - 2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
 - 3. Include wire and cable of lengths required to install connected devices within 10 ft of location shown.
- C. Use wiring methods indicated.
- D. Pull all conductors into raceway at same time.
- E. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- F. Protect exposed cable from damage.
- G. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
- H. Use suitable cable fittings and connectors.
- I. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- J. Clean conductor surfaces before installing lugs and connectors.
- K. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- L. Terminate aluminum conductors with tin-plated aluminum-bodied compression connectors only. Fill with anti-oxidant compound before installing conductor.
- M. Use suitable reducing connectors or mechanical connector adaptors for connecting aluminum conductors to copper conductors.
- N. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- O. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- P. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- Q. Trench and backfill for direct burial cable installations. Install warning tape along entire length of direct burial cable.
- R. Identify and color code wire and cable under provisions of Section 16075 (26 0553). Identify each conductor with its circuit number or other designation indicated.

3.04 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in Industry standards

- B. Inspect and test in accordance with NETA STD ATS.
- C. Perform inspections and tests listed in NETA STD ATS.

END OF SECTION 26 0519

GROUNDING AND BONDING

SECTION 26 0526

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding components.

1.02 RELATED SECTIONS

- A. Section 03300 (03 3053) – Miscellaneous Cast-in-Place Concrete.

1.03 REFERENCES

- A. Install per NFPA 70 – (National Electrical Code; National Fire Protection Association)

1.05 SUBMITTALS

- A. See Section 16010 (26 0500) - Basic Electrical Requirements - Submittal procedures.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING CONDUCTORS

- A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes 10AWG and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes 4 AWG and larger shall be permitted to be identified per NEC.
- B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes 10AWG and smaller shall be ASTM B1 solid bare copper wire.
- C. Electrical System Grounding: Conductor sizes shall not be less than what is shown on the drawings and not less than required by the NEC, whichever is greater.

2.02 GROUND CONNECTIONS

- A. Below Grade: Exothermic-welded type connectors
- B. Above Grade:
 - 1. Bonding jumpers: Compression type connectors, using zinc-plated fasteners and external tooth lockwashers.
 - 2. Ground Busbars: Two-hole compression type lugs using tin-plated copper or copper alloy bolts and nuts.

PART 3 EXECUTION

3.01 GENERAL

- A. Verify existing conditions prior to beginning work.
- B. Ground in accordance with the NEC, as shown on drawings, and as specified.

3.02 INSTALLATION

- A. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

END OF SECTION 26 0526

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HANGERS AND SUPPORTS

SECTION 26 0529

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Conduit and equipment supports.
- B. Anchors and fasteners.

1.02 REFERENCES

- A. Install per NECA (National Electrical Contractors Association)
- B. Install per NFPA 70 – (National Electrical Code; National Fire Protection Association)

1.03 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Thomas & Betts Corporation.
- B. Threaded Rod Company.
- C. Erico.
- D. Threadco.
- E. Substitutions: See Section 16010 (26 0500) – Basic Electrical Requirements: Product Substitutions.

2.02 MATERIALS

- A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
- B. Supports: Fabricated of structural steel or formed steel members; galvanized.
- C. Anchors and Fasteners:
 - 1. Do not use powder-actuated anchors, spring clips, or beam clamps.
 - 2. Obtain permission from Architect before using powder-actuated anchors.
 - 3. Concrete Structural Elements: Use precast inserts, expansion anchors, powder-actuated anchors, or preset inserts.
 - 4. Steel Structural Elements: Use beam clamps, steel spring clips, steel ramset fasteners, or welded fasteners.
 - 5. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
 - 6. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
 - 7. Solid Masonry Walls: Use expansion anchors or preset inserts.
 - 8. Sheet Metal: Use sheet metal screws.
 - 9. Wood Elements: Use wood screws.
- D. Formed Steel Channel:
- E. Steel Spring Clips:

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.
 - 1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
 - 2. Do not drill or cut structural members.
 - 3. Obtain permission from Architect before drilling or cutting structural members.
- B. Rigidly weld support members or use hexagon-head bolts to present neat appearance with

- adequate strength and rigidity. Use spring lock washers under all nuts.
- C. Install surface-mounted cabinets and panelboards with minimum of four anchors.
 - D. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.
 - E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION 26 0529

BOXES

SECTION 26 0533

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Pull and junction boxes.

1.02 RELATED SECTIONS

- A. Section 16010 (26 0500) – Basic Electrical Requirements - Firestopping.
- B. Section 16139 (26 2716) - Cabinets and Enclosures.
- C. Section 16140 (26 2726) – Wiring Devices: Wall plates in finished areas.
- D. Section 16155 (26 2717) – Equipment Wiring.

1.03 REFERENCES

- A. Install per NECA (National Electrical Contractors Association)
- B. Meet NEMA (National Electrical Manufacturers Association) standard requirements
- C. Install per NFPA 70 (National Electrical Code; National Fire Protection Association)

1.04 SUBMITTALS

- A. See Section 16010 (26 0500) - Basic Electrical Requirements - Submittal procedures.
- B. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Provide products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Appleton Electric
- B. Arc-Co./Division of Arcade Technology
- C. Unity Manufacturing
- D. Raco
- E. Thomas & Betts (Steel City)
- F. Hubbell
- G. Quazite
- H. Wiremold
- I. Substitutions: See Section 16010 (26 0500) – Basic Electrical Requirements: Product Substitutions.

2.02 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2-inch male fixture studs where required.
 - 2. Concrete Ceiling Boxes: Concrete type.
- B. Nonmetallic Outlet Boxes: NEMA OS 2.
- C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- D. Wall Plates for Finished Areas: As specified in Section 16140 (26 2726).

2.03 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Hinged Enclosures: As specified in Section 16139 (26 2716).
- C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:

1. Material: Galvanized cast iron.
2. Cover: Furnish with ground flange, neoprene gasket, and stainless-steel cover screws.
- D. In-Ground Cast Metal Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting:
 1. Material: Galvanized cast iron.
 2. Cover: Smooth cover with neoprene gasket and stainless-steel cover screws.
 3. Cover Legend: "ELECTRIC"
- E. In-Ground Fiberglass Handholes: Die molded fiberglass
 1. Cable Entrance: Pre-cut 4x4 inch cable entrance at center bottom of each side.
 2. Cover: weatherproof fiberglass, nonskid finish
 3. Cover Legend: Refer to plans and details.
 4. Hardware: Stainless steel inserts and bolts

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify locations of outlets in work areas prior to rough-in.

3.02 INSTALLATION

- A. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.
- C. Coordinate installation of outlet boxes for equipment connected under Section 16155 (26 2717).
- D. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- E. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
 1. Adjust box locations up to 10 feet if required to accommodate intended purpose, obtain approval from Architect prior to installation.
- F. Orient boxes to accommodate wiring devices oriented as specified in Section 16140 (26 2726).
- G. Maintain headroom and present neat mechanical appearance.
- H. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- I. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- J. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 16010 – Fire Stopping.
- K. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- L. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan and elevations.
- M. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- N. Use flush mounting outlet box in finished areas.
- O. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- P. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- Q. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- R. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- S. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- T. Use adjustable steel channel fasteners for hung ceiling outlet box.
- U. Do not fasten boxes to ceiling support wires.
- V. Support boxes independently of conduit.
- W. Use gang box where more than one device is mounted together. Do not use sectional box.
- X. Use gang box with plaster ring for single device outlets.
- Y. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- Z. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal

box in other locations.

AA. Handholes:

1. Do all excavation. Bottom of excavation shall be undisturbed earth. If earth is disturbed, backfill with sand and compact.
2. Set per manufacturers recommendations.
3. Backfill shall be compacted to 95% Procter density. Remove all excess material from site.
4. Restore all disturbed surfaces to their original condition.

3.03 ADJUSTING

- A. Install knockout closures in unused box openings.
- B. Adjust handholes such that cover is 1/4" above grade.

END OF SECTION 26 0533

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CONDUIT

SECTION 26 0534

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Conduit, fittings and conduit bodies.

1.02 RELATED SECTIONS

- A. Section 02582 (33 7119) - Underground Electrical Ducts and Manholes.
- B. Section 16010 (26 0500) - Basic electrical requirements.
- C. Section 16060 (26 0526) - Grounding and Bonding.
- D. Section 16070 (26 0529) - Hangers and Supports.
- E. Section 16075 (26 0553) - Electrical Identification.
- F. Section 16138 (26 0537) - Boxes.

1.03 REFERENCES

- A. Meet ANSI (American National Standard) standard requirements
- B. Install per NECA (National Electrical Contractors Association)
- C. Meet NEMA (National Electrical Manufacturers Association) standard requirements
- D. Install per NFPA 70 (National Electrical Code; National Fire Protection Association)

1.04 SUBMITTALS

- A. Project Record Documents: Accurately record actual routing of conduits larger than 1-1/4 inches.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept conduit on site. Inspect for damage.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

PART 2 PRODUCTS

2.01 CONDUIT REQUIREMENTS

- A. Conduit Size: Comply with NFPA 70.
 - 1. Minimum Size: 3/4 inch unless otherwise specified.
- B. Underground Installations:
 - 1. More than Five Feet from Foundation Wall: Use thinwall non-metallic conduit.
 - 2. Within Five Feet from Foundation Wall: Use thickwall nonmetallic conduit.
 - 3. Roadway: Use thick wall non-metallic conduit.
- C. Outdoor Locations Above Grade: Use rigid steel conduit.
- D. Wet and Damp Locations: Use rigid steel conduit.
- E. Dry Locations:
 - 1. Concealed: Use electrical metallic tubing.
 - 2. Exposed:
 - a. In unfinished spaces below 8'-0" A.F.F.: Use intermediate metal conduit.
 - b. In unfinished spaces above 8'-0" A.F.F.: Use electrical metallic tubing.
 - c. In all finished spaces use electrical metallic tubing unless noted on plan

2.02 METAL CONDUIT

- A. Manufacturers:
 - 1. Allied Tube & Conduit
 - 2. Beck Manufacturing, Inc.
 - 3. Wheatland Tube Company

- 4. Substitutions: See Section 06010 (26 0500) – Basic Electrical Requirements: Product Substitutions.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Rigid Aluminum Conduit: ANSI C80.5.
- D. Intermediate Metal Conduit (IMC): Rigid steel.
- E. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.03 PVC COATED METAL CONDUIT

- A. Manufacturers:
 - 1. Allied Tube & Conduit
 - 2. Thomas & Betts Corp
 - 3. Robroy Industries
 - 4. Substitutions: See Section 16010 (26 0500) – Basic Electrical Requirements: Product Substitutions.
- B. Description: NEMA RN 1; rigid steel conduit with external PVC coating, 20 mil thick.
- C. Fittings and Conduit Bodies: NEMA FB 1; steel fittings with external PVC coating to match conduit.

2.04 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Allied Tube & Conduit
 - 2. Beck Manufacturing, Inc
 - 3. Wheatland Tube Company
 - 4. Substitutions: See Section 16010 (26 0500) – Basic Electrical Requirements: Product Substitutions.
- B. Description: ANSI C80.3; galvanized tubing.
- C. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron set screw type.

2.05 NONMETALLIC CONDUIT

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc
 - 2. Electri-Flex Company.
 - 3. International Metal Hose.
 - 4. Substitutions: See Section 16010 (26 0500) – Basic Electrical Requirements: Product Substitutions.
- B. Thin Wall Description: NEMA TC 2; Schedule 40 PVC.
- C. Thick Wall Description: NEMA TC2; Schedule 80 PVC
- D. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.02 INSTALLATION

- A. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Install steel conduit as specified in NECA 101.
- C. Install nonmetallic conduit in accordance with manufacturer's instructions.
- D. Arrange supports to prevent misalignment during wiring installation.
- E. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- G. Fasten conduit supports to building structure and surfaces under provisions of Section 16070

(26 0529).

- H. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- I. Do not attach conduit to ceiling support wires.
- J. Arrange conduit to maintain headroom and present neat appearance.
- K. Route exposed conduit parallel and perpendicular to walls.
- L. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- M. Route conduit under slab, where permitted, from point-to-point.
- N. Do not cross conduits in slab.
- O. Maintain adequate clearance between conduit and piping.
- P. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- Q. Cut conduit square using saw or pipecutter; de-burr cut ends.
- R. Bring conduit to shoulder of fittings; fasten securely.
- S. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- T. Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations.
- U. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2-inch size.
- V. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- W. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.
- X. Provide suitable pull string in each empty conduit except sleeves and nipples.
- Y. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- Z. Ground and bond conduit under provisions of Section 16060 (26 0526).
- AA. Identify conduit under provisions of Section 16075 (26 0553).
- AB. All conduit shall be concealed in finished areas unless otherwise noted.
- AC. Do not install horizontal runs of conduit in masonry walls.
- AD. Use rigid, coated EMT 90° bends in all underground conduit.

3.03 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods as referenced in Section 16010.
- B. Install conduit to preserve vapor retarder and air infiltration barrier in exterior walls and floor penetrations.
- C. Route conduit through roof openings for piping and ductwork wherever possible. Where separate roofing penetration is required, coordinate location and installation method with roofing installation.

END OF SECTION 26 0534

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ELECTRICAL IDENTIFICATION

SECTION 26 0553

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates and labels.
- B. Wire and cable markers.
- C. Conduit markers.
- D. Field-painted identification of conduit.

1.02 REFERENCES

- A. NFPA 70 - National Electrical Code; National Fire Protection Association

1.03 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Brady Corporation.
- B. Seton Identification Products.
- C. Hellermann Tyton.
- D. Substitutions: See Section 16010 (26 0500) Basic Electrical Requirements: Product Substitutions

2.02 NAMEPLATES AND LABELS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
- B. Locations:
 - 1. Each electrical distribution and control equipment enclosure.
 - 2. Panelboards.
 - 2. Communication cabinets.
- C. Letter Size:
 - 1. Use 1/8 inch letters for identifying individual equipment and loads.
 - 2. Use 1/4 inch letters for identifying grouped equipment and loads.
- D. Receptacle and switch plates shall be identified on the back side by the panel and circuit serving the device.

2.03 WIRE MARKERS

- A. Description: Cloth, tape, split sleeve, or tubing type wire markers.
- B. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, and junction boxes each load connection.
- C. Legend:
 - 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
 - 2. For 120/240 volt and 3-phase systems, wire colors to be black, red, blue and white grounded conductors.

2.04 JUNCTION BOXES

- A. Identify junction box covers with a permanent readable marker, indicating circuits contained within or noting the system type for low voltage systems.

2.05 UNDERGROUND WARNING TAPE

- A. Description: 4 inch wide plastic tape, detectable type colored red with suitable warning legend describing buried electrical lines.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

- A. Install nameplates and labels parallel to equipment lines.
- B. Secure nameplates to equipment front using screws or rivets.
- C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.
- E. All panelboard directories are to be typed.

END OF SECTION 26 0553

PANELBOARDS

SECTION 26 2416

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Power distribution panelboards.

1.02 RELATED SECTIONS

- A. Section 26 0526 - Grounding and Bonding.
- B. Section 26 0553 - Electrical Identification..

1.03 REFERENCES

- A. Meet NEMA (National Electrical Manufacturers Association)
- B. Install per NECA (National Electrical Contractors Association)
- C. Install per NFPA 70 – (National Electrical Code; National Fire Protection Association)

1.04 SUBMITTALS

- A. See Section 26 0500 - Basic Electrical Requirements - Submittal procedures.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.
- E. Maintenance Data: Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.
- C. All equipment specified within shall be of the same manufacturer.
- D. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.06 MAINTENANCE MATERIALS

- A. Furnish six of each panelboard key.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cutler-Hammer/Eaton Corporation
- B. GE Company
- C. Square D Company
- D. Siemens ITE
- E. Substitutions: See Section 26 0500 – Basic Electrical Requirements: Product Substitutions.

2.02 POWER DISTRIBUTION PANELBOARDS

- A. Description: NEMA PB 1, circuit breaker type.
- B. Panelboard Bus: Aluminum, ratings as indicated. Provide aluminum ground bus in each panelboard.
- C. Provide 100% neutral buss unless noted otherwise.
- D. Minimum integrated short circuit rating:
 - 1. 240 Volt Panelboards: 22,000 amperes rms symmetrical.
 - 2. 480 Volt Panelboards: 22,000 amperes rms symmetrical.
- E. Fusible Switch Assemblies: NEMA KS 1, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Designed to

- accommodate Class R fuses.
- F. Molded Case Circuit Breakers: With integral thermal and instantaneous magnetic trip in each pole; UL listed. For air conditioning equipment branch circuits provide circuit breakers UL listed as Type HACR.
- G. Circuit Breaker Accessories: Trip units and auxiliary switches as indicated.
- H. Enclosure: NEMA PB 1, unless noted otherwise.
- I. Cabinet Front: Surface type, fastened with hinge and latch, hinged door with flush lock, metal directory frame, finished in manufacturer's standard gray enamel.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1 and NECA 1.
- B. Install panelboards plumb. Install recessed panelboards flush with wall finishes.
- C. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed handwritten circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide typed or neatly handwritten circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- G. Provide engraved plastic nameplates under the provisions of Section 26 0553.
- H. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Identify each as SPARE.
 - 1. Minimum spare conduits: 5 empty 1 inch.
- I. Ground and bond panelboard enclosure according to Section 26 0526.
- J. In commercial kitchens all equipment under the hood shall have shunt trip breakers. All equipment in the kitchen shall be GFI protected. Provide breakers and/or GFI receptacles to meet the requirements per the NEC.

3.02 FIELD QUALITY CONTROL

- A. Inspect and test per manufacturer's recommendations.

3.03 ADJUSTING

- A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 10 percent of each other. Maintain proper phasing for multi-wire branch circuits.

3.04 CLEANING

- A. Touch up scratched or marred surfaces to match original finish.

END OF SECTION 26 2416

WIRING DEVICES

SECTION 26 2726

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall switches
- B. Wall dimmers
- C. Receptacles
- D. Device plates and decorative box covers

1.02 RELATED SECTIONS

- A. Section 16138 (26 0533) - Boxes.

1.03 REFERENCES

- A. Install per NECA (National Electrical Contractors Association)
- B. Meet NEMA (National Electrical Manufacturers Association) standard requirements
- C. Install per NFPA 70 (National Electrical Code; National Fire Protection Association)

1.04 SUBMITTALS

- A. See Section 16010 (26 0500) - Basic Electrical Requirements - Submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Manufacturer's Installation Instructions.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Provide products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.
- D. comply with Nema standard WD-1 "general purpose wiring devices"

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wiring Devices - Ivory
 - 1. Cooper Wiring Devices (Arrow Hart)
 - 2. GE Wiring Devices
 - 3. Leviton Manufacturing, Inc
 - 4. Hubbell Inc.
 - 5. Substitutions: See Section 16010 (26 0500) – Basic Electrical Requirements: Product Substitutions.
- B. Multi-outlet assemblies - Ivory
 - 1. Wiremold
 - 2. Substitutions: See Section 16010 (26 0500) – Basic Electrical Requirements: Product Substitutions

2.02 WALL SWITCHES

- A. Wall Switches: Heavy Duty, AC only general-use snap switch
 - 1. Manufacturer:
 - a. Leviton CSB1 or approved equal.
 - 2. Body and Handle: Ivory plastic with toggle handle.
 - 3. Indicator Light: Lighted handle type switch; red handle.
 - 4. Ratings:
 - a. Voltage: 120-277 volts, AC.
 - b. Current: 20 amperes.
- B. Switch Types: Single pole, double pole, 3-way, 4-way and pilot.

2.04 RECEPTACLES

- A. Receptacles: Heavy duty
 - 1. Device Body: plastic
 - 2. Configuration: Refer to plans and as specified
- B. Duplex Convenience Receptacles: Type 5 – 20R.
 - 1. Manufacturer:
 - a. Leviton 5801 or approved equal
- C. Single Convenience Receptacles: Type 5-20R.
 - 1. Manufacturer:
 - a. Leviton 5801 or approved equal.
- D. GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements. 5-20R
 - 1. Manufacturer:
 - a. Leviton 6898 or approved equal.

2.05 WALL PLATES

- A. Cover Plates: smooth flexible nylon plastic in finished spaces. (Ivory).
- B. Cover Plates: Galvanized steel plates in unfinished spaces.
- C. Cover Plates: Smooth stainless steel in kitchen areas.
- D. Weatherproof Cover Plates: Gasketed cast metal with gasketed in use device cover.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that outlet boxes are installed at proper height.
- B. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.03 INSTALLATION

- A. Install securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- D. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- E. Do not share neutral conductor on load side of dimmers.
- F. Do not share neutrals on dedicated circuits.
- G. Install receptacles with grounding pole on top.
- H. Connect wiring device grounding terminal to outlet box with bonding jumper.
- I. For Isolated Ground receptacles (IG), connect wiring device grounding terminal only to branch circuit isolated equipment grounding conductor.
- J. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- K. Connect wiring devices by wrapping conductor around screw terminal.
- L. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- M. Install protective rings on active flush cover service fittings.
- N. Where more than one wall switch is installed in same location, set under one cover plate.
- O. Make any necessary adjustments to the system at no charge to the Owner during warranty period.

3.04 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 16138 (26 0533) to obtain mounting heights specified.
- B. Install wall switch 48 inches above finished floor.
- C. Install convenience receptacle 18 inches above finished floor.

- D. Install convenience receptacle 6 inches to center above backsplash of counter when noted on plan as "AC". Verify exact location with Architectural drawings.
- E. Install dimmer 48 inches above finished floor.

3.05 FIELD QUALITY CONTROL

- A. Perform Manufacturers standard field inspection, testing, and adjusting
- B. Inspect each wiring device for defects.
- C. Operate each wall switch with circuit energized and verify proper operation.
- D. Verify that each receptacle device is energized.
- E. Test each receptacle device for proper polarity.
- F. Test each GFCI receptacle device for proper operation.

3.06 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

3.07 CLEANING

- A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION 26 2726

ENCLOSED SWITCHES

SECTION 26 2818

ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fusible switches.
- B. Nonfusible switches.

1.02 RELATED SECTIONS

- A. Section 26 0529 - Hangers and Supports.
- B. Section 26 0553 - Electrical Identification: Engraved nameplates.

1.03 REFERENCES

- A. Meet NEMA (National Electrical Manufacturers Association) standard requirements
- B. Install per NFPA 70 (National Electrical Code; National Fire Protection Association)

1.04 SUBMITTALS

- A. See Section 26 0500 - Basic Electrical Requirements - Submittal procedures.
- B. Product Data: Provide switch ratings and enclosure dimensions.
- C. Project Record Documents: Record actual locations of enclosed switches.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.
- C. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cutler-Hammer/Eaton Corporation
- B. GE Company
- C. Square D Company
- D. Siemens ITE
- E. Substitutions: See Section 26 0500 – Basic Electrical Requirements: Product Substitutions.

2.02 COMPONENTS

- A. Fusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch.
 - 1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
 - 2. Handle lockable in OFF position.
 - 3. Fuse clips: Designed to accommodate NEMA FU1, Class R fuses.
- B. Nonfusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch.
 - 1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
 - 2. Handle lockable in OFF position.
- C. Enclosures: NEMA KS 1.
 - 1. Interior Dry Locations: Type 1.
 - 2. Exterior Locations: Type 3R.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install fuses in fusible disconnect switches per manufacturer's nameplate rating.
- C. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

3.02 FIELD QUALITY CONTROL

- A. Inspect and test each switch per manufacturer's recommendations.

END OF SECTION 26 2818

INTERIOR LUMINAIRES

SECTION 26 5113

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior luminaires and accessories
- B. LED Drivers
- C. Emergency power supply
- D. Emergency Transfer Device

1.02 RELATED SECTIONS

- A. Section 01 91 01 or 01 91 02 – Commissioning Process
- B. Section 26 27 26 – Wiring Devices

1.03 REFERENCES

- A. Meet ANSI (American National Standard) standard requirements
- B. Install per NECA (National Electrical Contractors Association)
- C. Meet NEMA (National Electrical Manufacturers Association) standard requirements
- D. Install per NFPA 70 (National Electrical Code; National Fire Protection Association)
- E. Install per NFPA 101 (Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association)
- F. RoHS – Restriction of Hazardous Substances. Council of the European Union (EC) Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- G. DLC.
- H. Energy Star.
- I. LM-79-08 (or latest) – IES Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products.
- J. LM-80-08 (or latest) – IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- K. TM-21-11 (or latest) – IES Technical Memorandum on Projecting Long Term Lumen Maintenance of LED Light Sources.
- L. NEMA SSL 1-2010 (or latest) – Electronic Drivers for LED Devices, Arrays, or Systems.

1.04 DESCRIPTION OF WORK

- A. The work under this section includes interior luminaires and accessories, exit signs, and building-mounted exterior lighting.

1.05 COORDINATION

- A. Coordinate with Architectural ceiling plans for mounting of fixture types.

1.06 SUBMITTALS

- A. See Section 26 0500 - Basic Electrical Requirements - Submittal procedures.
- B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- C. Verify the type of ceiling and suspension method prior to ordering fixtures.
- D. Product Data: For each luminaire type, submit luminaire information including catalog cuts with highlighted catalog numbers and required accessories:
 - Luminaire:
 - Manufacturer and catalog number,
 - Type (identification) as indicated on the plans and schedule,
 - Delivered lumens,
 - Input watts,
 - Efficacy,
 - Color rendering index.
 - Driver:
 - Manufacturer and catalog number,

- Type (Non-Dimming, Step-dimming, Continuous dimming, etc.),
 - Power Factor, Crest Factor, THD, etc.
- E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Quality Assurance. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- F. Operation and Maintenance Data: Instructions for each product.

1.07 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70 and NFPA 101.
- B. LED Luminaires shall meet all Design Lights Consortium® (DesignLights.org) Product Qualification Criteria. This does not require that the luminaire be listed on the Design Lights Consortium's® Qualified Products List, but they must meet the Product Qualification Criteria. The technical requirements that the luminaire shall meet for each Application Category are:
 - Minimum Light Output.
 - Zonal Lumen Requirements.
 - Minimum Luminaire Efficacy.
 - Minimum CRI.
 - L70 Lumen Maintenance.
 - Minimum Luminaire Warranty of 5 years (not pro-rated) to include LED driver and all LED components.
- C. Energy Star Listed.
- D. Luminaire shall be certified by a Nationally Recognized Testing Laboratory (UL, ETL, or IEC).
- E. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years' experience.
- F. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.08 UNIT PRICING

- A. Provide unit pricing for all single name specification fixture types.

PART 2 PRODUCTS

2.01 LUMINAIRES

- A. Furnish products as indicated in Schedule included on the Drawings. If the fixture designation is omitted from a light fixture, assume a fixture of the type used in similar areas in preparing Bid. Confirm type with Owner's Representative prior to ordering.
- B. Substitutions: See Section 26 0500 – Basic Electrical Requirements: Product Substitutions.
 - 1. Pre-Qualification of contractor –offered substitutions are required (7 days prior to bid date. Failure to submit within the deadline constitutes a guarantee that only the base specified product(s) will be supplied and no other products will be considered. Provide calculations showing performance of proposed fixture, coordinate with engineer for reflectance's and architectural components that may affect light level, and provide photometric file in .ies format to Engineer. Provide PDF submittal of proposed substitution to engineer.
- C. Refer to fixture schedule for lamping of fixture. Manufacturer to label all fixtures as maximum allowable socket wattage per lamping noted in schedule. This is for current and future LEED documentation purposes.

2.02 LED LUMINAIRES

- A. Color Consistency: LED manufacturer shall use a maximum 3-step MacAdam Ellipse binning process to achieve consistent luminaire-to-luminaire color for interior luminaires. Exterior luminaires shall use a maximum 5-step MacAdam Ellipse binning process.
- B. Glare Control: Exterior luminaires shall meet DesignLights Consortium's® criteria for Zonal Lumen Distribution requirements or Backlight-Uplight-Glare (BUG) standards for exterior luminaires.
- C. Luminaire shall be mercury-free, lead-free, and RoHS compliant.
- D. Luminaire shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

- E. Light output of the LED system shall be measured using the absolute photometry method following IES LM-79 and IES LM-80 requirements and guidelines.
- F. Luminaire shall maintain 70% lumen output (L70) for a minimum of 50,000 hours.
- G. Lumen output shall not depreciate more than 20% after 10,000 hours of use.
- H. Luminaire and driver shall be furnished from a single manufacturer to ensure compatibility.
- I. Luminaire Color Rendering Index (CRI) shall be a minimum of 80 for interior luminaires, and a minimum of 70 for exterior luminaires or as noted on light fixture schedule.
- J. LED luminaire shall be thermally designed as to not exceed the maximum junction temperature of the LED for the ambient temperature of the location the luminaire is to be installed. Rated case temperature shall be suitable for operation in the ambient temperatures typically found for the intended installation. Exterior luminaires to operate in ambient temperatures of -20°F to 122°F (-29°C to 50°C).
- K. Luminaire shall operate normally for input voltage fluctuations of plus or minus 10 percent.
- L. Luminaire shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
- M. All connections to luminaires shall be reverse polarity protected and provide high voltage protection in the event connections are reversed or shorted during the installation process.
- N. All luminaires shall be provided with knockouts for conduit connections.
- O. The LED luminaire shall carry a limited 5-year warranty minimum for LED light engine(s)/board array, and driver(s).
- P. Provide all of the following data on submittals:
 - a. Delivered lumens
 - b. Input watts
 - c. Efficacy
 - d. Color rendering index.
- Q. The failure of one LED shall not affect the operation of the remaining LEDs.
- R. Emergency Inverters shall be sine-wave type, or have written confirmation from the luminaire manufacturer that the luminaire will function with a square-wave inverter.

2.03 LED DRIVERS

- A. Provide driver type (non-dimmed, step-dimmed, continuous-dimming, etc.) as indicated on the luminaire schedule on the drawings.
- B. Minimum Warranty of 5 years (not pro-rated) to include LED driver and all LED components.
- C. Driver shall have a rated life of 50,000 hours, minimum.
- D. Driver and LEDs shall be furnished from a single manufacturer to ensure compatibility.
- E. Driver shall have a minimum power factor (pf) of 0.9 and a maximum crest factor (cf) of 1.5 at full input power and across specified voltage range.
- F. Driver shall operate normally for input voltage fluctuations of plus or minus 10 percent.
- G. Driver shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
- H. Wiring connections to LED drivers shall utilize polarized quick-disconnects for field maintenance.
- I. Fuse Protections: All luminaires shall have built-in fuse protection. All power supply outputs shall be either fuse protected or be Polymeric Positive Temperature Coefficient (PTC)-protected as per Class 2 UL listing.
- J. Provide all of the following data on submittals:
 - a. Input watts
 - b. Power Factor (pf)
 - c. Crest Factor (cf) at full input power
 - d. Total Harmonic Distortion (THD).
- K. LED driver shall be compatible with dimming controls where dimming is indicated on the plans. Dimmable drivers shall use Dimming Constant Current (DCC) or Pulse Width Modulation (PWM) operation.
- L. Step-Dimming Drivers: Easily switched from 0% to 50% to 100% output power. Both switch-leg inputs shall control 50% of the luminaire's light output equally.

- M. Continuous Dimming Drivers: LED luminaires shall dim to (20%, 15%, 10%, 5%, or 0.1%) as specified in the Luminaire Schedule on the plans without visible flicker or "popcorn effect". "Popcorn effect" is defined as the luminaire being on a pre-set dimmed level (less than 100%), and going to 100% prior to returning to the pre-set level when power is returned to the luminaire. Continuous Dimming Drivers shall use 0-10V control.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting).
- B. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
- C. Support luminaires larger than 2 x 4-foot size independent of ceiling framing, unless local codes require all fixtures to be supported independent of ceiling framing.
- D. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- E. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- F. Exposed Grid Ceilings: Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.
- G. Install recessed luminaires to permit removal from below.
- H. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- I. Install clips to secure recessed grid-supported luminaires in place.
- J. Install wall mounted luminaires, emergency lighting units, and exit signs at height as indicated on Drawings.
- K. Install accessories furnished with each luminaire.
- L. Connect luminaires and exit signs to branch circuit outlets provided under Section 26 0537 as indicated.
- M. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- N. Bond products and metal accessories to branch circuit equipment grounding conductor.
- O. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.
- P. Install downlights with clean gloves on. No fingerprints should be seen on downlight reflectors.
- Q. Dimmed luminaire circuits shall have separate neutrals.
- S. Dimmed LED luminaires shall have a positive OFF, which requires turning off the circuit to the luminaire so that the luminaires don't "glow" at the lowest dimmed setting. This shall be accomplished using a switch, relay, or some other means acceptable to DFD.
- T. Fixtures shall not be turned on unless temperatures are above 50 degrees unless cold weather rated ballasts are utilized.
- U. Provide controls as indicated on the plans. Controls shall be compatible with the drivers being installed.

3.02 ZERO-TO-10V DIMMING CONTROL WIRING INSTALLATION

- A. Zero-to-10V dimming control conductors are classified by the NEC as Class 2 conductors and shall be kept separate from line-voltage conductors per NEC 725.136(A). Matching the insulation rating of Conductors of Different Systems does not apply to Class 2 conductors per NEC 300.3(C)(1), Informational Note No.1.
- B. Wall box dimmers will typically have two conduits: One conduit for line-voltage power, and one conduit or conduit stub for the 0-10V control wiring.
- C. The 0-10V wiring may be routed in free air if:
 - The room is approximately 900 sq.ft. or less,
 - The 0-10V wiring stays within the room,
 - The ceiling space is a non-plenum space, and
 - All splices of 0-10V wiring are spliced in a box.

- The 0-10V wiring may be tie-wrapped to the outside of the luminaire fixture whip per NEC 300.11(B)(2). Tie-wraps shall be UL listed for UV resistance.
- D. At each luminaire, separate openings (either manufactured knock-outs or punched openings) shall be used for the line-voltage power and the 0-10V wiring. The EC shall use an NM cable connector at the opening for the 0-10V wiring. Zero-to-10V conductors entering and within a luminaire enclosure shall maintain a minimum separation of 6 mm (0.25 in.) per NEC 725.136(D).
- E. Metal-Clad (MC) type cable that combines power and Class 2 circuits into a single cable may be used for the luminaire wiring within a single room. Examples of such products are Encore Wire® MC-LED™ or Southwire® MC-PCS Duo™. Manufacturer's names and catalog numbers are used for quality and performance only. MC Cables manufactured by others shall be equally acceptable provided they meet or exceed in performance and quality as specified.

3.03 FIELD QUALITY CONTROL

- A. Perform field inspection to verify all fixtures are operational.
- B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.04 ADJUSTING

- A. Aim and adjust luminaires as directed.
- B. Position exit sign directional arrows as indicated.
- C. Coordinate adjustment of integral light sensors with lighting control system.

3.05 CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosures.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

3.06 PROTECTION

- A. Relamp luminaires that have failed lamps at Substantial Completion.
- B. All lamps shall be stored horizontally

3.07 SCHEDULE - See Drawings

END OF SECTION 26 5113

EXTERIOR LUMINAIRES

SECTION 26 5600

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior luminaires and accessories.

1.02 RELATED SECTIONS

- A. Section 03300 (03 3053) – Miscellaneous Cast-in-Place Concrete.

1.03 REFERENCES

- A. Meet ANSI (American National Standard) standard requirements
- B. Install per NECA (National Electrical Contractors Association)
- C. Meet NEMA (National Electrical Manufacturers Association) standard requirements
- D. Install per NFPA 70 (National Electrical Code; National Fire Protection Association)

1.04 SUBMITTALS

- A. See Section 16010 (26 0500) - Basic Electrical Requirements - Submittal procedures.
- B. Shop Drawings: Indicate dimensions and components for each luminaire which is not a standard product of the manufacturer.
- C. Product Data: Provide dimensions, ratings, and performance data.
- D. Test Reports: Indicate measured illumination levels.
- E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.
- F. Operation and Maintenance Data: Instructions for each product.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.
- C. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle poles per manufacturer's recommendations.

PART 2 PRODUCTS

2.01 LUMINAIRES

- A. Furnish products as indicated in Schedule included on the Drawings.
- B. Substitutions: See Section 16010 (26 0500) – Basic Electrical Requirements - Substitutions.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 501.
- B. Provide concrete bases for lighting poles at locations indicated, in accordance with Section 03300 (03 3000).
- C. Install poles plumb.
 - 1. Provide double nuts to adjust plumb.
 - 2. Grout around each base.
- D. Install lamps in each luminaire.
- E. Bond luminaires, metal accessories, and metal poles to branch circuit equipment grounding conductor. Provide supplementary grounding electrode at each pole.
- F. Provide fusing in base of pole.
- G. Do not install poles without fixtures without written approval from manufacturer

3.02 FIELD QUALITY CONTROL

- A. Perform field inspection to verify all fixtures are operational.
- B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

3.03 CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosure.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

3.06 SCHEDULE – Refer to Drawings

END OF SECTION 26 5600

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities.
7. Temporary erosion- and sedimentation-control measures.

1.2 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction as indicated on Drawings.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain on Owner's property, excess cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Provide documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
1. Use sufficiently detailed photographs or videotape.

2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

- B. Record Drawings: Identify and accurately show locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.5 QUALITY ASSURANCE

- A. Preinstallation Conference: Refer to Specification Section 014000.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify Miss Julie for area where Project is located before site clearing. Employ the services of a private utility locator firm to locate all existing utilities (for work inside the meters).
- C. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place. Contractor is responsible for securing all required SESC Permits prior to construction.
- D. The following practices are prohibited within the drip line of existing trees:
 1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Erection of sheds or structures.
 4. Impoundment of water.
 5. Excavation or other digging unless otherwise indicated.
 6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- E. Do not direct vehicle or equipment exhaust towards protection zones.
- F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- G. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
 - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain. Wrap a 1-inch blue vinyl tie tape flag around each tree trunk at 54 inches above the ground.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Take measures to prevent tracking of mud and debris onto adjacent roadways and sweep daily as required to remove any such materials.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. General: Protect trees and plants remaining on-site
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Owner.

3.4 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.

- B. Locate, identify, and disconnect utilities indicated to be abandoned in place.
- C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.
- D. Excavate for and remove underground utilities indicated to be removed.
- E. Removal of underground utilities is included in earthwork sections and with applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security and utilities section and Section 024116 "Structure Demolition" and Section 024119 "Selective Demolition."

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
 - 3. Trees under future building footprint must be removed complete.
 - 4. Use only hand methods for grubbing within protection zones.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to density specified in Section 312000.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 1 inch in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - 1. Limit height of topsoil stockpiles to 72 inches.
 - 2. Do not stockpile topsoil within protection zones.

3. Dispose of surplus topsoil off Owner's property. Surplus topsoil is that which exceeds quantity indicated to be reused.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing to remain before removing adjacent existing material. Saw-cut faces vertically.
 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

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SECTION 31 2000 - EARTH MOVING

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.
- B. Geotechnical Evaluation Report completed by Soils and Structures for the Project; recommendations apply.
- C. City of Spring Lake Standards and Specifications.
- D. Standards and Requirements of any agencies having jurisdiction.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses, and exterior plants.
 - 2. Excavating and backfilling for buildings and structures.
 - 3. Subbase course for concrete walks and pavements.
 - 4. Excavating and backfilling for utility trenches.
- B. Related Sections include the following:
 - 1. Division 01 Section "Photographic Documentation" for recording pre-excavation and earthwork progress.
 - 2. Division 01 Section "Temporary Tree and Plant Protection" for protecting and trimming trees to remain.
 - 3. Division 31 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
 - 4. Division 32 Section "Turf and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.
 - 5. Division 32 Section "Plants" for planting bed establishment and tree and shrub pit excavation and planting.

1.3 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- D. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work upon written request by Contractor prior to excavation.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

E. Fill: Soil materials used to raise existing grades.

F. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

H. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

J. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Geotextile.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.

C. Pre-excavation Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Comply with Section 01 3233 "Photographic Documentation." Submit before earthwork begins.

1.5 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

B. Codes and standards. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

1.6 FIELD CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Engineer's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating.
- B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- C. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- D. Do not direct vehicle or equipment exhaust towards protection zones.
- E. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture as indicated below:
 - 1. Beneath buried piping, conduit and exterior concrete walks. Six inches of clean, well-graded, thoroughly compacted sand which meets MDOT Class II Granular Material Specifications or ASTM D-2487 Soil Classification Groups SW or SP.
 - 2. Beneath bituminous pavement and concrete curbs and gutters. Six or eight inches, as specified in the Geotechnical Report, of stabilized processed road gravel meeting MDOT 21AA Dense Graded Aggregate Specifications or equivalent unless specifically detailed within the plans.

- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve and meeting MDOT 21AA Dense Graded Aggregate Specifications.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve and meeting MDOT Class 2 Sand Specifications.
- G. Drainage Course: Narrowly graded mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.
 - 1. Fill meeting MDOT Class II Granular Material Specifications may also be used per the Geotechnical Report for the Project.

2.2 GEOTEXTILES

- A. Geotextiles shall be as specified on the Drawings.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 31 Section "Site Clearing."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing," during earthwork operations.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. If necessary, providing pumps to efficiently remove ground water from excavation area. Contractor to provide dewater plan illustrating discharge points to Engineer prior to commencing. Dewatering operations are considered incidental to the excavations costs unless otherwise noted. If necessary, discharge pumped water through filter bags to remove sediment from discharge. Appropriately dispose of filter bags.
- C. All dewatering activities shall be completed in accordance with the City of Spring Lake, Ottawa County, and EGLE standards and requirements.

- D. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 - 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs on grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide; or as required by utility owner.
- B. Classified Excavation: Excavate per the recommendations outlined in the Geotechnical Report for the Project.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches in accordance with the applicable sections for each type of utility as set forth in this document.

3.8 SUBGRADE INSPECTION

- A. Notify Geotechnical Engineer as necessary to inspect excavations prior to backfill and compaction.
- B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll of subgrade in accordance with the recommendations outlined in the Geotechnical Report for the Project.
 - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.
- D. Refer to Geotechnical Engineering Report issued for additional requirements of proof roll operation.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, sub-drainage, damp-proofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

- A. Excavate trenches in accordance with the applicable sections for each type of utility as set forth in this document.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.
- C. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact initial backfills under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Place and compact final backfill of satisfactory soil to final subgrade elevation.

3.12 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 1. Under grass and planted areas, use satisfactory soil material.
 2. Under walks and pavements, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 9 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight in accordance with Modified Proctor Test, ASTM D 1557:
 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus, or minus 1 inch.
 - 2. Walks: Plus, or minus 1 inch.
 - 3. Pavements: Plus, or minus 1/2 inch.

3.16 SUBBASE AND BASE COURSES

- A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

3.17 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Place drainage course 4 inches in compacted thickness in a single layer per the Geotechnical Report for the Project.
 - 2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry density according to ASTM D 1557.
 - 3. Install slab vapor barrier on prepared drainage course according to manufacturer's written instructions, overlapping sides and ends.

3.18 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167–ASTM D 6938, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
 - 2. Under Lawn and Unpaved Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 5000-sq. ft. or less of unpaved area.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained. Retesting compaction after areas after initial failed test may be charged to the Contractor.

3.19 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 31 2000

SECTION 33 3600 - UTILITY SEPTIC TANKS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Septic tank.
 - 2. Filter drainage field system.
 - 3. Interconnecting piping.
- B. Related Sections:
 - 1. Section 22 40 00 - Plumbing Fixtures.
 - 2. Section 31 05 16 - Aggregates for Earthwork: Bedding and filter materials.
 - 3. Section 31 23 16 - Excavation.
 - 4. Section 31 23 17 - Trenching.
 - 5. Section 31 23 23 - Fill.
 - 6. Section 33 05 13 - Manholes and Structures.
 - 7. Section 33 31 00 - Sanitary Utility Sewerage Piping: Effluent discharge.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - 2. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - 3. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
 - 4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 5. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
 - 6. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: For the following:
 - 1. Tank
 - 2. Effluent Filter
 - 3. Piping
 - 4. Stone

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the Ottawa County Health Department standards and specification and the approved on-site septic permit.
- B. Maintain one copy of each document on site.

1.5 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate the Work with connections to building sanitary sewer piping outlet.

PART 2 PRODUCTS

2.1 SEPTIC TANK

- A. Product Description:
 - 1. Septic Tank: Reinforced precast concrete construction per ASTM C-1227, 4,000 psi 28 day minimum strength, concrete partitioned chambers, concrete lid with lift rings, vent, inlet and outlet inspection hole, and riser to grade.
 - 2. Tank Capacity: 1,000 gallon.
 - 3. All seams shall be sealed with Butyl Seal per ASTM C-990-91.
 - 4. Tanks shall be tested for water tightness, once installed, per ASTM C-1227 section 9.

2.2 EFFLENT FILTER

- A. Zable A100: 12 X 20 ABS filter hosing and cartridge, capable of filtration down to 1/16 inch.
- B. Approved equal with a daily flow rate of at least 3,000 GPD and filtration down to 1/16 inch.

2.3 CONNECTING PIPE MATERIALS

- A. Plastic Pipe (PVC): ASTM D2729; nominal inside diameter of 4 inch, bell and spigot solvent sealed joints.
- B. Fittings: Same material as pipe, tee bends, elbows, cleanouts, reducers, ends to suit pipe joint.

2.4 FILTER FIELD PIPE MATERIALS

- A. Plastic Pipe (PVC) plain end, nominal inside diameter of 4 inch.
- B. Use perforated pipe in filter field system; unperforated for header and at junction.

2.5 FILTER AGGREGATE

- A. Filter Aggregate Materials: MDOT 6A washed stone as specified.

2.6 ACCESSORIES

- A. Nonwoven Geotextile Fabric: 2 oz/sy minimum weight, 200 gpm/sqft minimum permeability.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify building sanitary sewer connection, size, location and invert are as indicated on Drawings.

3.2 PREPARATION

- A. Ream pipe ends and remove burrs.
- B. Remove scale and dirt from components before assembly.
- C. Establish invert elevations for each component in system.
- D. Hand trim excavation to suit septic tank, and field tile arrangement. Remove stones, roots or other obstructions.

3.3 TANK AND TANK BEDDING

- A. Excavate in accordance with Section 31 20 00 for work of this Section. Hand trim excavation for accurate placement of tank to elevations indicated.
- B. Place bedding material level in one continuous layer not exceeding 6 inches compacted depth, compact to 95 percent.
- C. Backfill around sides of tank, tamped in place, and compacted to 95 percent.
- D. Maintain optimum moisture content of bedding material to attain required compaction density.
- E. Install septic tank and related components on bedding.

3.4 CONNECTING PIPING

- A. Connect outlet between building sanitary piping and septic tank, between the septic tanks, and between septic tank and filter field header with Type 4 inch PVC pipe and fittings.
- B. Place pipe and fittings on clean excavated subsoil.
- C. Slope piping to each successive component, minimum of 1 percent.
- D. Cover pipe with clean excavated subsoil, sides and top.

3.5 INSTALLATION - FILTER FIELD

- A. Place field pipe header, PVC, at constant elevation.
- B. Place MDOT 6A aggregate bed 6 inches thick, tamp compact firm. Establish slope of bed to suit established invert elevations.
- C. Place pipe sloping away from header minimum of 0.33 percent maximum, with perforations facing down.
- D. Cover entire field with MDOT 6A aggregate 2 inches thick, lightly compact. Level prior to placement of subsoil cover.

3.6 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Request inspection by County Health department prior to placing aggregate cover over piping.

3.7 PROTECTION OF FINISHED WORK

- A. Do not permit vehicular traffic over drainage field.

END OF SECTION

QUALIFICATION STATEMENT

Each bidder may be requested to submit qualifications in accordance with the following questions:

All questions shall be answered, and the data given must be clear and comprehensive. The bidder may submit any additional information he desires.

1. Name of bidder.
2. Permanent main office address.
3. When organized.
4. If a corporation, where incorporated.
5. How many years have you been engaged in and worked under your present or trade name?
6. Contracts on hand: (Schedule these, showing gross amount of each contract and the appropriate anticipated dates of completion).
7. General character of work performed by you, i.e. total gross sales of the year, percentage and percentage by subcontractors, breakdown by categories.
8. Have you ever defaulted on a contract? If so, where and why?
9. Have you ever failed to complete any work awarded to you? If so, where and why.
10. List five contracts recently completed by you, starting with approximate gross cost for each, and the month and year completed. Provide names and telephone numbers of Owners and/or architects for same.
11. List your major equipment available for this contract.
12. Experience in construction work similar in scale to this project.
13. Background and experience of the principal members of your organization, including the officers.
14. Give bank and supplier references.
15. Percentage and types of work to be performed by your people and percentages and types of subcontractors.
16. List subcontractors to be used for this work.
17. Completion and submittal of all the above questions by your subcontractors may be requested from the successful bidder.
18. Sign and date this data and all attachments.

End of Qualification Statement

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Application for Special Inspection/Inspector

Contractor to fill in special inspector or firm name and turn in with bid (list multiple firms if multiple firms will be used). Contractor to pay for all testing as noted below as part of his/her base bid.

Location of the Building: Ottawa Sands Park
18280 North Shores Drive, West Olive, MI 49460

Address	-	-
	City	State

Applicant:

Jolanta Stecka, R.A.

MCSA Group, Inc.

529 Greenwood Avenue SE, East Grand Rapids, MI 49506	(616) 451-3346
--	----------------

Name	Address	Phone
------	---------	-------

Materials and Work Subject to Special Inspection: *(Edit Per Project)*

☐ Steel Fabrication (is fabricator ASIC certified?) yes___ no___

☒ Steel Erection (bolts, nuts, washers, material, welding, cutting, etc.)

☐ Masonry Construction Operations (material: proportioning, mixing, consistency and application of mortar and grout; condition, size, location and spacing of reinforcement; cold and/or hot weather protection; etc.)

☒ Cast-in-Place Concrete (material, condition, size, location and spacing of reinforcement; placement techniques; cold and/or hot protection; etc.)

☐ Precast Concrete Fabrication (must have a quality control program administered by an approved agency).

☐ Precast Concrete Erection (compliance with erection drawings; cutting; etc.)

☒ Wood (trusses, lam beams, micro lams, I joists, etc.)

☒ Soil Compaction (compliance with construction drawings/soil report; inspection to be done just prior to pouring footings and / or floor slabs)

☐ Other: _____

Name of Special Inspectors or Firms:

Name	Address	Phone
------	---------	-------

Name	Address	Phone
------	---------	-------

Name	Address	Phone
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OTTAWA SANDS COUNTY PARK RESTROOM BUILDING

18280 NORTH SHORES RD., FERRYSBURG, MI

LAND and WATER CONSERVATION FUND GRANT No. 26- 01892

Owner: OTTAWA COUNTY PARKS AND RECREATION COMMISSION

Contact: Curt TerHaar
cterhaar@miottawa.org
616-738-4656

Architect: MCSA GROUP, INC.

529 Greenwood Avenue SE
East Grand Rapids, MI49506
616-451-3346
Jolanta Stecka, RA
jstecka@mcsagroup.com

MPE Engineer: CLASSIC ENGINEERING, LLC

100 Cesar e. Chavez Ave.SW, Ste #400
Grand Rapids, MI 49503
616-742-2810

Civil Engineer: HOLLAND ENGINEERING, INC.

220 Hoover Boulevard
Holland, MI 49423
616-392-5938

Sheet Index:

T1	TITLE SHEET
A-1	FLOOR & ROOF PLANS SCHEDULES, INTERIOR ELEVATIONS
A-2	EXTERIOR ELEVATIONS, SECTION
A-3	SECTIONS
A-4	DETAILS
S-0.1	STRUCTURAL NOTES
S-1.1	FOUNDATION & ROOF FRAMING PLANS
S-2.1	STRUCTURAL DETAILS
P-1	PLUMBING PLAN
M-1	MECHANICAL PLAN
E-1	FLOOR PLAN - POWER /LIGHTING
E-2	LEGEND, DETAILS
E-3	LEGEND, DETAILS & ONE-LINE DIAGRAM
E-4	SITE PLAN - POWER
C-101	SEPTIC FIELD PLAN
C-501	SEPTIC SYSTEM NOTES AND DRAIN FIELD DETAILS

Date: November 8, 2023

Project No. A1227

BID SET



APPLICABLE CODE:

2015 MICHIGAN BUILDING CODE
2015 MICHIGAN REHABILITATION CODE
2015 MICHIGAN UNIFORM ENERGY CODE ADOPTS W/ AMENDMENTS 2015 IECC, ASHRAE 90.1.2013
2015 MICHIGAN MECHANICAL CODE 2015 MICHIGAN PLUMBING CODE
2017 NATIONAL ELECTRICAL CODE & MICHIGAN PART 8 ELECTRICAL RULES
2012 INTERNATIONAL FIRE CODE
ACCESSIBILITY: 2015 MBC, 1966 PA 1 MCL 125.1351 TO 125.1356; ICC/ ANSI A117.1

BUILDING USE GROUP: U - UTILITY

BUILDING CONSTRUCTION TYPE: 3B

ALLOWABLE AREA: 8,500 S.F.
BUILDING AREA: 1,028 S.F.

ALLOWABLE BUILDING HEIGHT: 55 FT.
BUILDING HEIGHT: 17'-4"

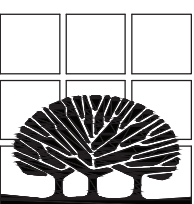
FIRE SUPPRESSION: NONE REQUIRED.



Ottawa Sands Park Restroom Building
Ottawa County Parks & Recreation



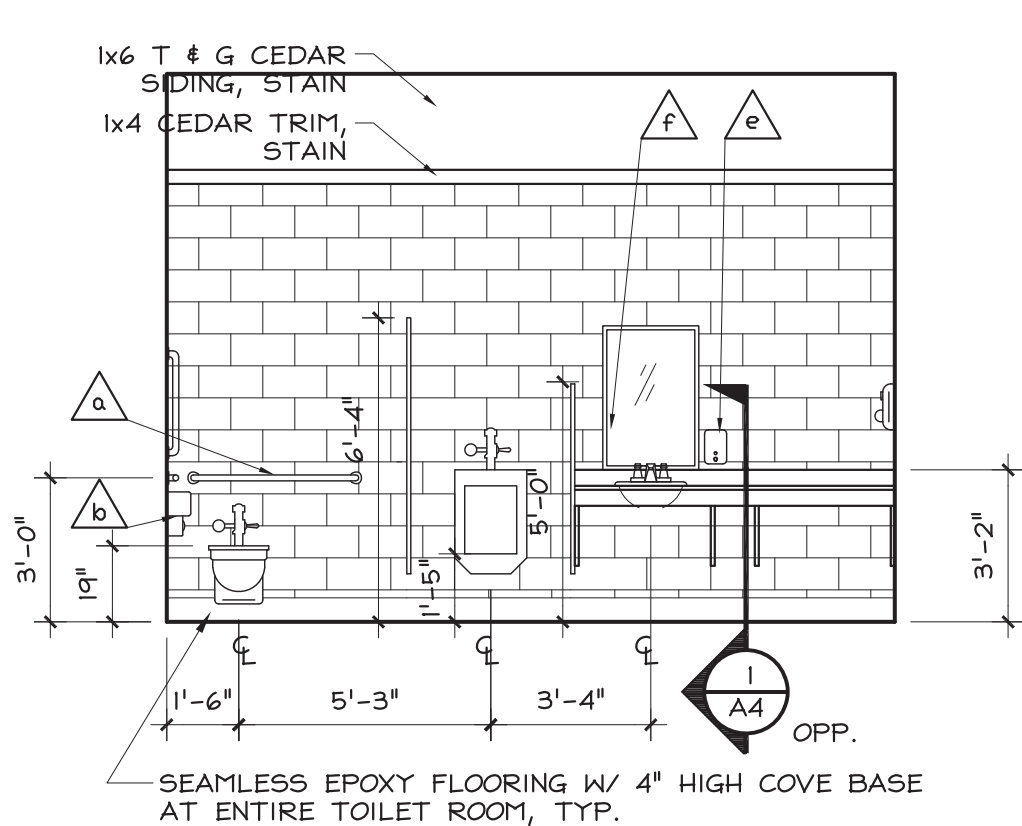
MCSA GROUP, INC.
Landscape Architecture • Park & Recreation Planning • Architecture
Downtown Planning • Interior Design • Sports Facility Planning
529 Greenwood Avenue S.E. • East Grand Rapids, MI 49506
616-451-3346 • FAX: 616-451-1935 • EMAIL: tas@mcsagroup.com



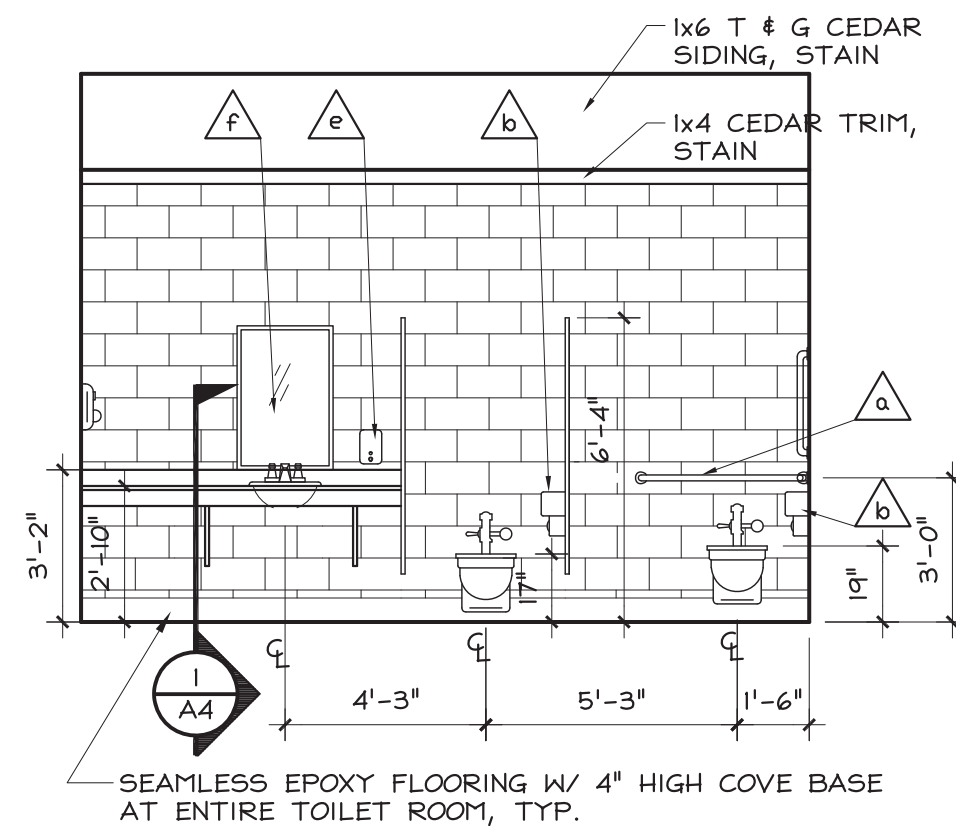
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DATE
11-08-2023
REVISIONS
Bid Set

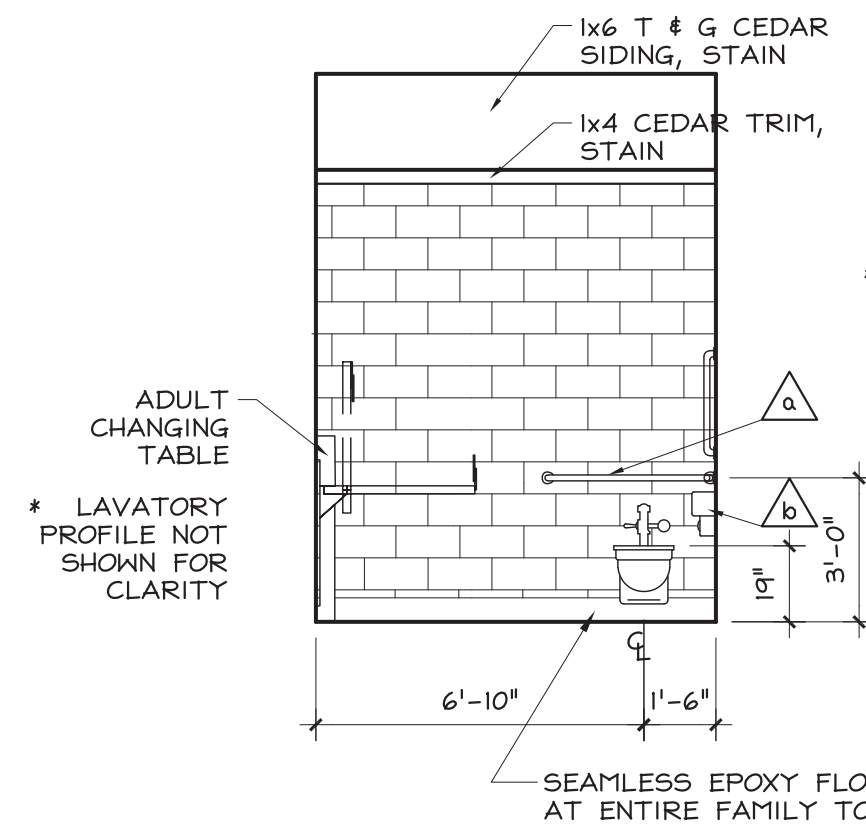
PROJECT NO.
1227
SHEET NO.
T1



1 WOMEN'S TOILET
SCALE: 1/4" = 1'-0"

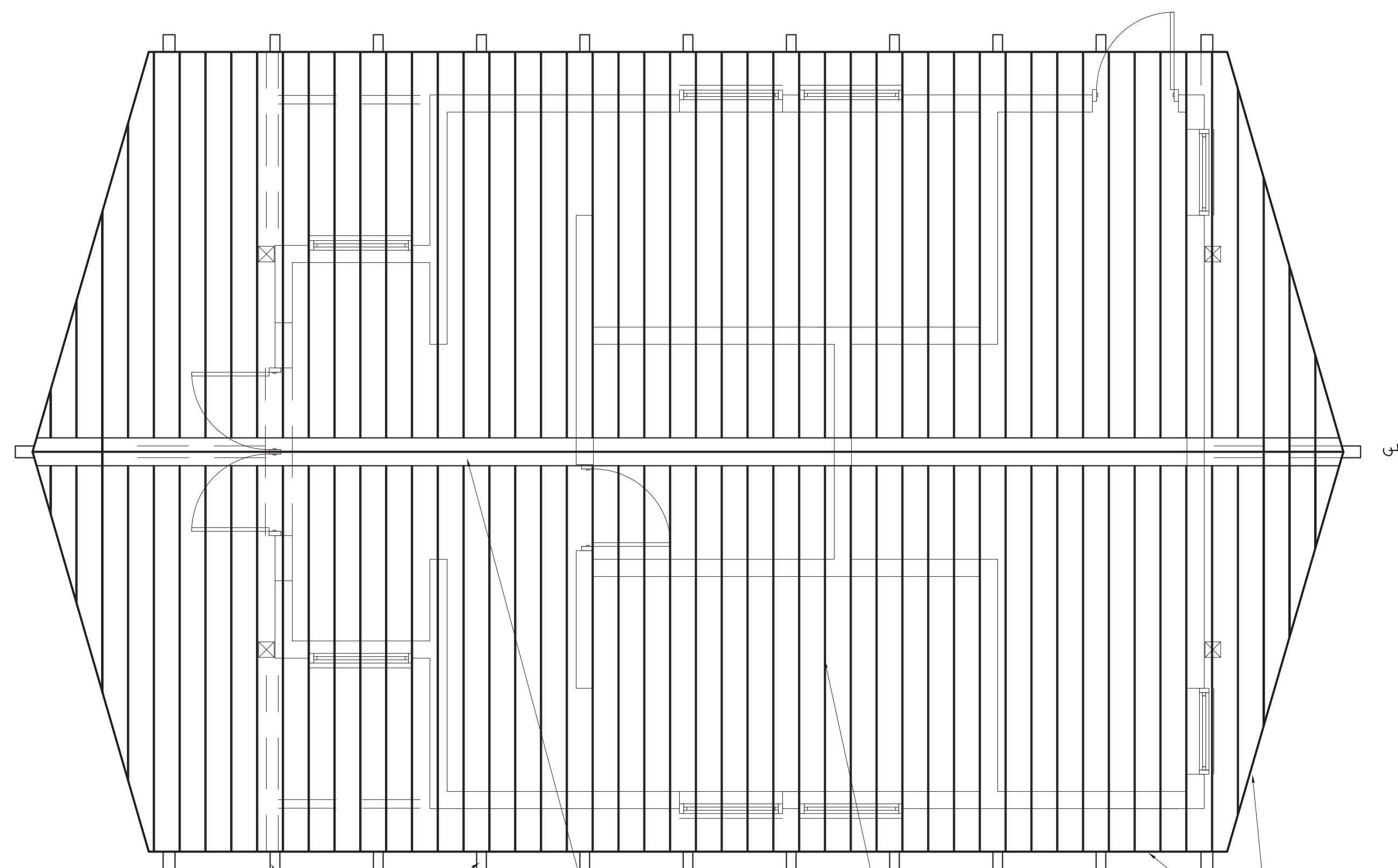


2 MEN'S TOILET
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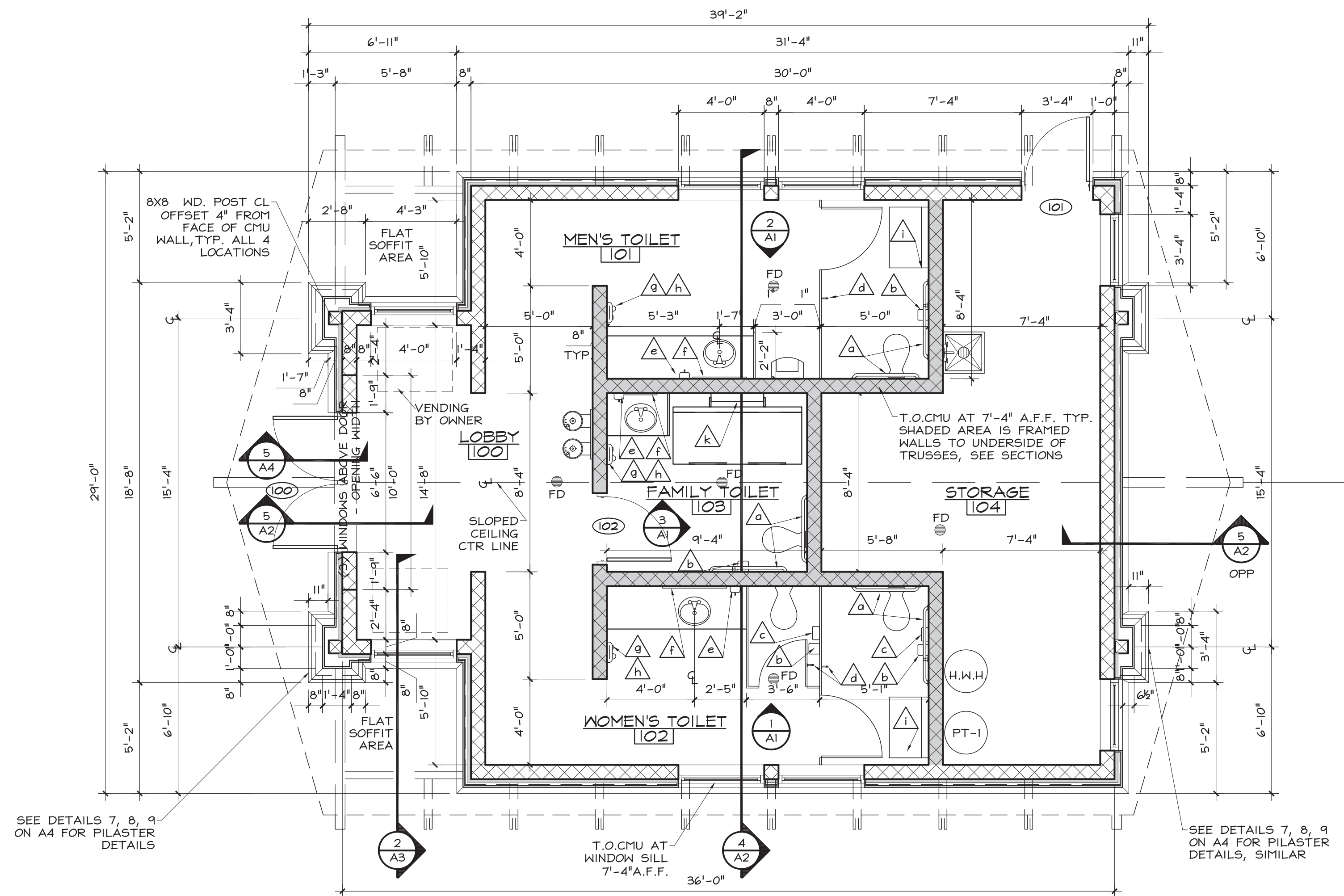


3 FAMILY TOILET
SCALE: 1/4" = 1'-0"

ACCESSORY SCHEDULE			
GRAB BARS: HORIZONTAL BARS: TOP AT 33-36" AFF; VERTICAL BAR: CENTER LINE AT 39-41" AFF FROM BACK WALL & BOTTOM AT 39-41" AFF.	SOAP DISPENSER: FURNISHED AND INSTALLED BY OWNER: MOUNTING HEIGHT: 40" MAX.	MIRROR: 24" WIDE x 36" HIGH MOUNTING HEIGHT: 38" AFF (MAX.)	HAND DRYER: MOUNTING HEIGHT: 40" MAX. TO CONTROL
TOILET TISSUE DISPENSER: MOUNTING HEIGHT = 19" AFF (MIN.) 48" AFF MAX. TO CENTERLINE OF DISPENSER. REAR EDGE OF DISPENSER TO BE 8" IN FRONT OF WATER CLOSET (DISPENSER MUST BE 1 1/2" (MIN.) BELOW THE GRAB BAR)	SANITARY NAPKIN DISPOSAL: MOUNTING HEIGHT = 34" AFF (TO TOP OF UNIT) B.F. MOUNTING HEIGHT = 27" AFF (TO TOP OF UNIT)	PROTECTIVE WALL PANEL- AT EACH HAND DRYER: PROVIDED BY HAND DRYER MANUFACTURER, SEE SPECIFICATIONS	BABY CHANGING STATION: MOUNTING HEIGHT: 34" AFF TO SHELF
COAT HOOK: MOUNTING HEIGHT: 54" AFF	BARRIER FREE SIGNAGE: INSTAL: 60" AFF AND 9" FROM H.M. DOOR FRAME TO CENTER OF SIGN.	POWERED ADULT CHANGING STATION: TABLE SURFACE HGT. ADJUSTABLE	
NOTE INSTALL ALL TOILET FIXTURES AND ACCESSORIES IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE OF MICHIGAN BUILDING CODE (MBC 2015) AND ADOPTED ICC A117.1 - 2009 STANDARDS FOR BARRIER FREE ACCESSIBILITY STANDARDS.			



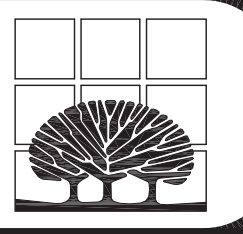
ROOF PLAN
1/4" = 1'-0"

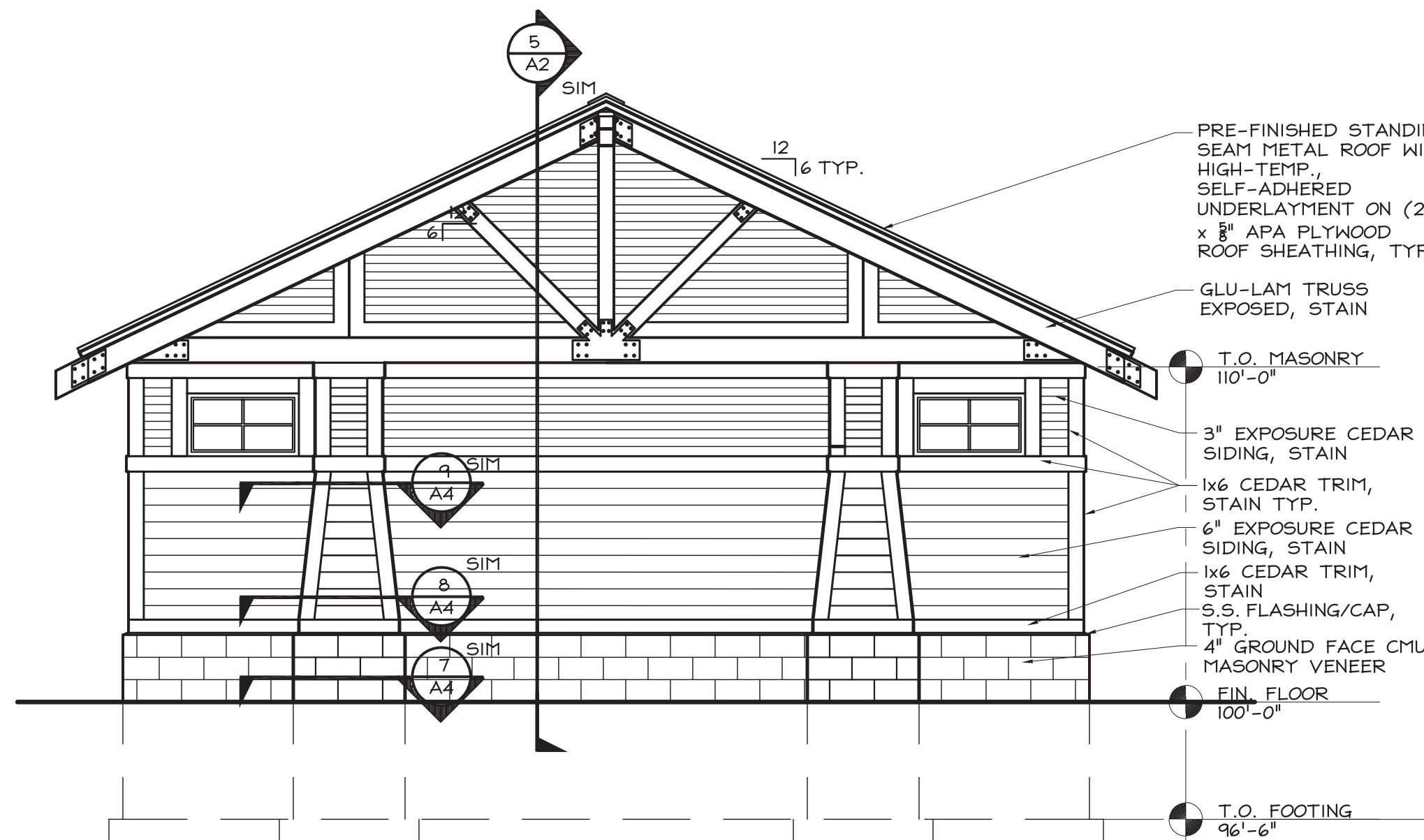


FLOOR PLAN
1/4" = 1'-0"

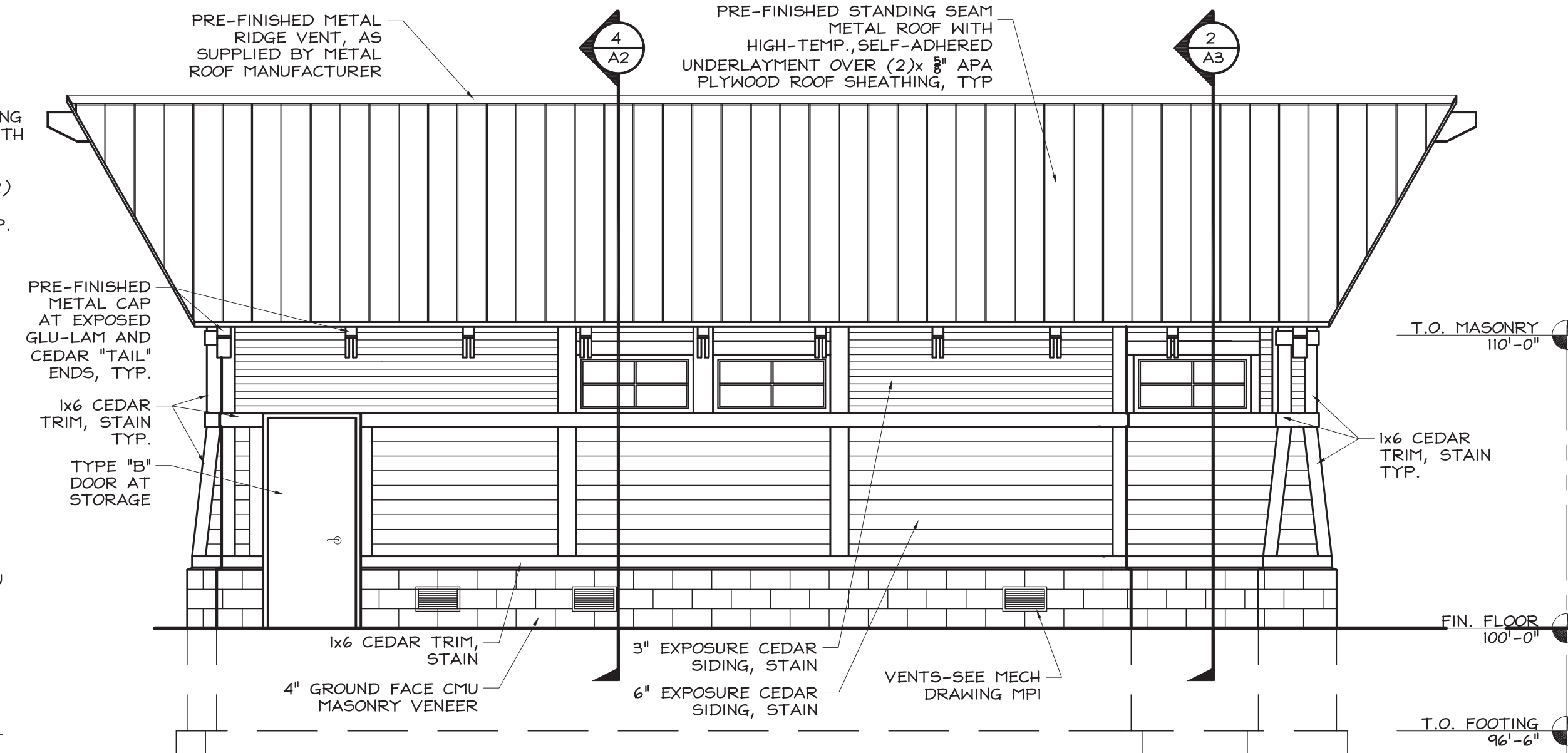
ROOM FINISH SCHEDULE						
NO.	ROOM	FLOOR	BASE	WALLS	CEILING	HT.
100	LOBBY	EPOXY	EPOXY COVE 4"H	CMU, PAINT,*	WD. DECK, STAIN	VARIES
101	MEN'S TOILET	EPOXY	EPOXY COVE 4"H	CMU, PAINT,*	WD. DECK, STAIN	VARIES
102	WOMEN'S TOILET	EPOXY	EPOXY COVE 4"H	CMU, PAINT,*	WD. DECK, STAIN	VARIES
103	FAMILY TOILET	EPOXY	EPOXY COVE 4"H	CMU, PAINT,*	WD. DECK, STAIN	VARIES
104	STORAGE	SEALED CONC.	-	CMU, PAINT,**	PLYWOOD, PAINT	VARIES
* - WD. FRAMED WALL SECTIONS FROM T.O.CMU TO UNDERSIDE OF TRUSSES, 1x6 T & G CEDAR, STAINED.						
** - WD. FRAMED WALL SECTIONS FROM T.O.CMU TO UNDERSIDE OF TRUSSES, PLYWOOD, PAINTED.						

DOOR SCHEDULE								
NO.	SIZE	DOOR			FRAME			REMARKS
		TYPE	MAT.	FINISH	TYPE	MAT.	FINISH	
100	PR-3'-0" X 7'-2" X 1-3/4"	A	H.M.	PAINT	1	H.M.	PAINT	1-(2 SETS) PROVIDE CLOSER, REMOVABLE MULLION
101	3'-0" X 7'-2" X 1-3/4"	B	H.M.	PAINT	2	H.M.	PAINT	2 PROVIDE CLOSER
102	3'-0" X 7'-2" X 1-3/4"	B	H.M.	PAINT	2	H.M.	PAINT	3 PROVIDE CLOSER

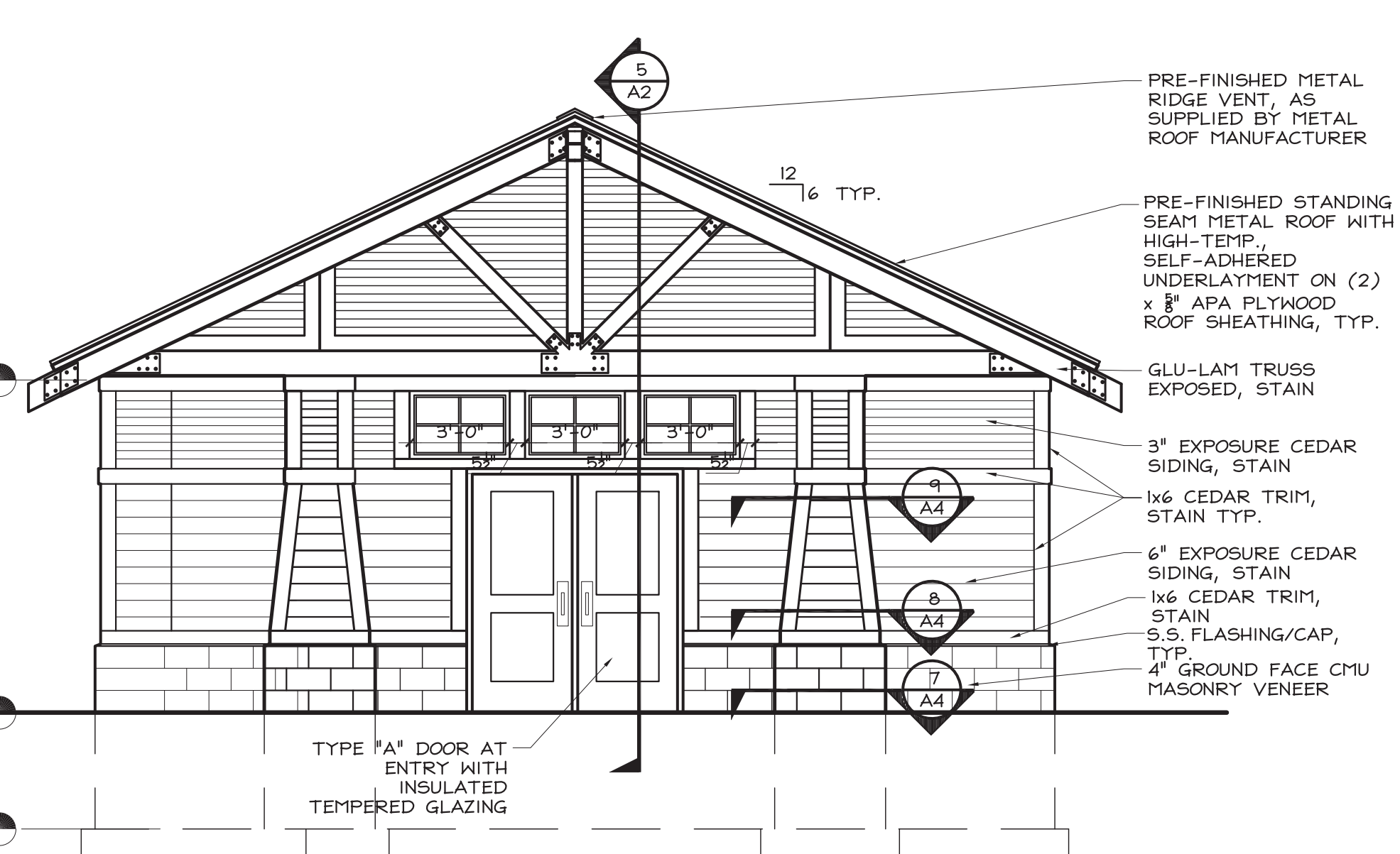




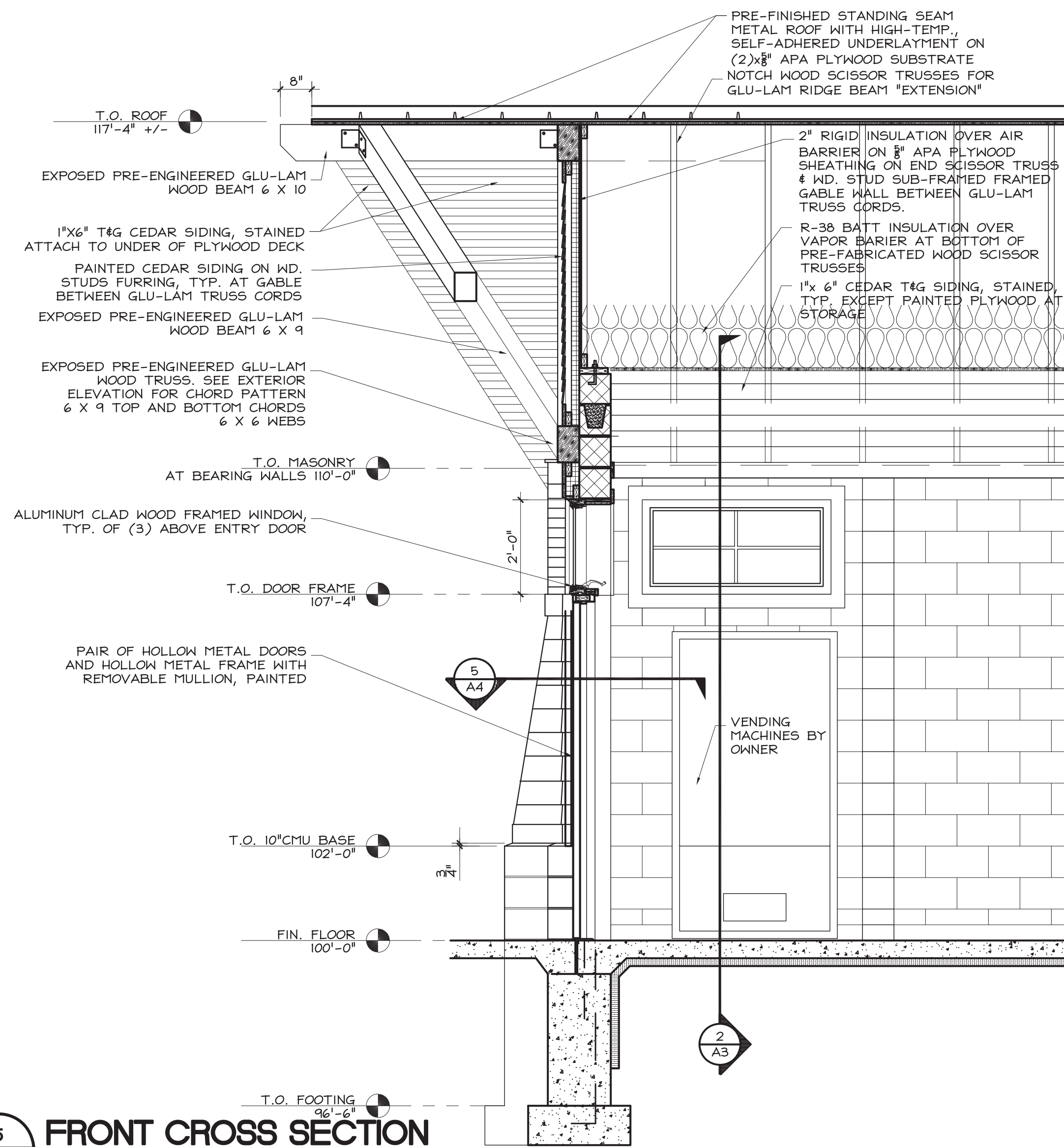
3 SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



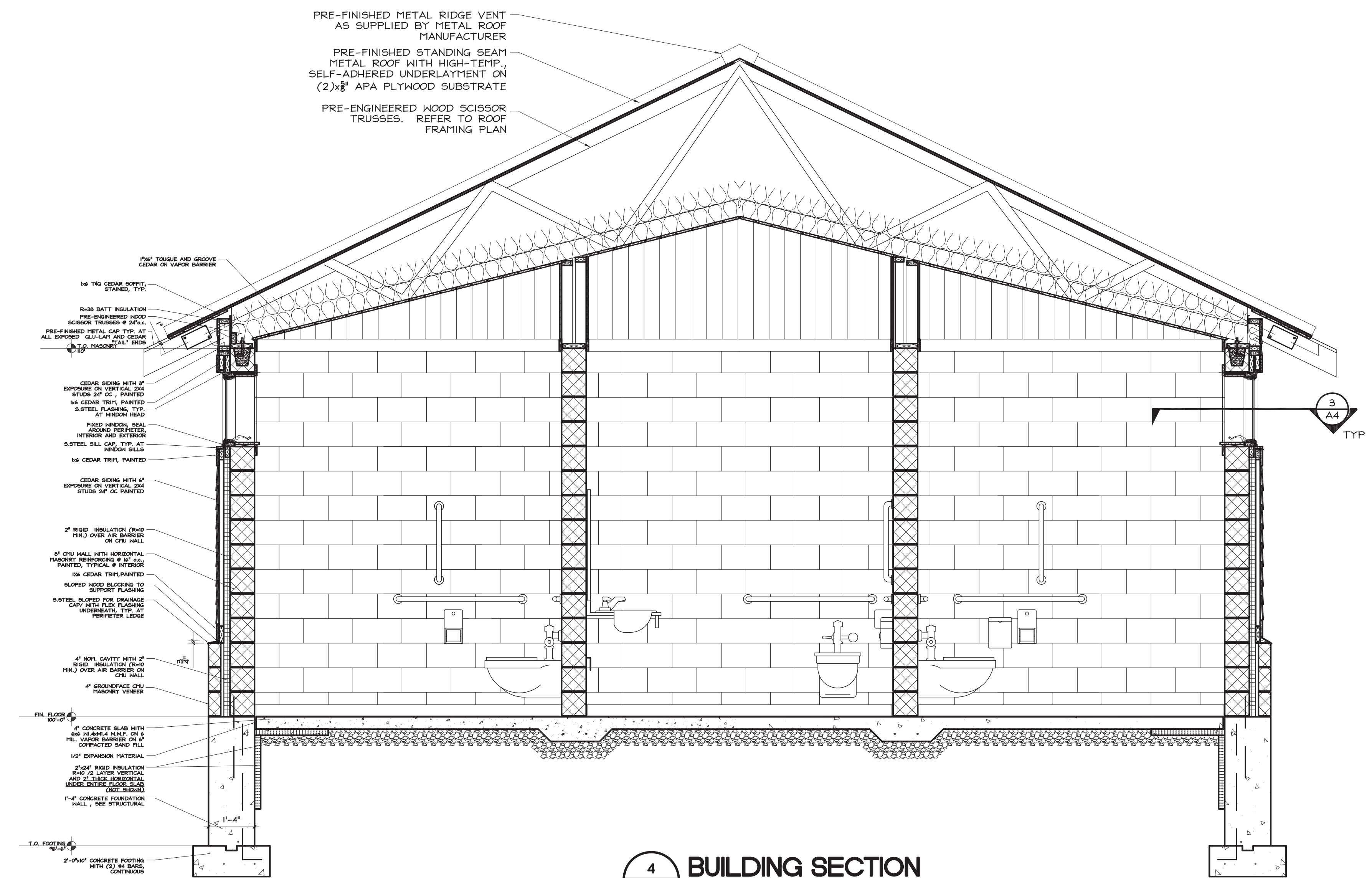
2 EAST ELEVATION
SCALE: 1/4" = 1'-0"



1 NORTH ELEVATION
SCALE: 1/4" = 1'-0"



5 FRONT CROSS SECTION
SCALE: 1/2" = 1'-0"

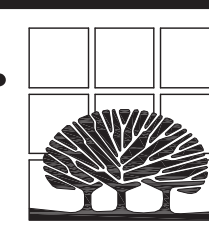


4 BUILDING SECTION
SCALE: 1/2" = 1'-0"

Ottawa Sands Park Restroom Building
Ottawa County Parks & Recreation



MCSA GROUP, INC.
Landscape Architecture • Park & Recreation Planning • Architecture
Downtown Planning • Interior Design • Sports Facility Planning
529 Greenwood Avenue S.E. • East Grand Rapids, MI 49506
616-451-3346 • FAX: 616-451-1935 • EMAIL: tas@mcsagroup.com



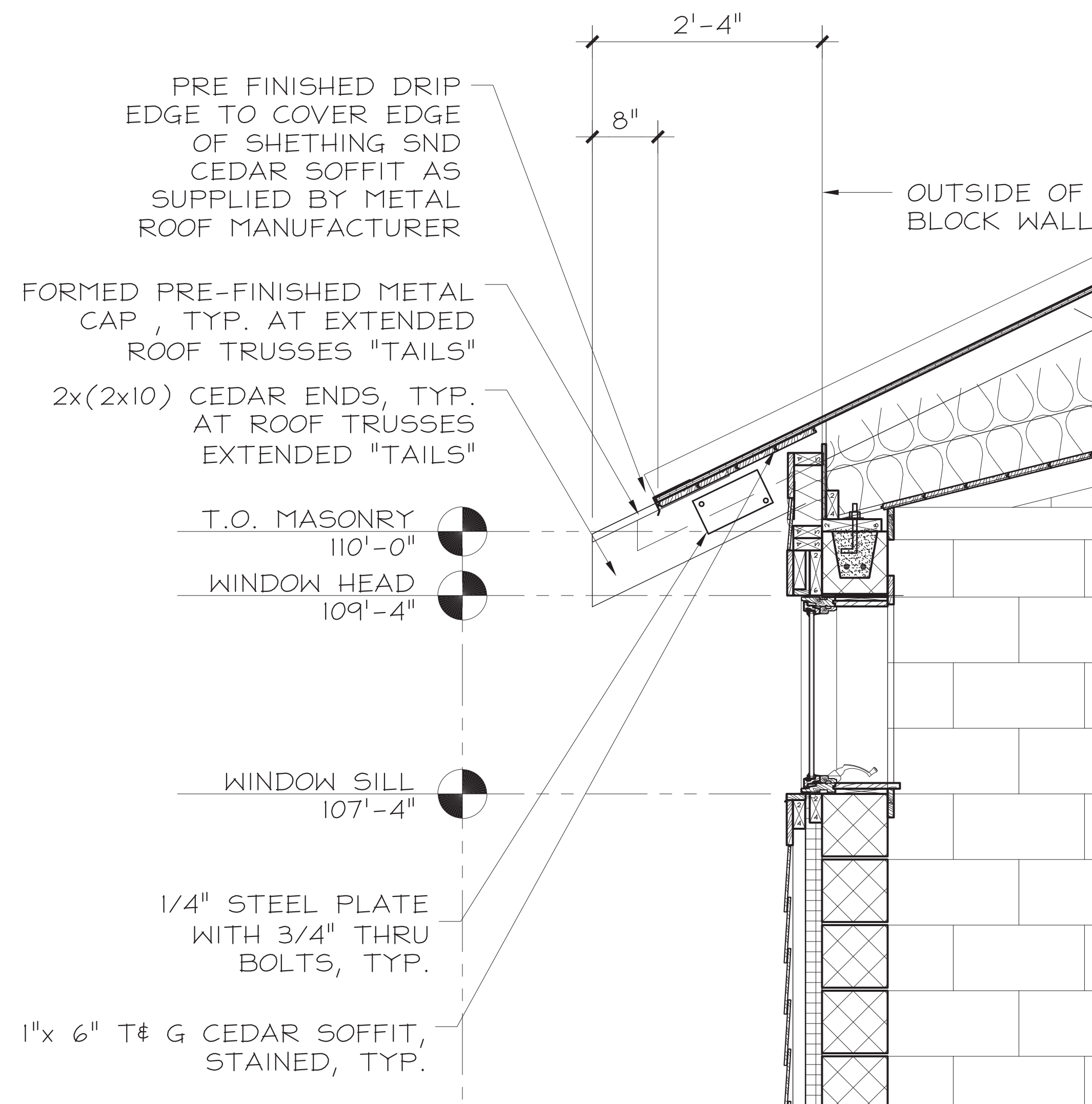
SCALE:
as shown

Exterior Elevations, Section

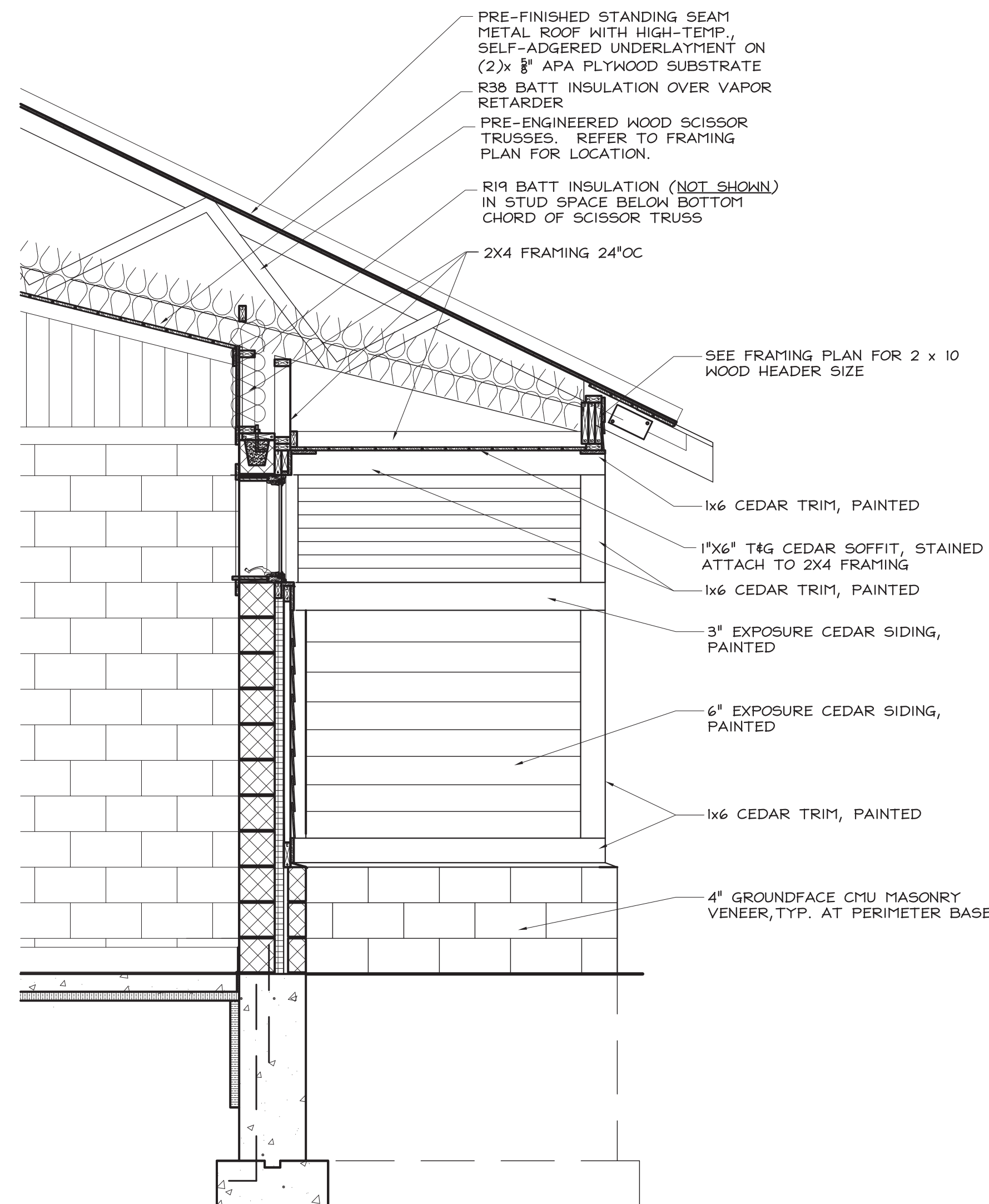
DATE
11-08-2023
REVISIONS
Bid Set

PROJECT NO.
1227
SHEET NO.
A2

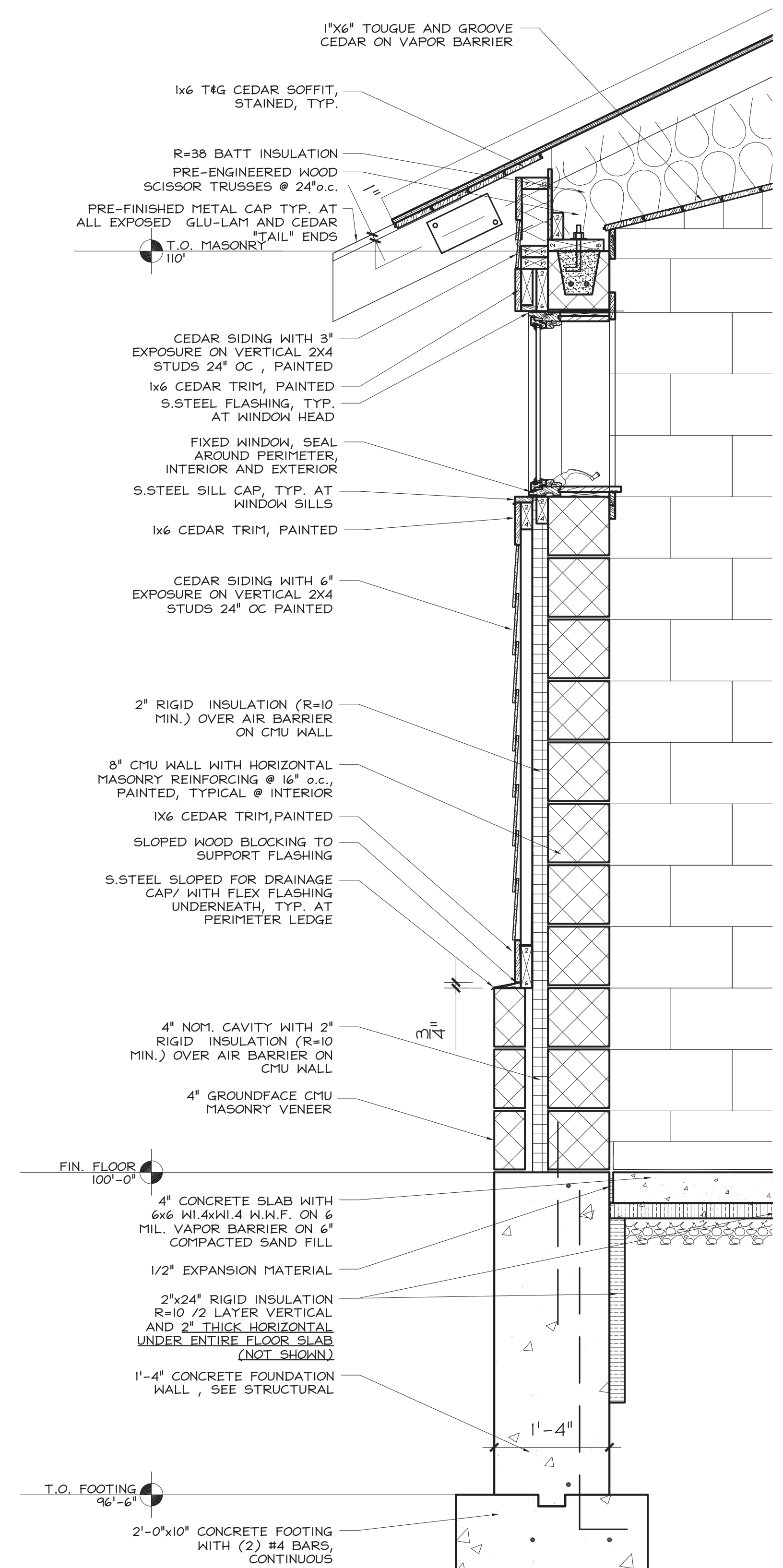
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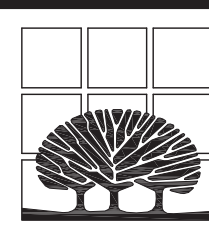
3
A3 EAVE DETAIL
SCALE: 1" = 1'-0"

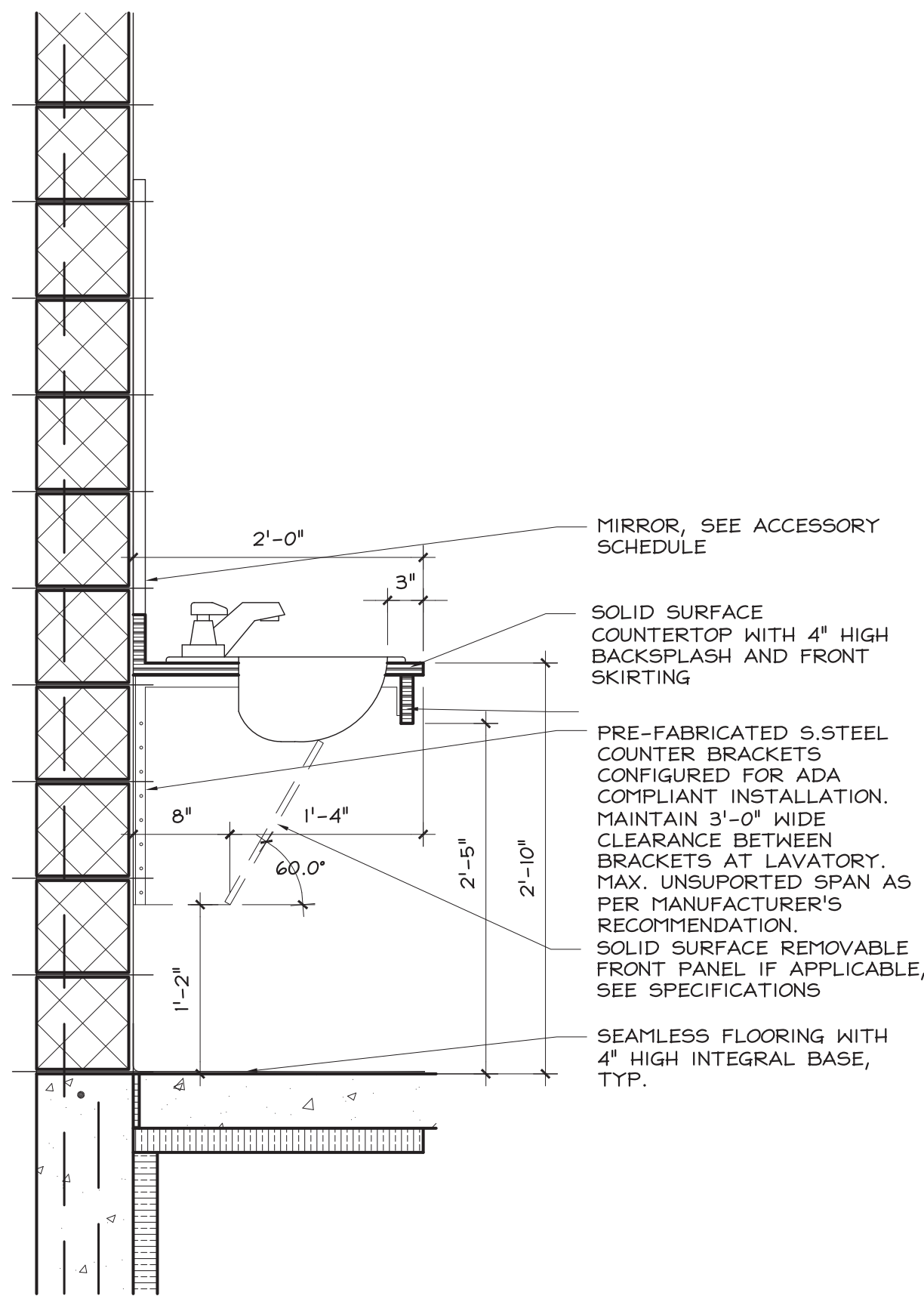


2
A3 SOFFIT DETAIL AT ROOF OVERHANG
SCALE: 1/2" = 1'-0"

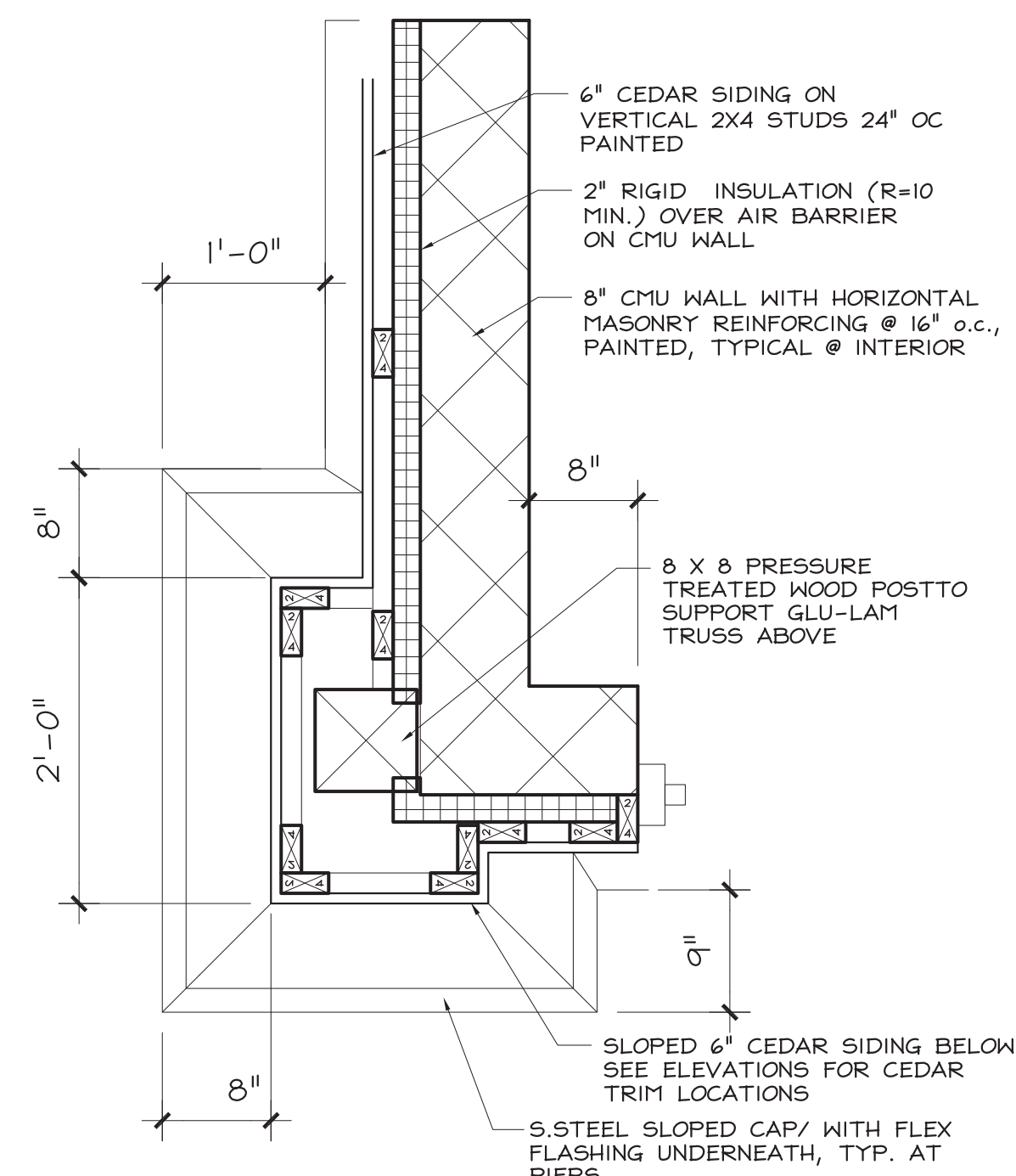
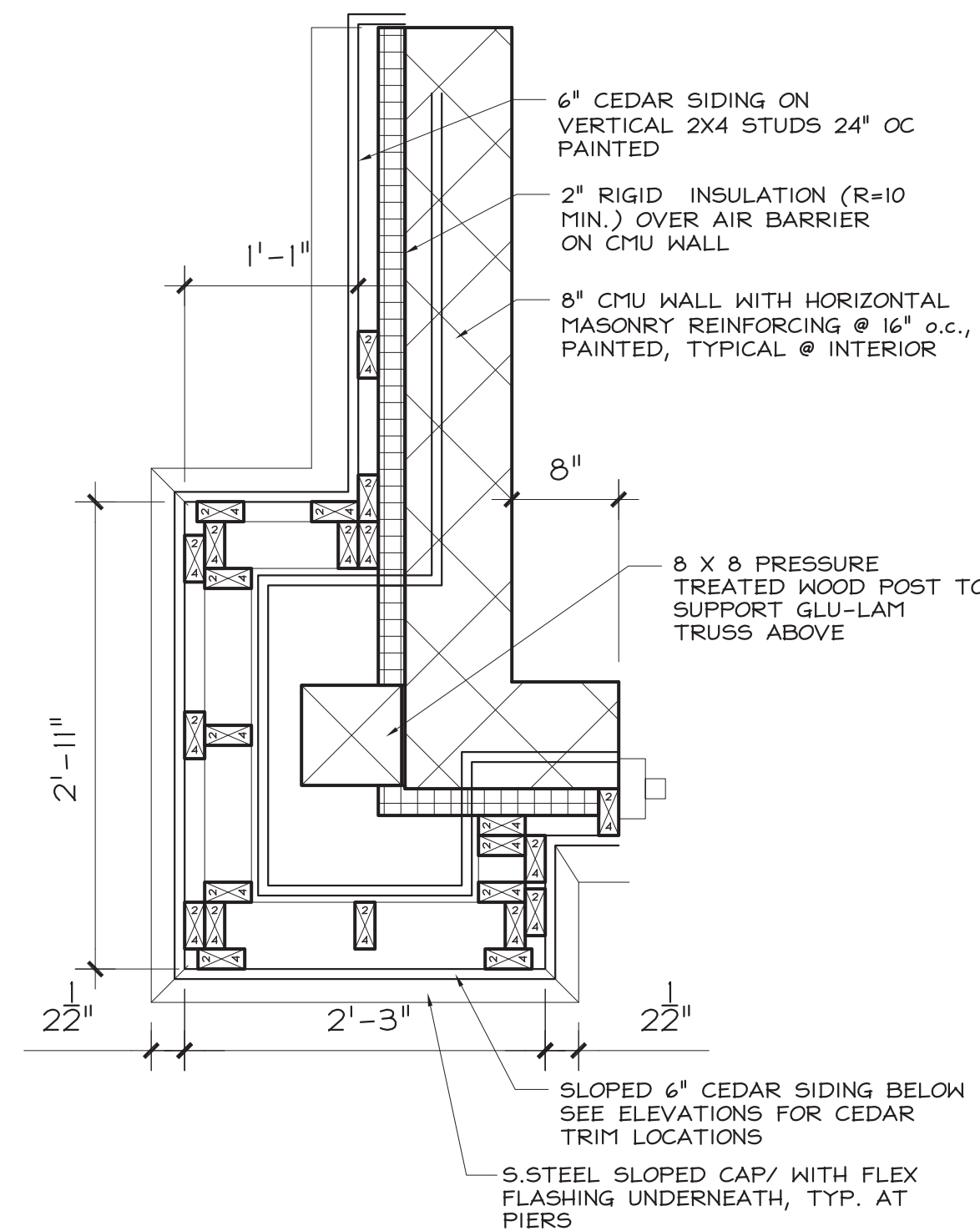
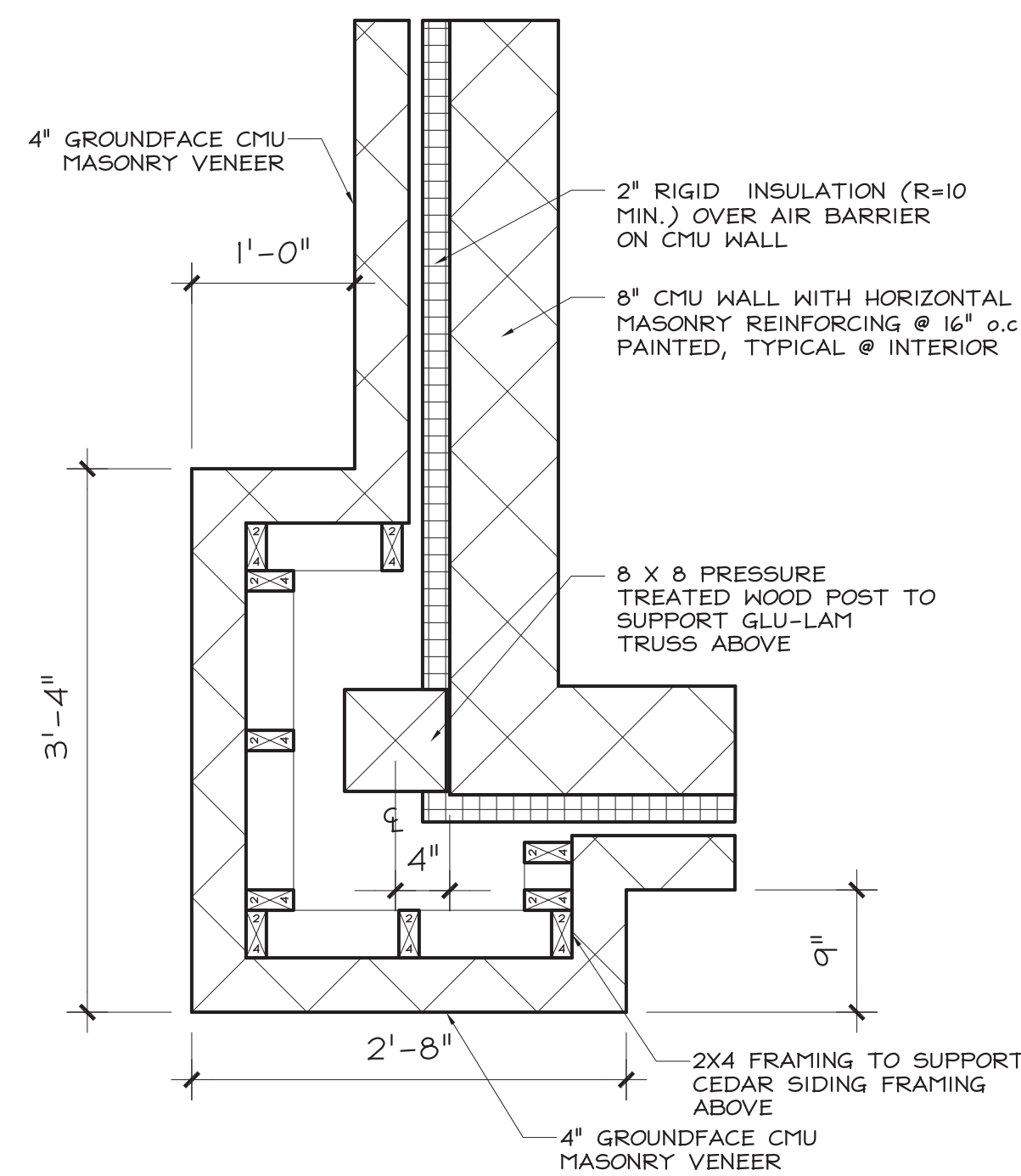
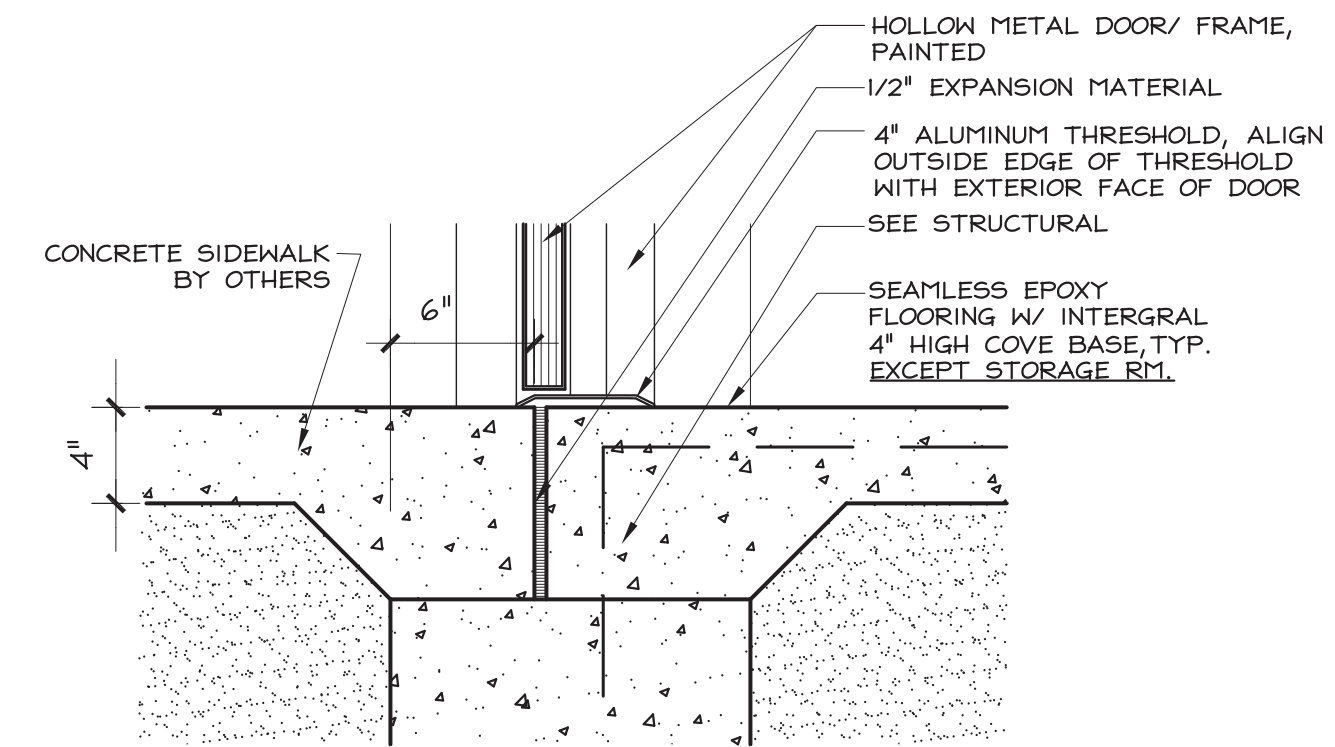
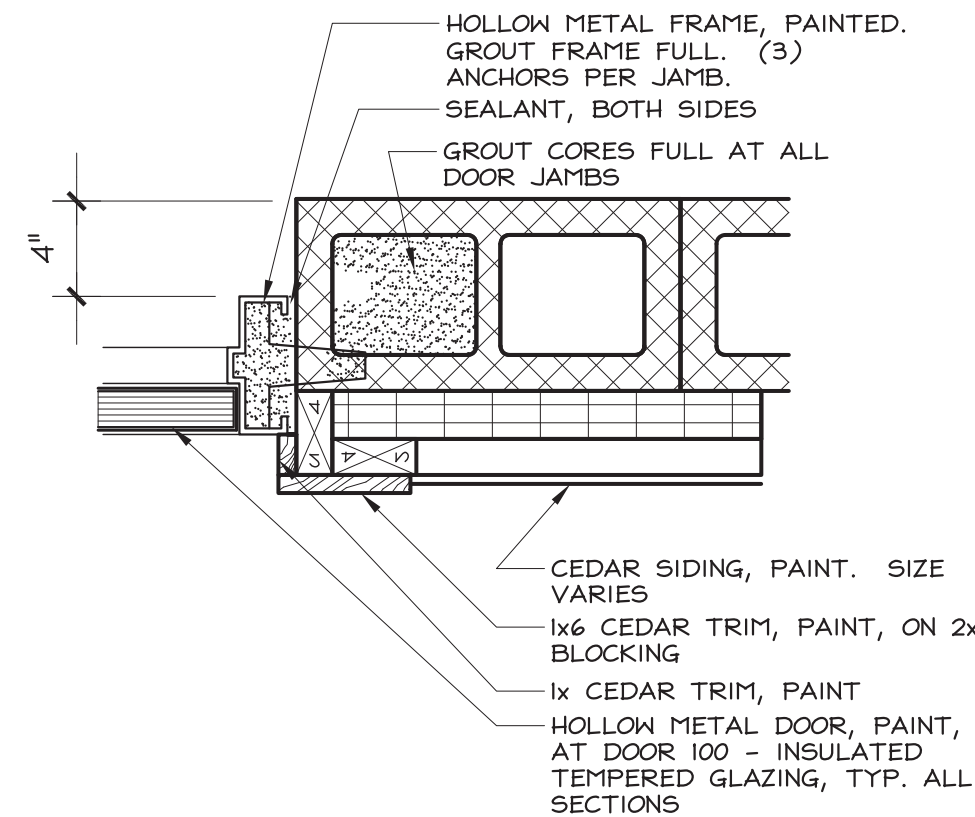
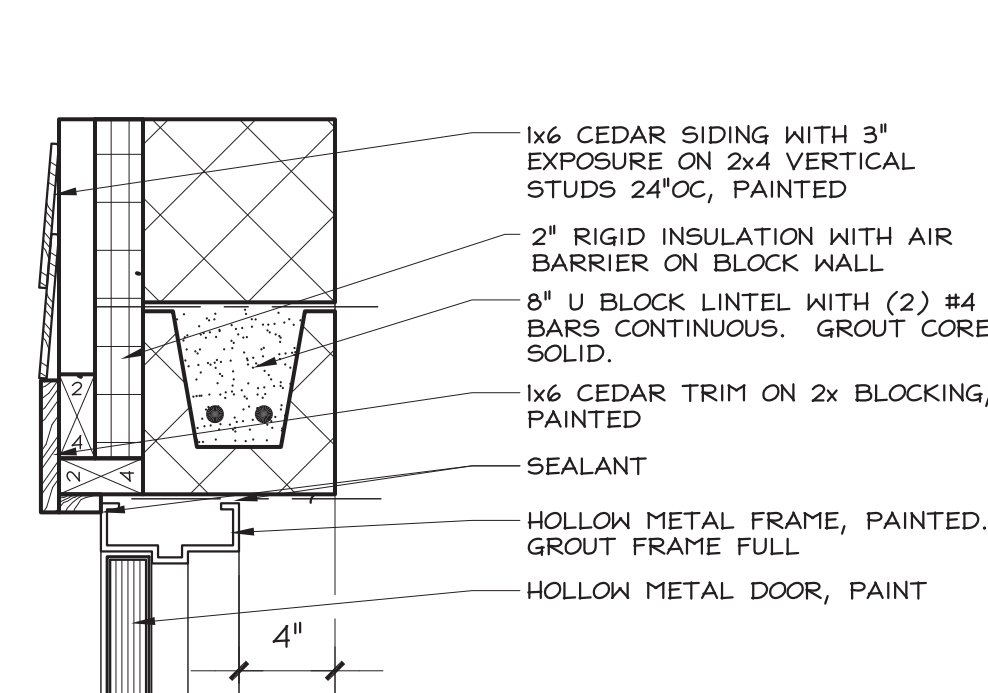
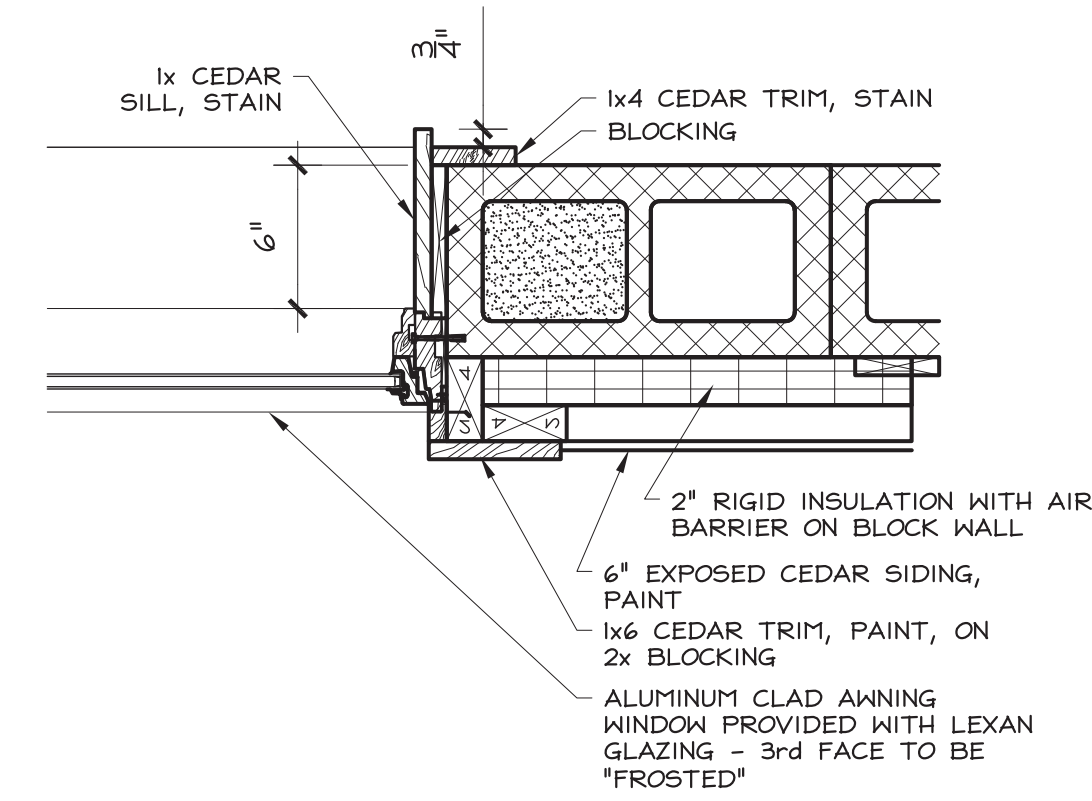
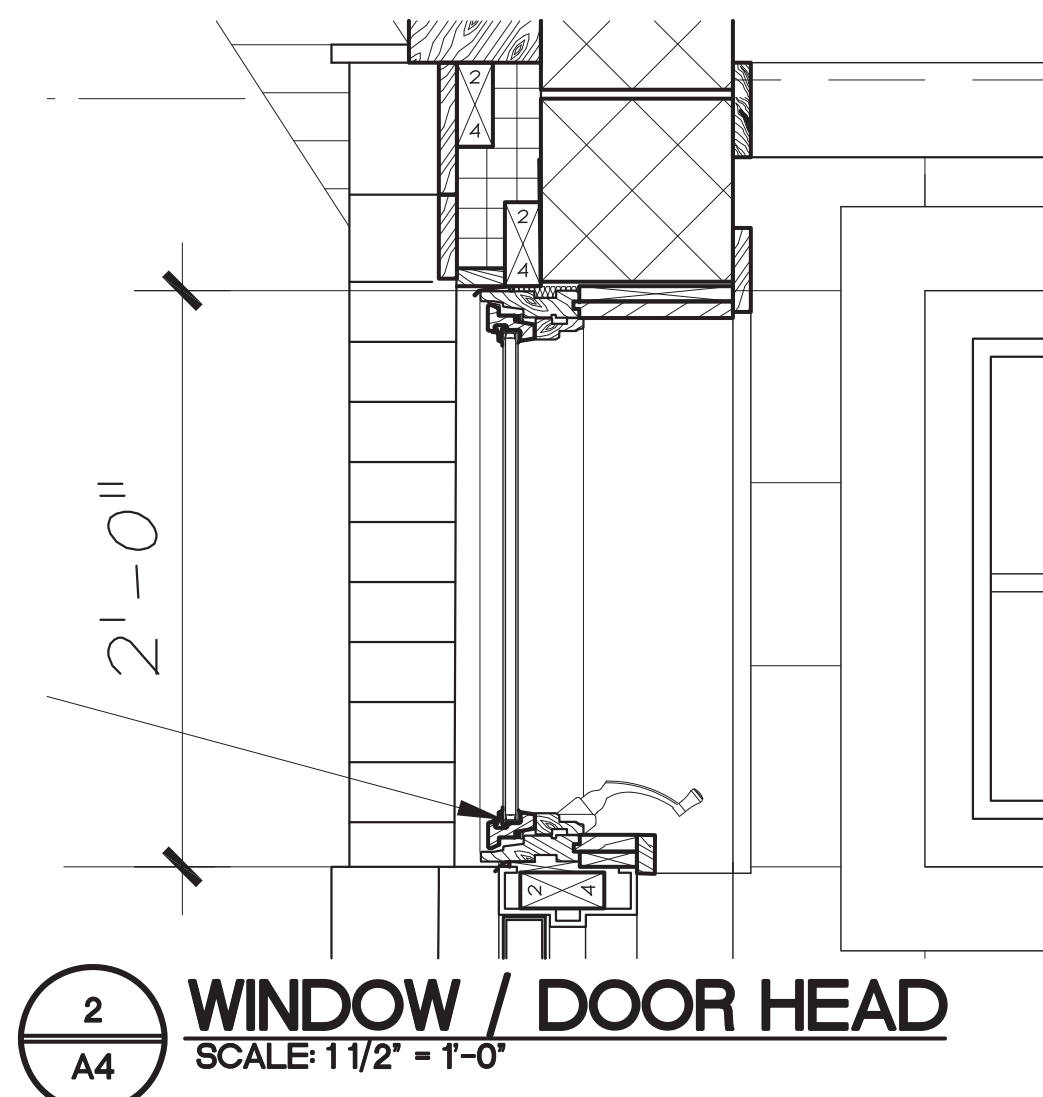


1
A3 WALL SECTION, TYP. AT WINDOW
SCALE: 1" = 1'-0"





1
A4
DETAIL
SCALE: 1 1/2" = 1'-0"



STRUCTURAL NOTES

GENERAL

- 1- CONSTRUCTION SHALL COMPLY WITH MICHIGAN BUILDING CODE [MBC] 2015 AND ALL OTHER APPLICABLE LOCAL CODES.
- 2- OSHA, AND OTHER APPLICABLE SAFETY CODE REQUIREMENTS ARE DETERMINED AND PROVIDED BY OTHERS. CLASSIC ENGINEERING IS NOT RESPONSIBLE FOR JOBSITE SAFETY.
- 3- THE STRUCTURAL DRAWINGS ARE FOR THE PLACEMENT AND SIZE OF STRUCTURAL COMPONENTS ONLY. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER IT IS FULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURES AND SEQUENCES, AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE DOWNS, AND BRACING EXCAVATIONS TO PREVENT CAVE IN. SUCH MATERIAL SHALL REMAIN THE CONTRACTORS PROPERTY AFTER COMPLETION OF THE PROJECT.
- 4- USE OF ENGINEERING DRAWINGS AS ERECTION DRAWINGS BY THE CONTRACTOR IS STRICTLY PROHIBITED.
- 5- DETAILS OF CONSTRUCTION NOT FULLY SHOWN SHALL BE OF THE SAME NATURE AS SHOWN FOR SIMILAR CONDIONS. ANY UNCLEAR CONDITIONS SHALL BE VERIFIED WITH ENGINEER PRIOR TO CONSTRUCTION OF THAT AREA.
- 6- IF ANY NOTE CONFLICTS WITH ANY DETAIL OR NOTE ON THE PLANS OR IN THE STRUCTURAL NOTES, THE STRICTEST PROVISION SHALL GOVERN.
- 7- DRAWINGS ARE NOT TO BE SCALED. ANY UNCLEAR DIMENSIONS OR DIMENSIONAL DISCREPANCIES BETWEEN DISCIPLINES SHALL BE VERIFIED WITH ARCHITECT.
- 8- ADDITIONS OF OPENINGS, PENETRATIONS OR EMBEDMENTS IN THE FIELD SHALL BE APPROVED BY THE CLASSIC ENGINEERING PRIOR TO FABRICATION.

FOUNDATIONS

- 1- FOOTINGS ARE DESIGNED TO BEAR ON SOIL OR ENGINEERED FILL ASSUMING AN ALLOWABLE BEARING CAPACITY OF 2000 PSF. IF MATERIAL OF THIS CAPACITY IS NOT CONFIRMED AT THE ELEVATIONS INDICATED, THE FOOTINGS SHALL BE LOWERED OR ENLARGED. NOTIFY AND CONSULT ENGINEER FOR ADJUSTMENTS. SEE GEOTECHNICAL REPORT, IF AVAILABLE, FOR ADDITIONAL FOUNDATION CONSIDERATIONS.
- 2- ALL FILL UNDER SLABS AND ADJACENT TO WALLS SHALL BE CLEAN GRANULAR SOIL COMPACTED TO A MINIMUM OF 95% MODIFIED PROCTOR. SEE GEOTECHNICAL REPORT FOR ADDITIONAL REQUIREMENTS.
- 3- EXERCISE CARE WHEN BACKFILLING WALLS. EXCEPT FOR WALLS WITH EQUAL FILL ON BOTH SIDES, NO BACKFILLING OF WALLS SHALL BE DONE UNTIL THE WALL HAS ATTAINED ITS FULL STRENGTH AND HAS BEEN PROPERLY SUPPORTED BY BRACING OR BY A COMPLETED FLOOR OR ROOF STRUCTURE. ALTERNATE FILL WHEN BACKFILLING WALLS WITH FILL ON BOTH SIDES.
- 4- COORDINATE FOUNDATION WORK WITH UNDERGROUND WORK BY MECHANICAL, PLUMBING AND ELECTRICAL CONTRACTORS, IF ANY.
- 5- CONTRACTOR SHALL PROVIDE FOUNDATION DRAINS WITH APPROPRIATE FILTER MATERIAL AS RECOMMENDED BY SOILS REPORT.

CONCRETE

- 1- CONCRETE SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH AS FOLLOWS:
3500 PSI FOUNDATIONS [WALLS, FOOTINGS]
4000 PSI SLABS ON GRADE
- 2- ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615. MAIN BARS TO BE GRADE 60. TIES AND STIRRUPS TO BE GRADE 40. WELDED WIRE MESH SHALL CONFORM TO ASTM A1064.
- 3- ALL ANCHOR RODS SHALL CONFORM TO ASTM F1554, GRADE 36.
- 4- MATERIAL AND WORKMANSHIP FOR ALL CONCRETE AND REINFORCING SHALL BE IN ACCORDANCE WITH THE ACI MANUAL OF STANDARD PRACTICE AND THE ACI BUILDING CODE REQUIREMENTS.
- 5- PROVIDE ENTRAINED AIR IN ALL EXPOSED EXTERIOR CONCRETE.
- 6- OTHER CONCRETE ADMIXTURES MAY BE USED AS NECESSARY, INCLUDING THE USE OF A PLASTICIZER TO IMPROVE WORKABILITY. HOWEVER, EXTRA WATER SHALL NOT BE ADDED BEYOND THAT WHICH IS REQUIRED FOR PROPER HYDRATION OF THE MIX DESIGN BEING USED.
- 7- FOR REINFORCING SPLICES, UNLESS OTHERWISE INDICATED, MAINTAIN A MINIMUM BAR LAP OF 30 BAR DIAMETERS AND A MINIMUM LAP OF 8" FOR WIRE MESH.
- 8- PROVIDE CORNER BARS TO MATCH ALL HORIZONTAL REINFORCING IN WALLS AND FOOTINGS. PROVIDE DOWELS AS REQUIRED TO MATCH VERTICAL WALL AND PIER REINFORCING. THIS INCLUDES DOWELS TO MATCH REINFORCED MASONRY WALLS ABOVE.
- 9- APPROPRIATE CURING MEASURES SHALL BE TAKEN FOR NEW CONCRETE. A MOIST CURE METHOD OR A CURING COMPOUND SHALL BE USED. COMMENCEMENT OF CURING OR APPLICATION OF A COMPOUND SHALL BE DONE IMMEDIATELY AFTER FINISHING OR REMOVING FORM WORK. THE CURING COMPOUND SHALL BE COMPATIBLE WITH FLOOR COVERINGS OR MANUFACTURERS INSTRUCTIONS.
- 10- APPROPRIATE PROCEDURES FOR COLD OR WARM WEATHER CONCRETE WORK SHALL BE FOLLOWED, AS NECESSARY, IN ACCORDANCE WITH ACI SPECIFICATIONS.
- 11- VERIFY AND COORDINATE ALL SLEEVES, OPENINGS, EMBEDDED ITEMS, ETC., AS NECESSARY, WITH THE APPLICABLE TRADE THAT MAY REQUIRE THEM.
- 12- SLABS ON GRADE SHALL HAVE CONSTRUCTION OR CONTRACTION JOINTS AT A MAXIMUM SPACING OF 10'-0" ON CENTER EACH WAY FOR 4" SLABS. MAINTAIN AN ASPECT RATIO OF LENGTH TO WIDTH OF NO MORE THAN 1.5.

CONCRETE MASONRY:

- 1- HOLLOW LOAD BEARING MASONRY UNITS SHALL CONFORM TO ASTM C90.
- 2- MORTAR FOR MASONRY SHALL CONFORM TO ASTM C270, TYPE M OR S. MINIMUM COMPRESSIVE STRENGTH OF BLOCK SHALL BE f'_m = 2000 PSI.
- 3- ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60.
- 4- PROVIDE SOLID MASONRY OR FILL CORE OF BLOCKS WITH GROUT A MINIMUM OF 3 COURSES UNDER ALL BEAM AND LINTEL BEARING POINTS. GROUT CORES FULL HEIGHT WHERE REINFORCING IS REQUIRED AT THE BEARING POINTS UNLESS NOTED OTHERWISE.
- 5- REINFORCED MASONRY CORES SHALL BE FILLED WITH GROUT IN LIFTS OF 48" MAXIMUM. GROUT SHALL BE PUDDLED OR VIBRATED IN PLACE.
- 6- MASONRY REINFORCING MUST BE CONTINUOUS, MAINTAIN MINIMUM LAP SPLICE OF 30" FOR #5 BARS & 38" FOR #6 BARS. SUPPORT REINFORCING VERTICALLY AT A DISTANCE NOT EXCEEDING 192 BAR DIAMETERS AND MAINTAIN 1/2" MINIMUM CLEARANCE BETWEEN THE STEEL AND MASONRY.
- 7- GROUT FOR REINFORCED CORES AND BOND BEAMS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF f'_g = 3000 PSI.
- 8- PROVIDE #4 BARS, VERTICAL AT ALL CORNERS, WITHIN 16" ON EACH SIDE OF OPENINGS, WITHIN 8" ON EACH SIDE OF CONTROL JOINTS, AND WITHIN 8" OF THE ENDS OF WALLS. PROVIDE #4 HORIZONTAL REINFORCEMENT AT THE BOTTOM OF WALL OPENINGS, EXTENDING A MINIMUM OF 24" BEYOND THE OPENING.
- 9- HORIZONTAL REINFORCEMENT SHALL BE A MINIMUM OF TWO WIRES OF W1.7 AT 16" MAXIMUM VERTICAL.
- 10- FOLLOW COLD/HOT WEATHER CONSTRUCTION GUIDELINES PER ACI 530.1, 1.8C & 1.8D.

STRUCTURAL STEEL

- 1- STEEL DESIGN, FABRICATION AND ERECTION TO BE IN ACCORDANCE WITH AISC 360-16, SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS.
- 2- STRUCTURAL STEEL ANGLES AND PLATE SHALL CONFORM TO ASTM A36. WIDE FLANGES SHALL CONFORM TO ASTM A992 GRADE 50.
- 3- ALL LINTELS SHALL BE G-90 GALVANIZED IN ACCORDANCE WITH ASTM A123.

STRUCTURAL WOOD FRAMING

- 1- TRUSSES AND ALL GLULAM COMPONENTS SHALL BE DESIGNED FOR THE DESIGN LOADS INDICATED, APPROVED BY A REGISTERED PROFESSIONAL ENGINEER. SEALED SHOP DRAWINGS SHALL BE SUBMITTED TO CLASSIC ENGINEERING FOR REVIEW. DEFLECTIONS SHALL BE LIMITED TO $[L/SPAN]$:
L/240 - ROOF LIVE LOAD
L/180 - ROOF DEAD + LIVE LOAD
- 2- TRUSS MANUFACTURER SHALL PROVIDE ERECTION DRAWINGS INDICATING ALL BRIDGING AND BRACING REQUIRED BY DESIGN.
- 3- WOOD TRUSSES AND/OR OTHER STRUCTURAL FRAMING MEMBERS ARE SHOWN AS A GENERAL LAYOUT ONLY AND EXACT PLACEMENT SHALL BE VERIFIED IN THE FIELD. HOWEVER, FRAMING PLACEMENT SHALL NOT EXCEED THE SPACING SHOWN ON THE DRAWINGS. WOOD TRUSS PLACEMENT SHALL ALSO BE COORDINATED WITH THE TRUSS ERECTION DRAWINGS.
- 4- ALL ROOF SHEATHING SHALL BE MIN. 23/32" APA RATED 48/24 SHEATHING, EXPOSURE 1.
- 5- ROOF SHEATHING SHALL BE INSTALLED CONTINUOUS OVER TWO OR MORE SPANS WITH STRENGTH AXIS PERPENDICULAR TO SUPPORTS. SHEATHING SHALL BE NAILED WITH 10d COMMON NAILS AT 6" O.C. AT PANEL EDGES & INTERMEDIATE SUPPORTS UNLESS NOTED OTHERWISE. ALTERNATELY, BLOCK ALL PANEL EDGES AND NAIL AT 6" O.C. AT PANEL EDGES AND 12" O.C. AT INTERMEDIATE SUPPORTS. ALLOW 1/8" GAP AT PANEL EDGES AND ENDS.
- 6- ROOF TRUSS TIES INDICATED ON PLANS ARE AN ESTIMATED MINIMUM REQUIREMENT. TRUSSES AND GIRDER TRUSSES MAY REQUIRE ADDITIONAL TIES BASED ON UPLIFT REACTIONS PROVIDED IN TRUSS SUBMITTAL.
- 7- PROVIDE TEMPORARY AND PERMANENT BRACING OF ROOF TRUSSES PER BCSI (BUILDING COMPONENTS SAFETY INFORMATION) PUBLISHED BY THE WOOD TRUSS COUNCIL OF AMERICA & TRUSS PLATE INSTITUTE.
- 8- GLULAM TIMBER COMPLY WITH ANSI/AITC A190.1, SOUTHERN PINE, PRESSURE TREATED.

DESIGN CODES

GENERAL - MICHIGAN BUILDING CODE 2015
WOOD - NATIONAL DESIGN SPECIFICATION 2015
MASONRY - ACI 530-13
CONCRETE - ACI 318-14

DESIGN CRITERIA

RISK CATEGORY II BUILDING

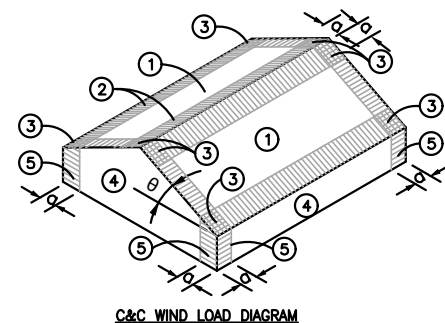
ROOF LOADS

EXPOSURE B, PARTIAL EXPOSURE
GROUND SNOW LOAD, P_g = 50 PSF
IMPORTANCE FACTOR, I_s = 1.0
EXPOSURE FACTOR, C_e = 1.0
THERMAL FACTOR, C_t = 1.2
SLOPE FACTOR, C_s = 1.0
BALANCED ROOF SNOW LOAD = 42 PSF
TOP CHORD DEAD LOAD = 5 PSF
BOTTOM CHORD DEAD LOAD = 10 PSF

WIND LOADS

ULTIMATE DESIGN WIND SPEED, V_{ult} = 115 MPH
NOMINAL DESIGN WIND SPEED, V_{nom} = 89 MPH
EXPOSURE CATEGORY C
IMPORTANCE FACTOR, I_w = 1.0
INTERNAL PRESSURE COEFFICIENT, GC_{pi} = +/-0.18

COMPONENT & CLADDING WIND PRESSURES [UNFACTORED, a = 3 FT.]				
Component	p = Net Design Pressures (psf)			
	Zone 1, 2, 3 (+)	Zone 1 (-)	Zone 2 (-)	Zone 3 (-)
Roof Truss	11.73	-23.94	-58.14	-65.47
Roof Decking & Fasteners	16.61	-26.38	-58.14	-94.78
	Zone 4 (+)	Zone 4 (-)	Zone 5 (+)	Zone 5 (-)
Walls	26.59	-29.03	26.59	-34.12
Wall Sheathing & Fasteners	28.83	-31.27	28.83	-38.60



SEISMIC LOADS

IMPORTANCE FACTOR, I_e = 1.0
SITE CLASS D
MAPPED SHORT PERIOD SPECTRAL RESPONSE ACCELERATION, S_a = 0.083g
MAPPED 1-SECOND SPECTRAL RESPONSE ACCELERATION, S_1 = 0.044g
SHORT PERIOD SPECTRAL DESIGN ACCELERATION, S_{ds} = 0.089g
1.0 SEC. SPECTRAL DESIGN ACCELERATION, S_{d1} = 0.071g
SEISMIC DESIGN CATEGORY B
RESPONSE MODIFICATION FACTOR, R = 3.5
SEISMIC RESPONSE COEFFICIENT, C_s = 0.025
DESIGN BASE SHEARS [UNFACTORED] V = 0.025W
ANALYSIS PROCEDURE - EQUIVALENT LATERAL FORCE

LATERAL FORCE RESISTING SYSTEM: INTERMEDIATE REINFORCED MASONRY SHEAR WALLS

ABBREVIATIONS

ARCH. - ARCHITECTURAL
B/- - BOTTOM OF
COL. - COLUMN
CONC. - CONCRETE
CONT. - CONTINUOUS
DIA. - DIAMETER
ELEV. - ELEVATION
EXT. - EXTERIOR
E.W. - EACH WAY
FND. - FOUNDATION
HORIZ. - HORIZONTAL
MIN. - MINIMUM
O.W. - ON CENTER
PSF - POUNDS PER SQUARE FOOT
PSI - POUNDS PER SQUARE INCH
REINF. - REINFORCING
SIM. - SIMILAR
T & B - TOP AND BOTTOM
T/- - TOP OF
TYP. - TYPICAL
UNO - UNLESS NOTED OTHERWISE
VERT. - VERTICAL
w/- - WITH
WWF - WELDED WIRE FABRIC

FASTENER SCHEDULE

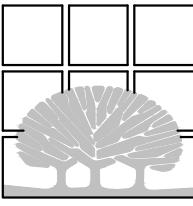
DESIGNATION	TYPE	DIMENSIONS
8d	COMMON NAIL	0.131"Ø x 2 1/2" LONG
10d	COMMON NAIL	0.148"Ø x 3" LONG
16d	COMMON NAIL	0.162"Ø x 3 1/2" LONG

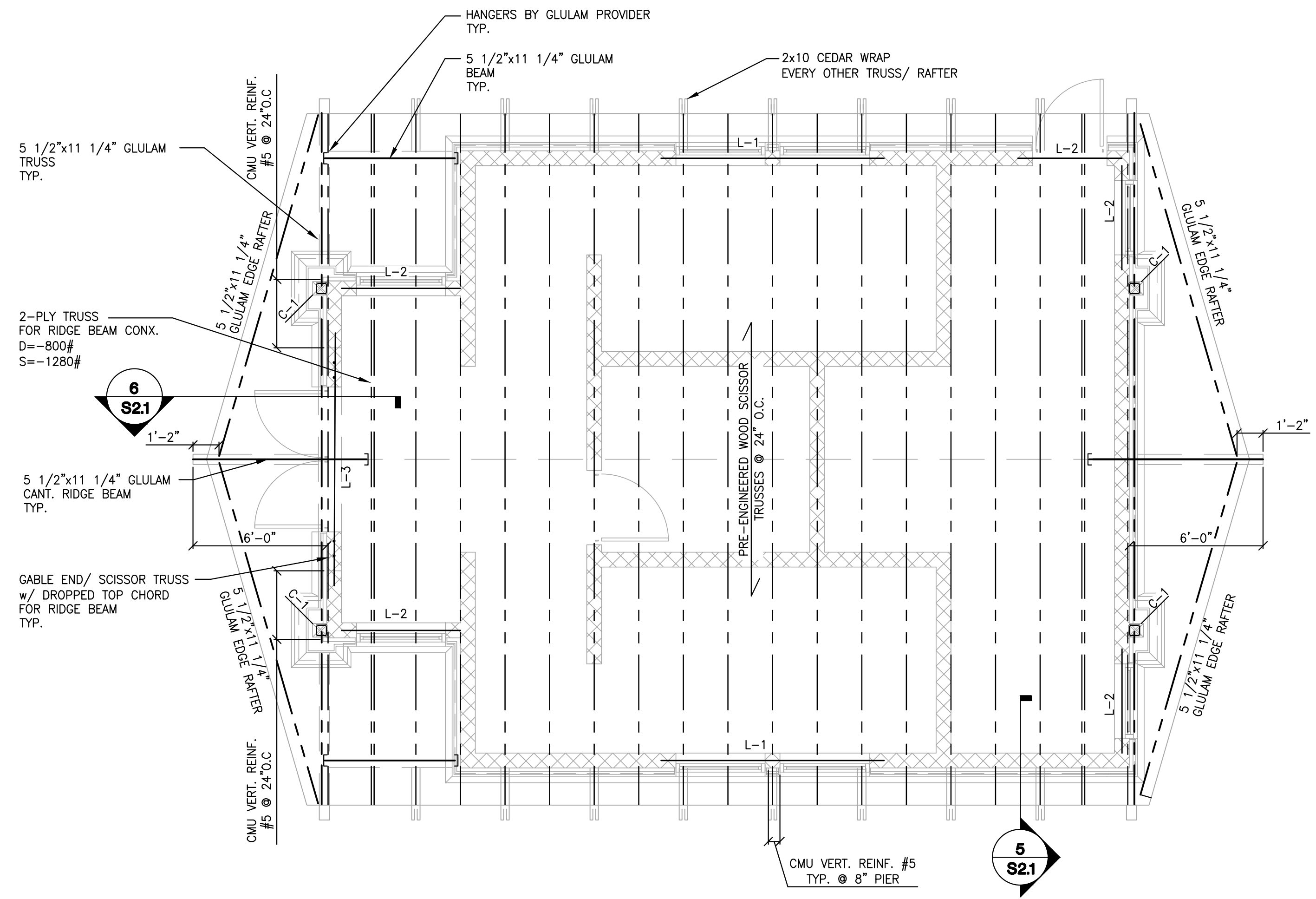
TIMBER DESIGN VALUES

SPECIES & GRADE	SIZE	BENDING F_b , PSI	TENSION PARALLEL TO GRAIN F_t , PSI	SHEAR PARALLEL TO GRAIN F_v , PSI	COMPRESSION PERPENDICULAR TO GRAIN $F_{c\perp}$, PSI	COMPRESSION PARALLEL TO GRAIN $F_{c\parallel}$, PSI	MODULUS OF ELASTICITY, PSI
SOUTHERN PINE #1	6x6	1350	900	165	375	825	1,500,000

REQUIRED VERIFICATION & INSPECTIONS [MBC 2015 CHAPTER 17]

SYSTEM or MATERIAL	FREQUENCY		INSPECTION		REMARKS
	CONTINUOUS	PERIODIC	CODE or STANDARD REFERENCE	MBC REFERENCE	
SOILS, MBC 1705.6/ TABLE 1705.6					
VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.		X			SEE GEOTECHNICAL REPORT IF AVAILABLE
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH & HAVE REACHED PROPER MATERIAL.		X			SEE GEOTECHNICAL REPORT IF AVAILABLE
PERFORM CLASSIFICATION & TESTING OF COMPACTED FILL MATERIALS.		X			SEE GEOTECHNICAL REPORT IF AVAILABLE
VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT & COMPACTION OF COMPACTED FILL.	X				SEE GEOTECHNICAL REPORT IF AVAILABLE
PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE & VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.		X			SEE GEOTECHNICAL REPORT IF AVAILABLE
CONCRETE. MBC 1705.3/ MBC TABLE 1705.3					
INSPECT REINFORCEMENT AND VERIFY PLACEMENT.		X	ACI 318 CHAPTER 10, 25.2, 25.3, 26.6.1-26.6.3		
VERIFY USE OF REQUIRED DESIGN MIX.		X	ACI 318: CHAPTER 19, 28.4.3-26.4.4	1904.1, 1904.2	
PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X		ASTM C172, ASTM C31, ACI 318 : 26.4, 26.12		
VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE & TECHNIQUES.		X	ACI 318: 26.5.3-26.5.5		
INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.		X	ACI 318: 26.11.1.2b		
MASONRY CONSTRUCTION. MBC 1705.2					
MASONRY - LEVEL B		X	TMS 402/ACI 530 TABLE 3.1.3 TMS 602/ACI 530.1- TABLE 4	1705.4	MASONRY CONSTRUCTION SHALL BE INSPECTED AND VERIFIED IN COMPLIANCE WITH TMS 402-11/ ACI 530-11/ ASCE 5-11 AND TMS 602-11/ ACI 530.1-11/ ASCE 6 QUALITY ASSURANCE PROGRAMS.





ROOF FRAMING PLAN
SCALE: 1/4" = 1'-0"

COLUMN SCHEDULE			
MARK	SIZE	COLUMN BASE	COLUMN CAP
C-1	6x6 S. PINE #1 P.T.	SIMPSON ABJ66Z ¹	SIMPSON CBT4Z ²
1- WITH 5/8" TITEN HD x 6", 12-16d COMMON NAILS.			
2- WITH 3- 1/2" x 4 3/4" DOWELS @ TRUSS BOTTOM CHORD & 3-1/2" BOLTS @ COLUMN			

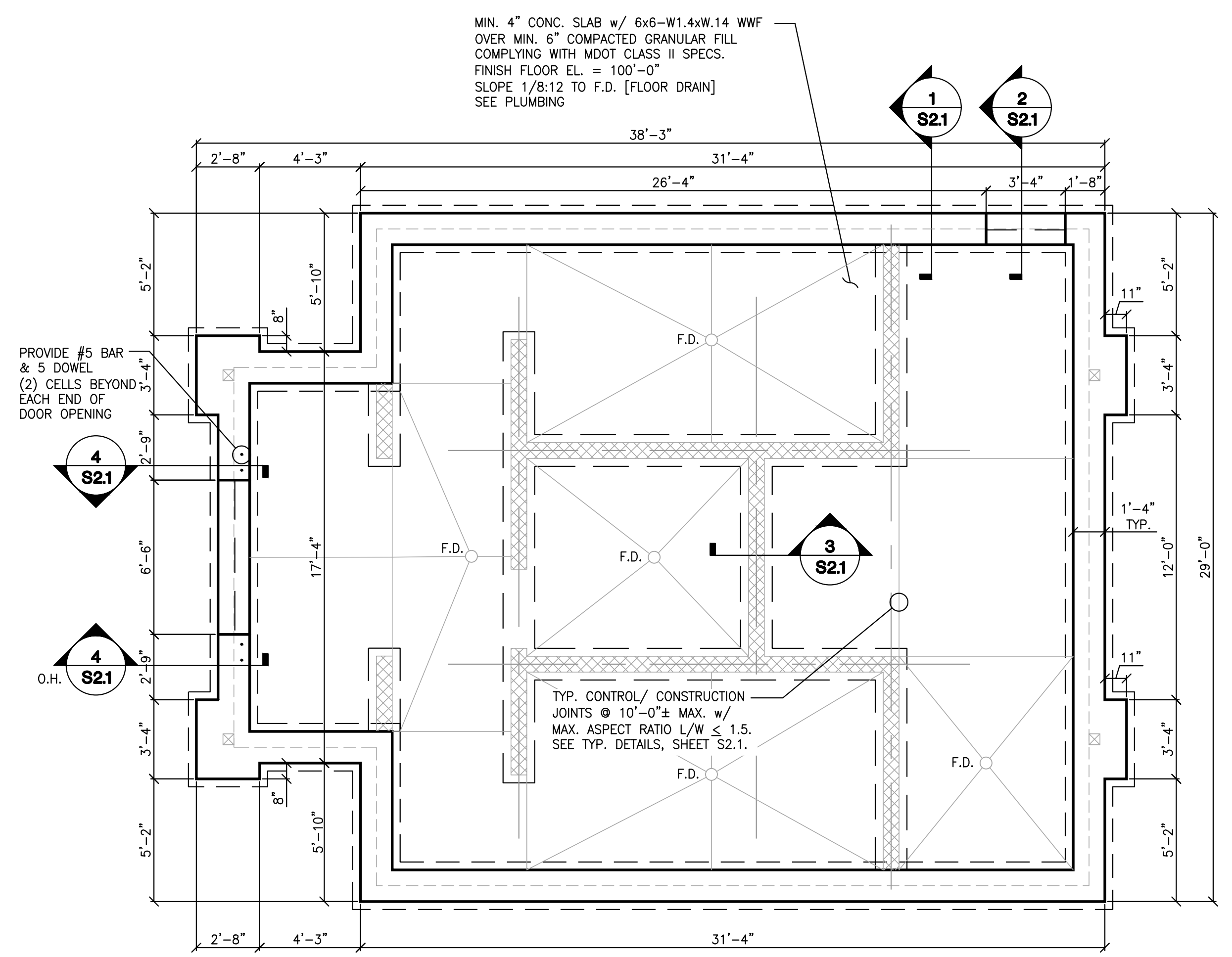
LINTEL SCHEDULE ¹		
MARK	SIZE	BRG. PL./BRG. LENGTH
L-1	8" BOND BEAM w/ 2-#4 T&B #4 STIRRUPS @ 8" O.C.	8"
L-2	8" BOND BEAM w/ 2-#4 BOTTOM	8"
L-3	W8x15 w/ PL. 5/16"x7"	1/2"x7"x8"
1- SEE TYP. STEEL LINTEL BEARING DETAIL, SHEET S2.1.		

FRAMING NOTES:
[SEE STRUCTURAL NOTES, SHEET S0.0]

1- MASONRY WALL REINFORCEMENT SHALL BE #5 @ 48" O.C. U.N.O.

2- PROVIDE CONTROL JOINTS AT CMU WALL AT 20'-0" O.C. MAX. AND MAX.10' FROM CORNERS. SEE TYP. DETAIL, SHEET S2.1.

3- GLULAM SIZES ARE APPROXIMATE. GLULAM PROVIDER SHALL PROVIDE MEMBERS OF SIMILAR DIMENSION.

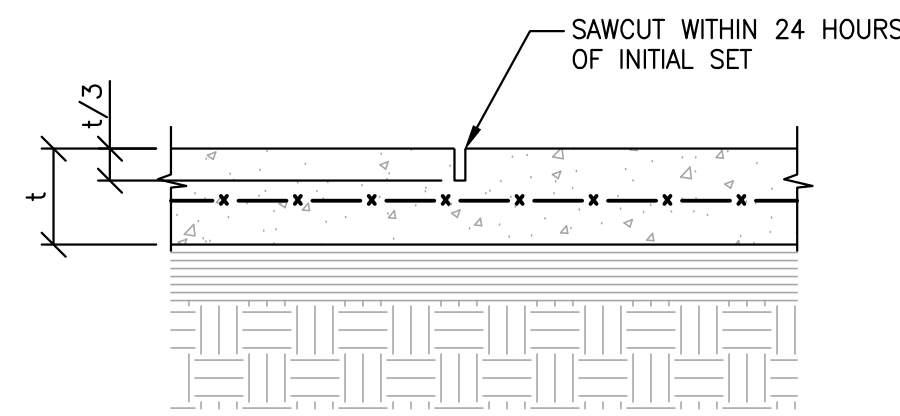


FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

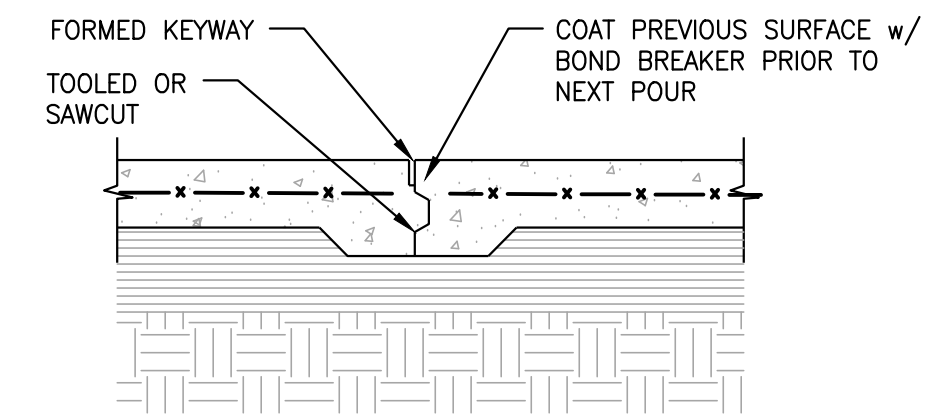
FOUNDATION NOTES:
[SEE STRUCTURAL NOTES, SHEET S0.0]

1- TOP OF CONCRETE EL. = 100'-0" U.N.O.
TOP OF FOOTING EL. = 97'-0" U.N.O.
TOP OF CONCRETE EL. = 99'-4" @ DOOR OPENINGS

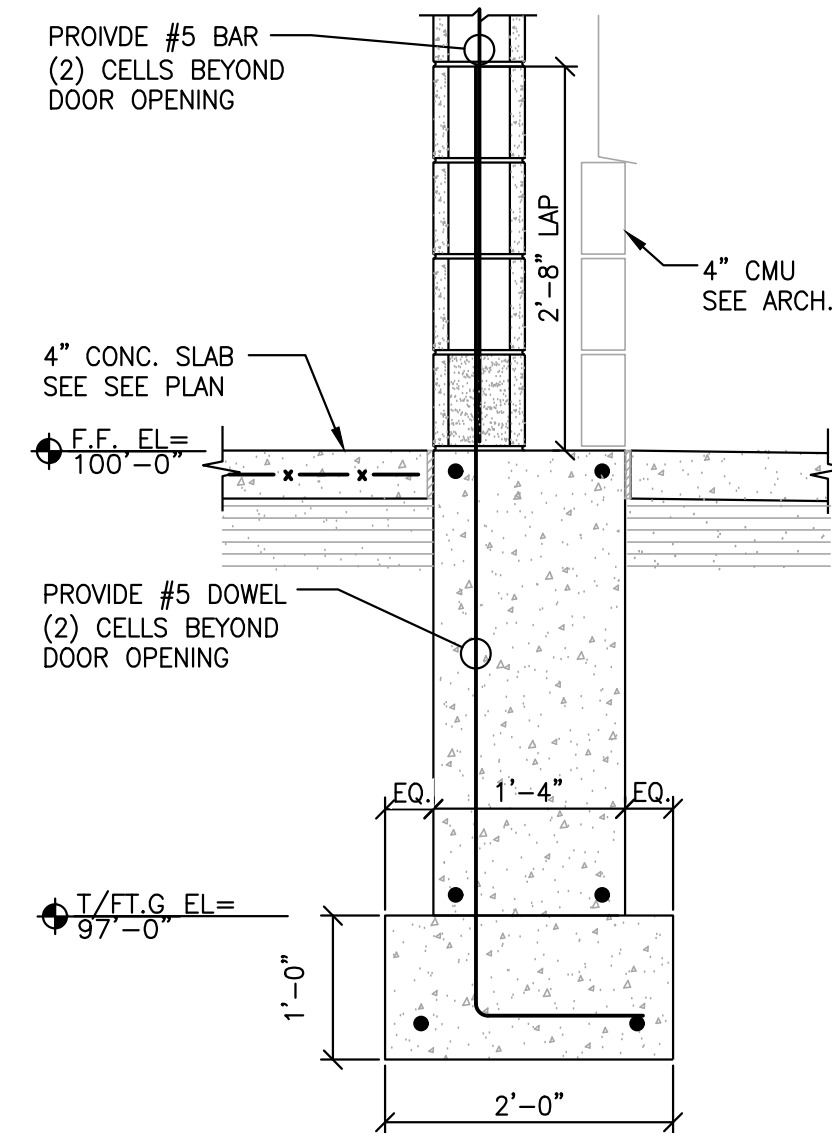




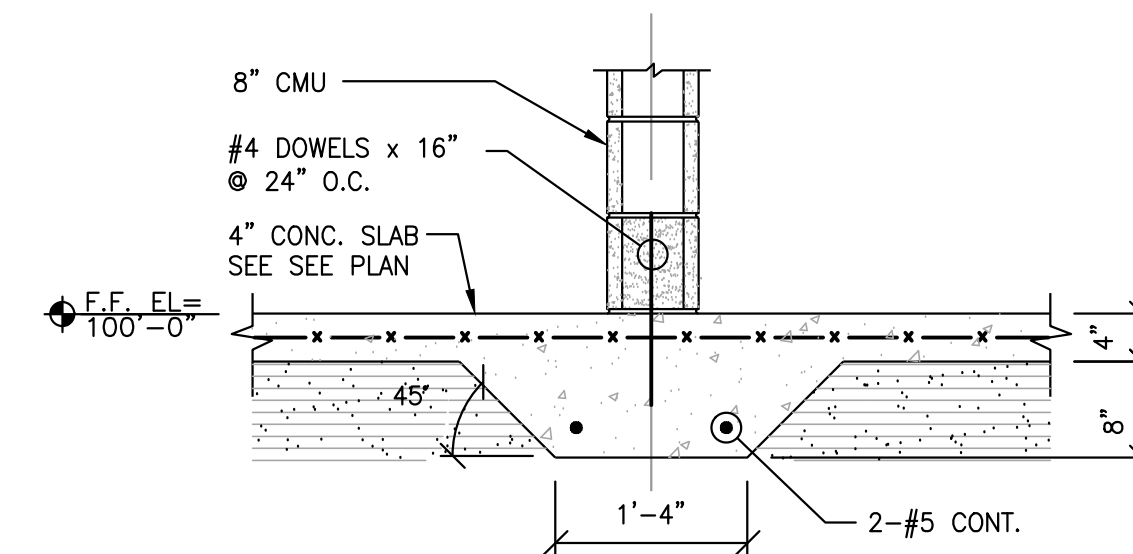
TYP. CONTROL JOINT DETAIL
S2.1 SCALE: NOT TO SCALE



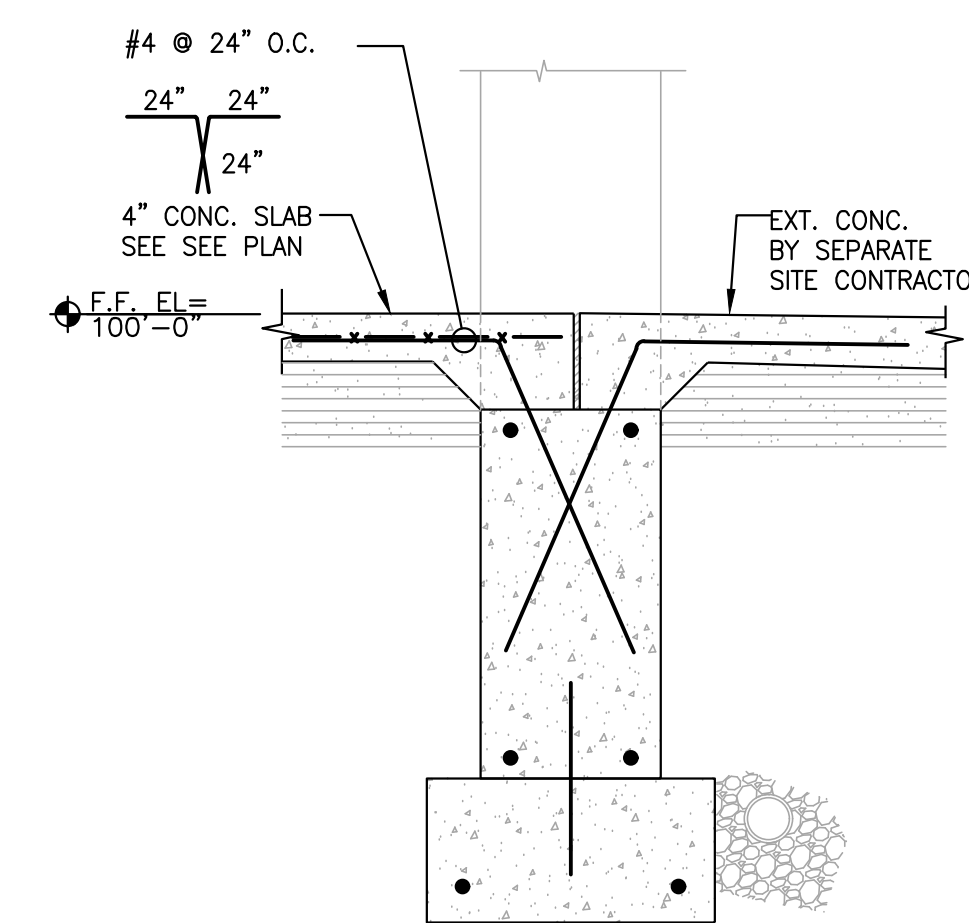
TYP. CONSTRUCTION JOINT DETAIL
S2.1 SCALE: NOT TO SCALE



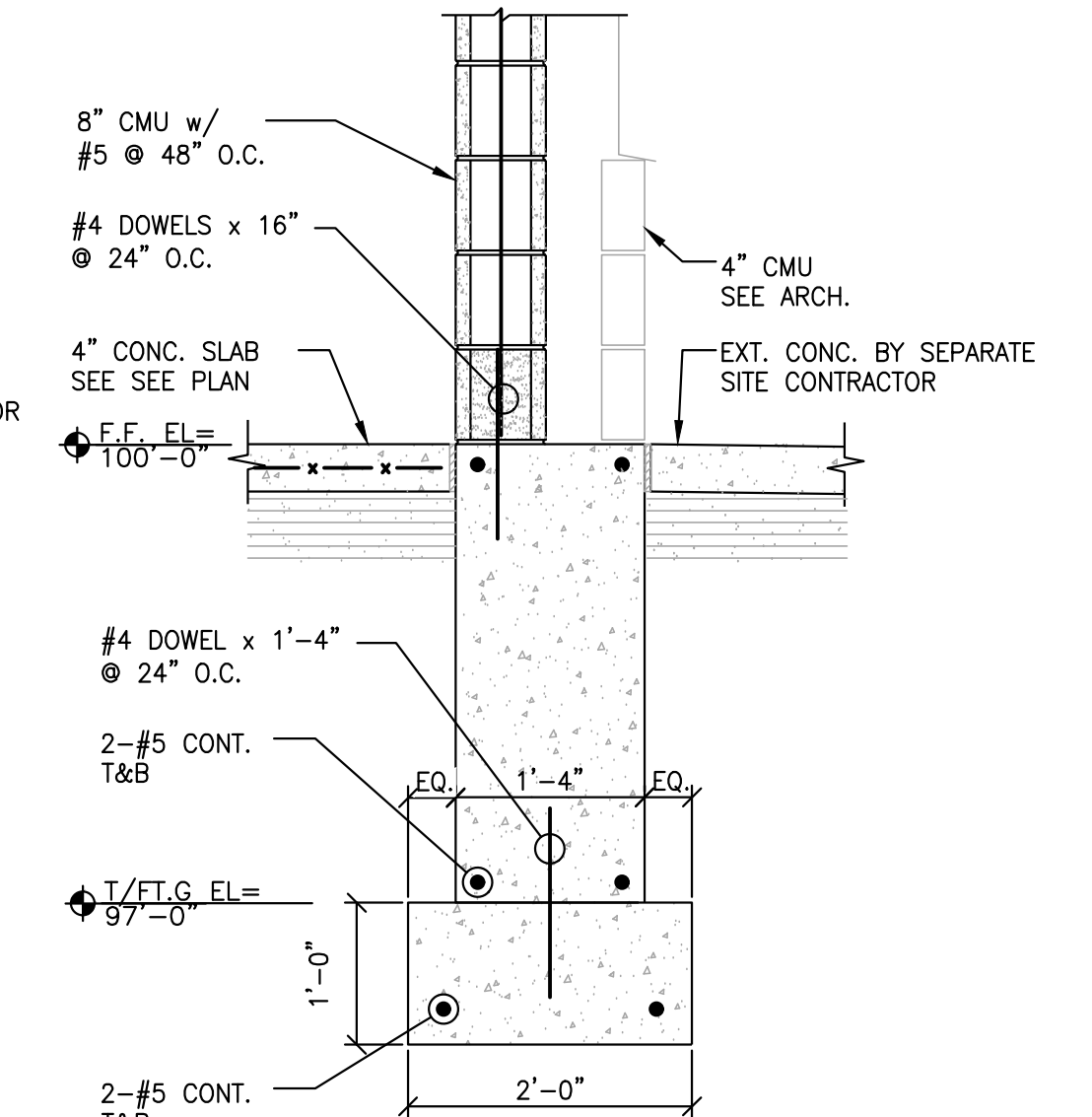
4 SECTION
S1.1 S2.1 SCALE: 3/4" = 1'-0"



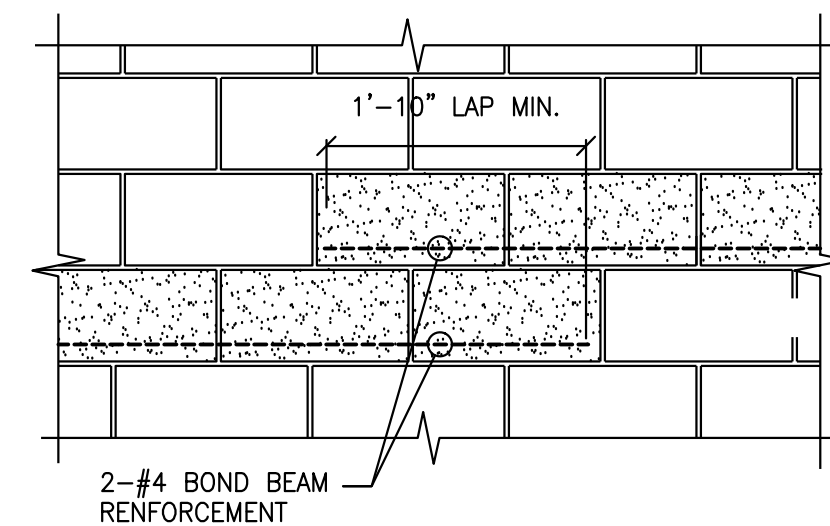
3 SECTION
S1.1 S2.1 SCALE: 3/4" = 1'-0"



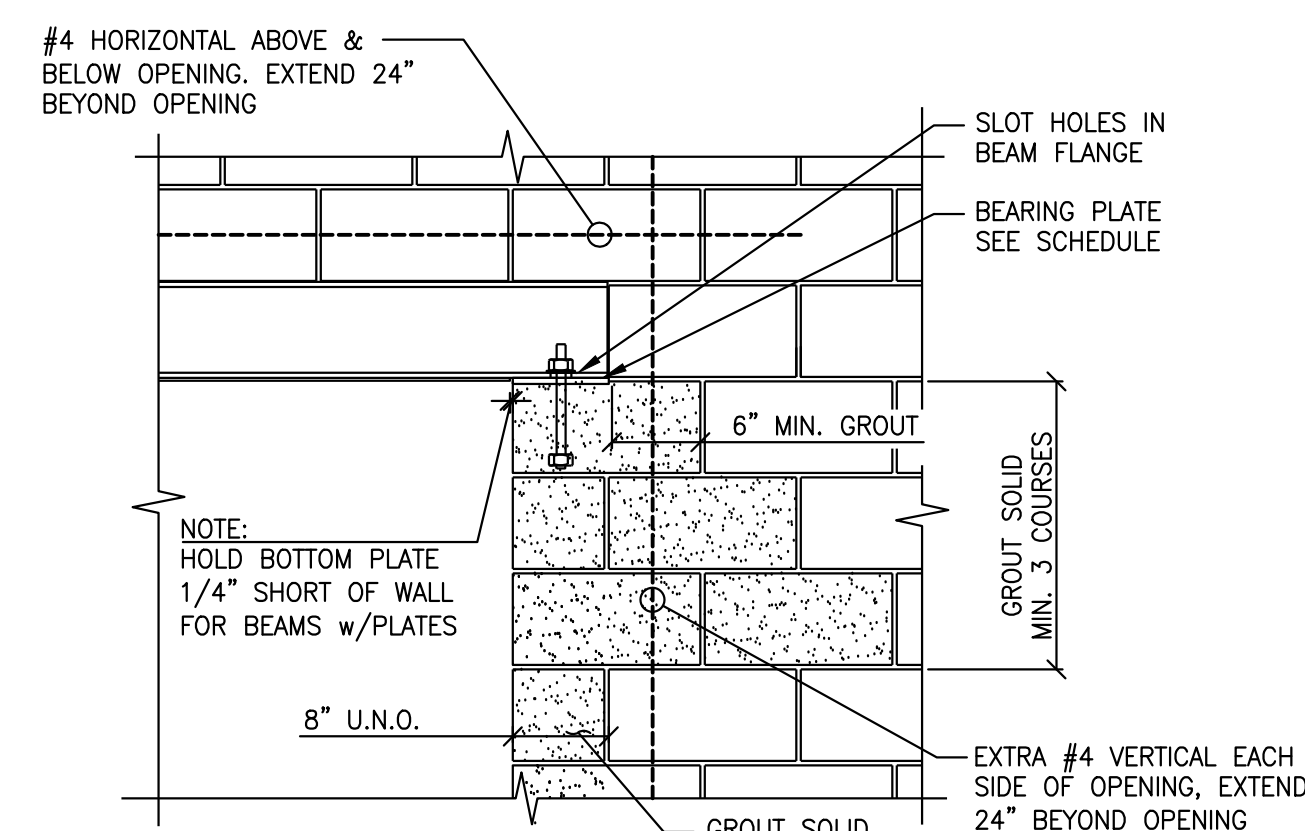
2 SECTION
S1.1 S2.1 SCALE: 3/4" = 1'-0"



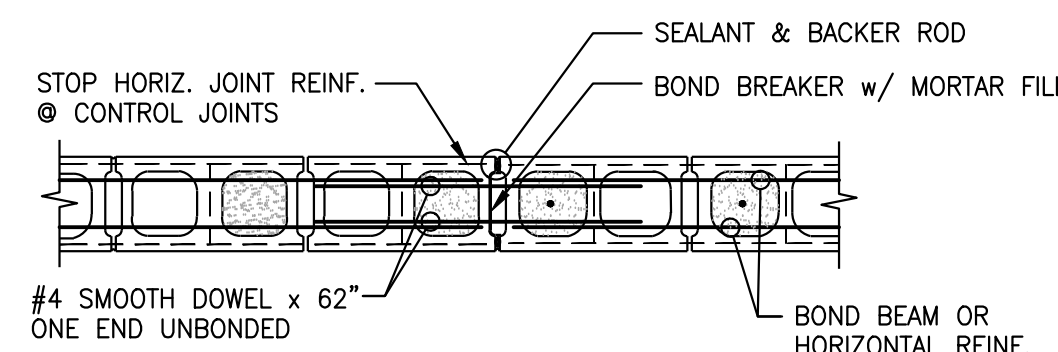
1 SECTION
S1.1 S2.1 SCALE: 3/4" = 1'-0"



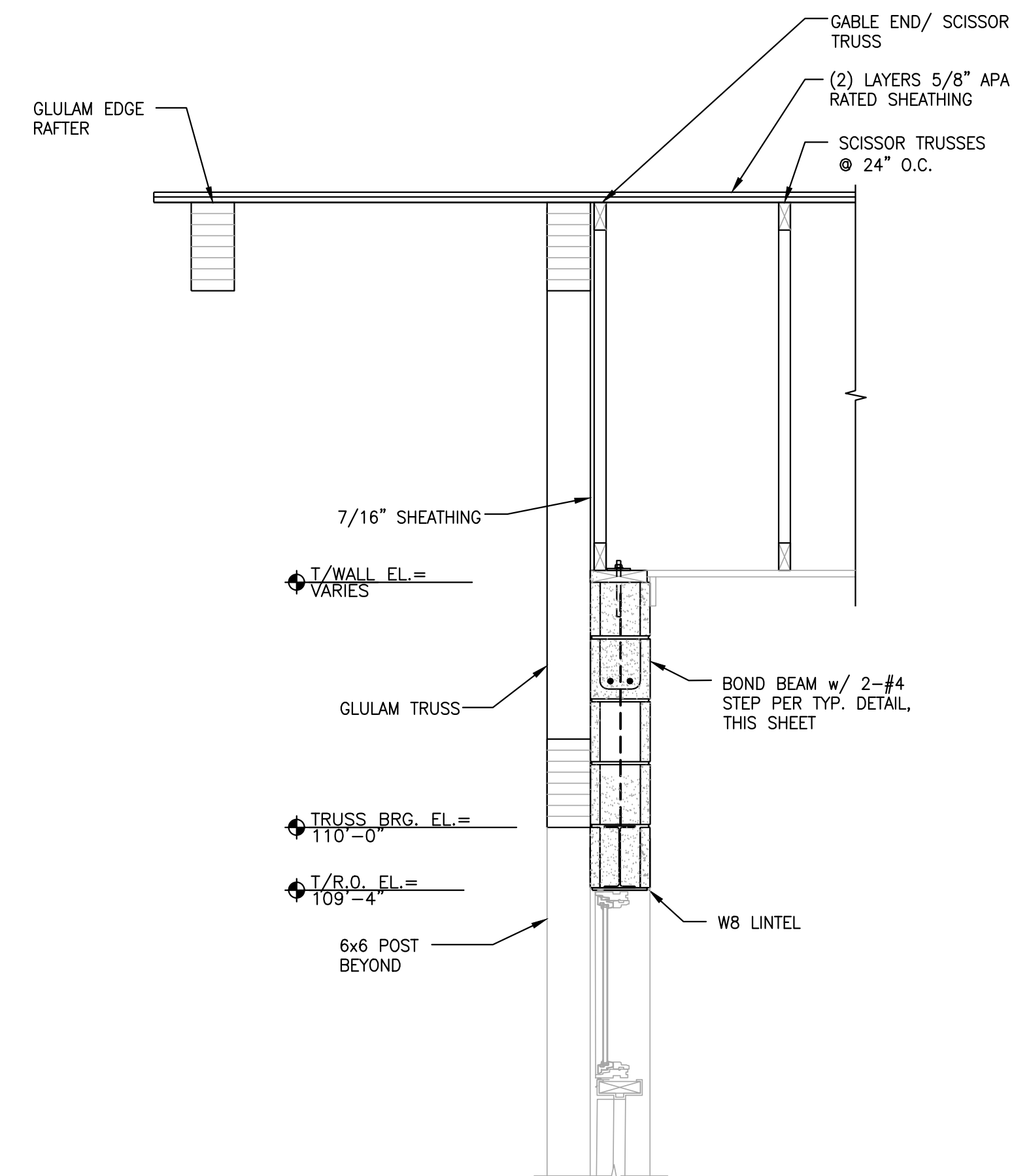
TYP. BOND BEAM STEP DETAIL
S2.1 SCALE: NOT TO SCALE



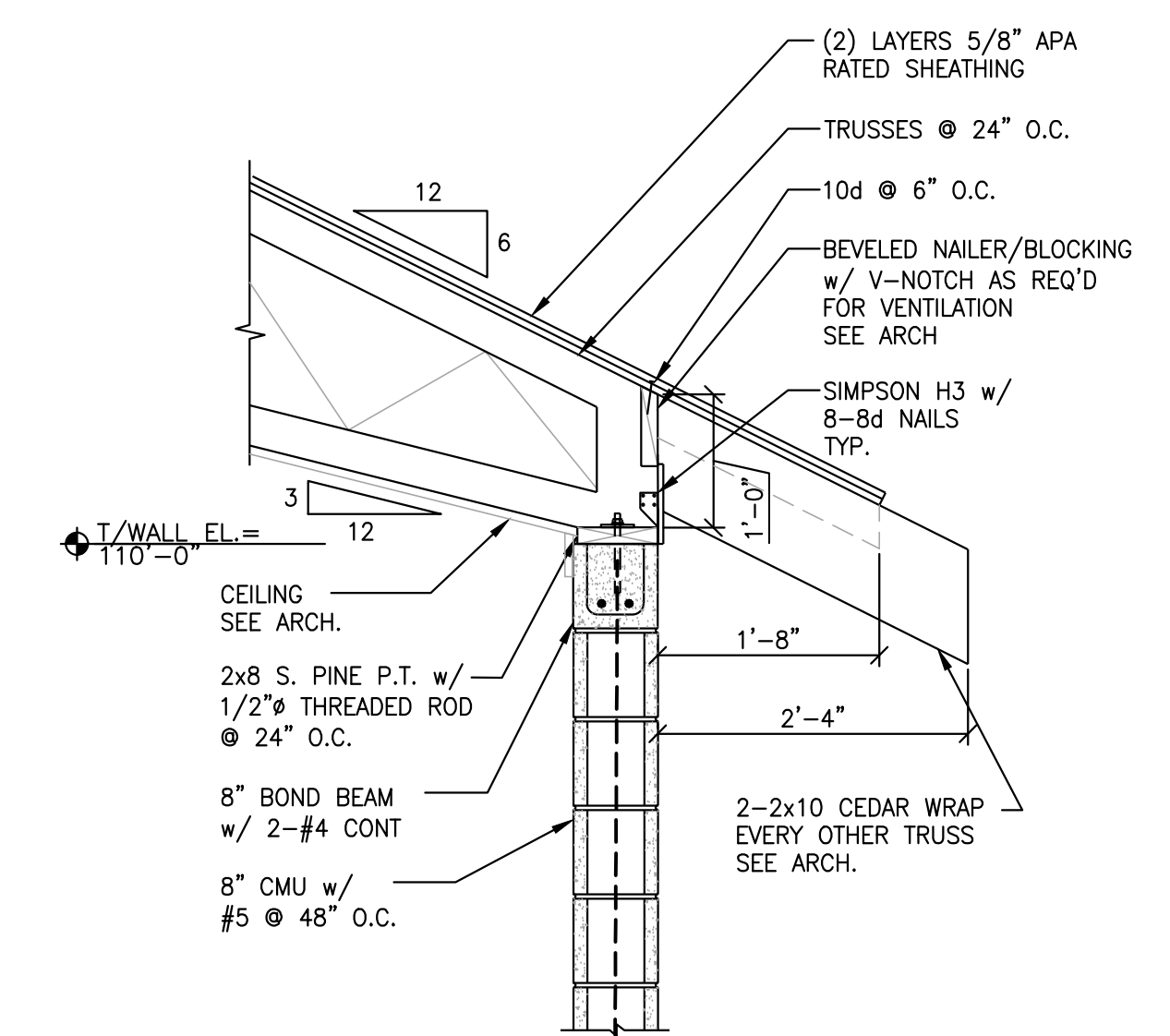
TYP. LINTEL BEARING DETAIL
S2.1 SCALE: NOT TO SCALE



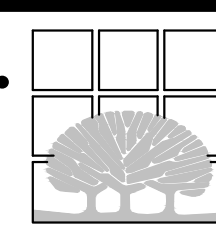
TYP. CMU CONTROL JOINT DETAIL
S2.1 SCALE: NOT TO SCALE



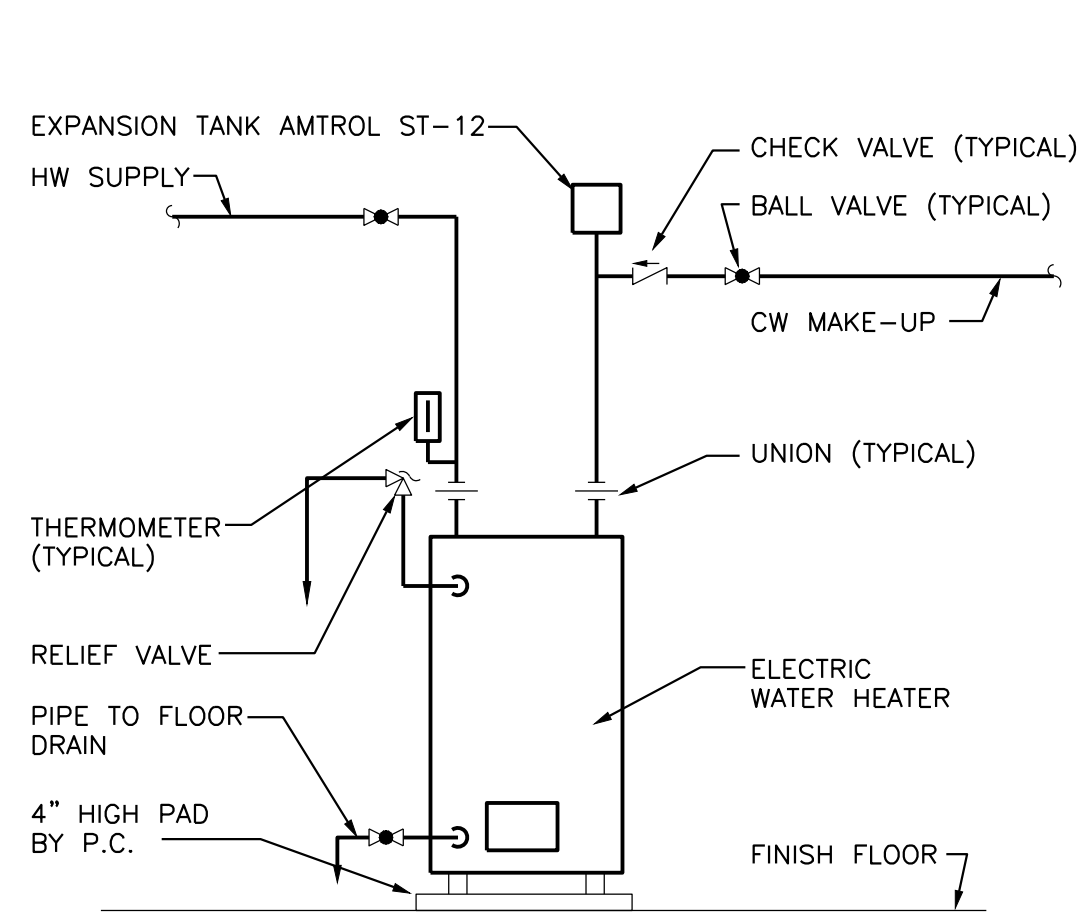
6 SECTION
S1.1 S2.1 SCALE: 3/4" = 1'-0"



5 SECTION
S1.1 S2.1 SCALE: 3/4" = 1'-0"



MINIMUM SIZE CONNECTION					
FIXTURE	SAN.	C.W.	H.W.	VENT	REMARKS
W.C.	4"	1"		2"	
URINAL	2"	3/4"		1 1/2"	WALL MTD.
LAV.	1 1/2"	1/2"	1/2"	1 1/2"	
SERVICE SINK	3"	3/4"	3/4"	1 1/2"	
DF	1 1/2"	1/2"		1 1/2"	



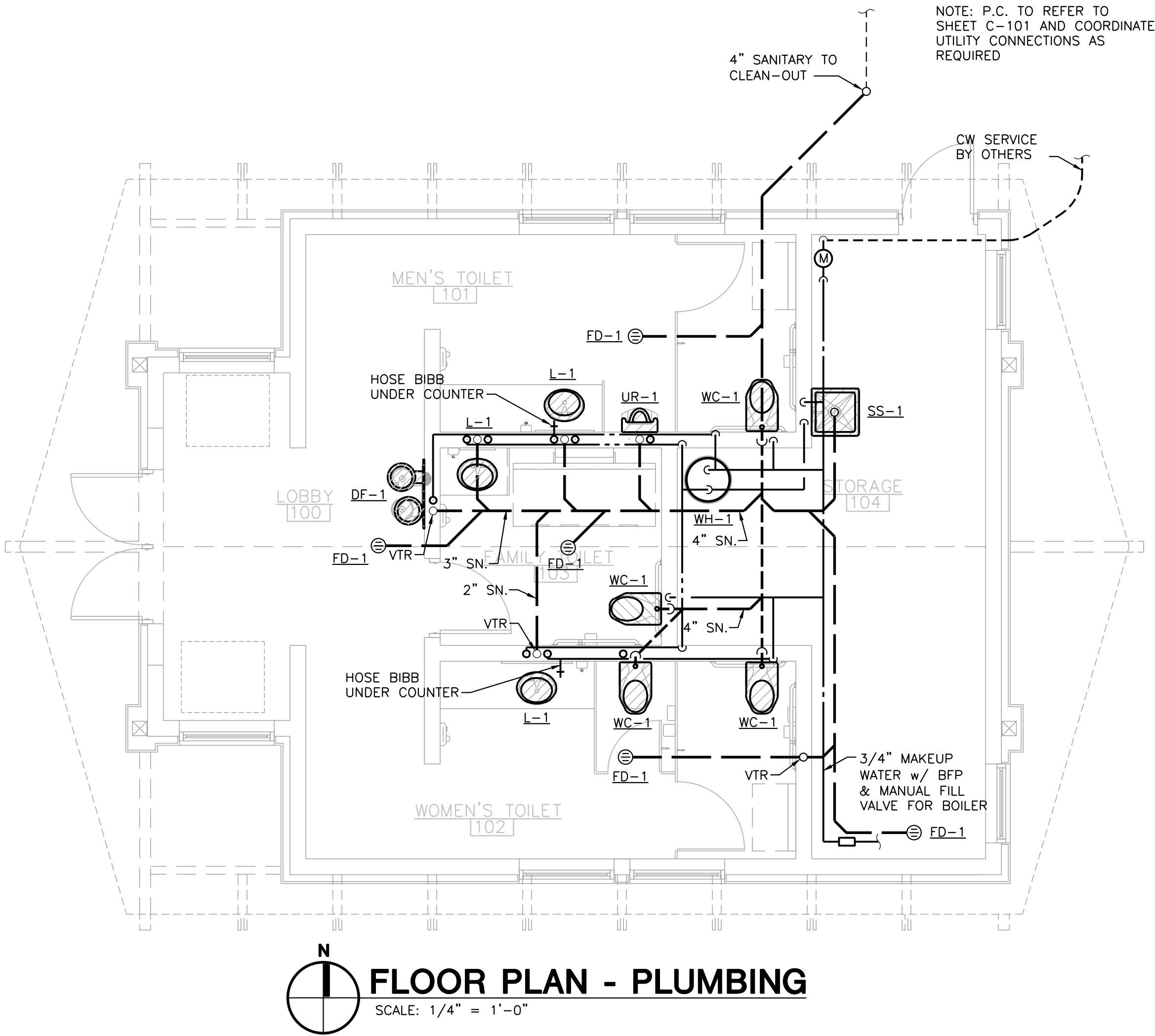
ELECTRIC WATER HEATER PIPING DETAIL
NOT TO SCALE

1. IN CONCEALED LOCATIONS WHERE PIPING IS INSTALLED THROUGH STUDS, JOISTS, OR RAFTERS, PROVIDE A 1/16" THICK STEEL PROTECTIVE SHIELD TO PROTECT THE PIPE FROM PUNCTURES.
2. PROVIDE WATER HAMMER ARRESTERS WHERE QUICK CLOSING VALVES ARE USED, OR AS REQUIRED. ARRESTERS SHALL CONFORM TO ASSE 1010 AND ACCESS SHALL BE PROVIDED TO EACH ARRESTER.
3. ALL PLUMBING VENTS THROUGH THE ROOF TO BE INSTALLED A MINIMUM OF 10'-0" AWAY FROM ALL FRESH AIR INTAKE OPENINGS.
4. DO NOT INSTALL ANY PIPING AROUND ELECTRICAL EQUIPMENT TO INSURE ALL CODE REQUIRED CLEARANCES. SEE ELECTRICAL PLANS FOR THESE LOCATIONS.
5. REFER TO MINIMUM SIZE CONNECTION SCHEDULE FOR ALL PLUMBING FIXTURES BRANCH PIPING SIZES.
6. PROVIDE IDENTIFICATION ON ALL SHUT-OFF VALVES SERVING WALL HYDRANTS AND HOSE BIBBS. IDENTIFY ALL OTHER VALVES THAT ARE NOT ADJACENT TO THE FIXTURE THEY SERVE.
7. PROVIDE A TEMPERING VALVE AT ALL ACCESSIBLE HANDWASHING FIXTURES THAT CONFORMS TO ASSE 1070.
8. ALL DOMESTIC PIPING TO BE TYPE 'L' COPPER, INSULATED TO MEET CODE.
9. ALL SANITARY PIPING TO BE SCHEDULE 40 PVC.
10. VENTING SHALL BE INSTALLED IN ACCORDANCE WITH CODE.
11. PROVIDE DRAIN VALVES AT ALL LOW POINTS OF PIPING SYSTEM TO ALLOW FOR FULL DRAINDOWN AND WINTERIZATION OF DOMESTIC PIPING.

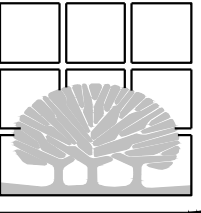
PLUMBING NOTES

PLUMBING FIXTURE LIST

- WC-1** WALL HUNG, VITREOUS CHINA, SIPHON JET, ELONGATED BOWL, BOLT CAPS, 16 1/8" RIM HEIGHT, 1 1/2" TOP SPUD, KOHLER MODEL K-4325. PROVIDE WITH SLOAN FLUSH VALVE, 1.6 GPF, AND WHITE SOLID PLASTIC OPEN FRONT SEAT, LESS COVER, BEMIS 1955CT. PROVIDE WITH JAY R SMITH ADJUSTABLE FIXTURE SUPPORT.
- UR-1** WALL MOUNTED, VITREOUS CHINA, SIPHON JET, WITH 3/4" TOP SPUD AND 2" OUTLET. KOHLER 4991-ET-0 BARDON. PROVIDE WITH FLUSH VALVE, 1.0 GPF. AND CONCEALED WALL SUPPORT CARRIER. MOUNTING HEIGHT TO BE 15" MAXIMUM TO RIM OF FIXTURE.
- L-1** SOLID SURFACE COUNTERTOP WITH INTEGRAL BOWL PROVIDED BY G.C.. PROVIDE FAUCET WITH 0.5 GPM AERATOR SLOAN MODEL SF-2300 DECK MOUNTED MID-INTEGRATED BASE BODY WITH BACK-CHECK TEE AND BELOW DECK MANUAL MIXING VALVE. 3/8" LOOSE KEY OPERATED ANGLE STOPS, PERFORATED DRAIN STRAINER AND TRAP ASSEMBLY WITH PROTECTIVE PIPE COVERS. PROVIDE A TEMPERING VALVE AT ALL ACCESSIBLE HANDWASHING FIXTURES THAT CONFORMS TO ASSE 1070.
- SS-1** FLOOR MOUNTED, PRECAST, ONE PIECE MOLDED STONE WITH BUMPER GUARD ON TWO SIDES. 24"X24"X10" MUSTEE 63M PROVIDE WITH WALL MOUNTED COMBINATION FITTING WITH INTEGRAL STOPS, VACUUM BREAKER, WALL BRACE, PAIL HOOK, MOP HANGER, HOSE AND HOSE BRACKET, CHICAGO FAUCET 897MPRCF.
- DF-1** WALL MOUNTED, BARRIER FREE, BI-LEVEL DRINKING FOUNTAIN WITH BOTTLE FILLING STATION. MOST DEPENDABLE FOUNTAINS MODEL 10485 WM. NO OTHER MANUFACTURERS ARE ALLOWED. INSTALL IN STRICT ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. PROVIDE WITH OPTIONAL ACCESS PANEL TO BE MOUNTED IN ROOM BEHIND UNIT.
- FD-1** CAST IRON FLOOR DRAIN WITH FLANGE, INTEGRAL REVERSIBLE COLLAR, SEEPAGE OPENINGS AND 5" ROUND ADJUSTABLE NICKEL BRONZE STRAINER TOP, JAY R SMITH MODEL 2031S. PROVIDE A TRAP SEAL CONFORMING TO ASSE 1018 OR ASSE 1044, ON ALL TRAPS SUBJECT TO LOSS BY EVAPORATION, EQUAL TO JAY R SMITH MODEL 2692.
- WH-1** WATER HEATER, ELECTRIC TANK TYPE, 30 GALLON, 4500W NON-SIMULTANEOUS ELEMENTS, 208/1/60, 48 GPH FIRST HOUR DELIVERY, 21 GPH RECOVERY AT 90 DEGREE RISE, EQUAL TO A.O. SMITH MODEL ENT-30+, FURNISHED WITH ALL SAFETY AND OPERATING CONTROLS, INCLUDING ASME P&T VALVE.



FLOOR PLAN - PLUMBING
SCALE: 1/4" = 1'-0"

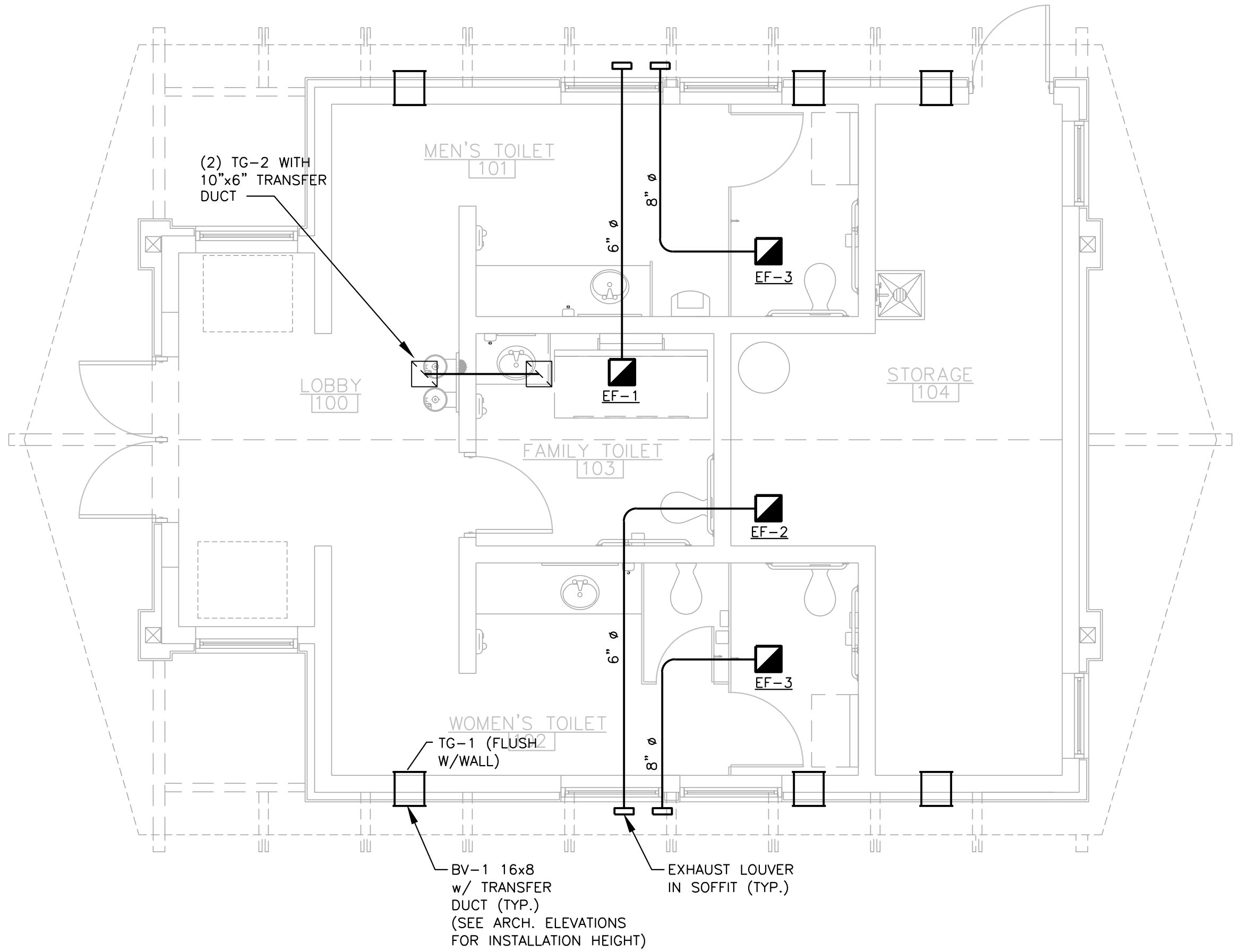
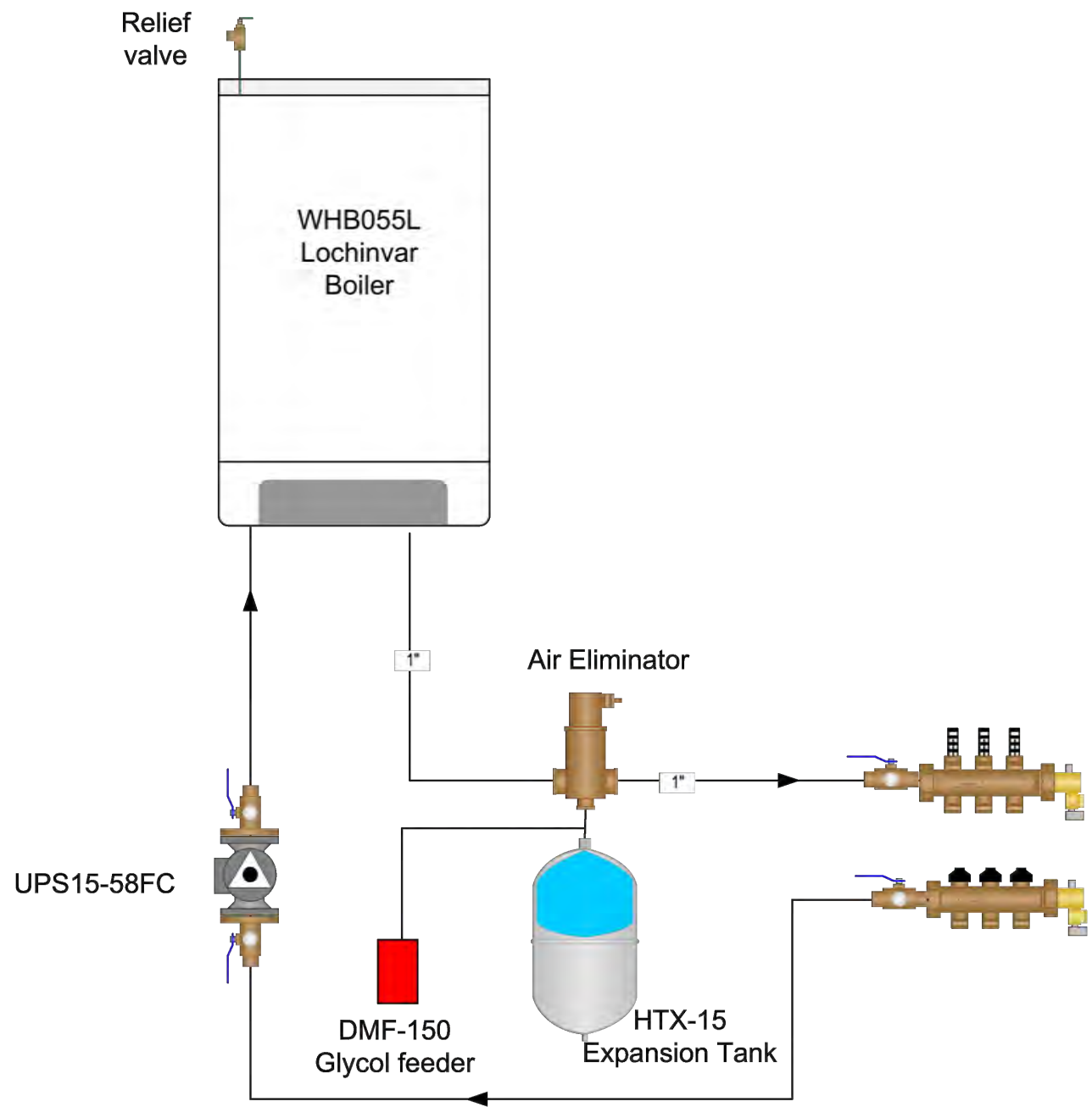


GRILLE, REGISTER AND DIFFUSER SCHEDULE					
MARK	SERVICE	MODEL	VOLUME DAMPER	FINISH	REMARKS
BV-1	BRICK VENT	BV168	---	ANODIZED	(1)
TG-1	SIDEWALL TRANSFER GRILLE	TG	---	ANODIZED	(1)
TG-2	CEILING TRANSFER GRILLE	RH45	---	ANODIZED	(1)

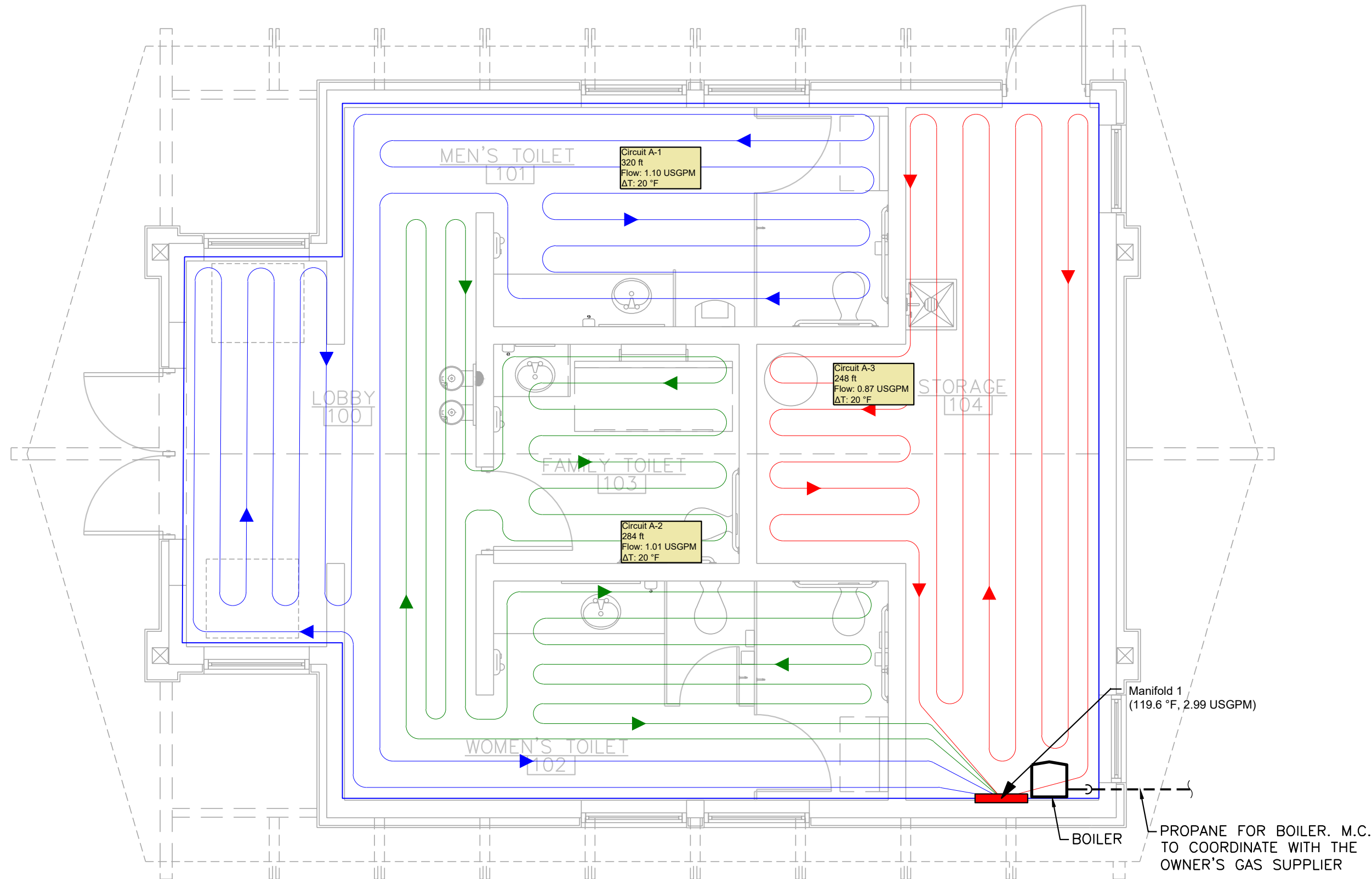
(1) BASED ON HART & COOLEY

FAN SCHEDULE											
MARK	SERVICE	MODEL	CFM	S.P.	HP/AMPS.	RPM	T.S./O.V.	WHEEL DIA.	SONES	VOLTAGE	REMARKS
EF-1	SEE PLAN	L100	100	0.25"	1.3 AMP	---	---	---	2.5	120V-1PH	(2)(1)
EF-2	STORAGE 103	L150	150	0.25"	1.8 AMP	---	---	---	3.2	120V-1PH	(2)(1)
EF-3	SEE PLAN	L300	300	0.25"	212W	---	---	---	3.4	120V-1PH	(2)(1)

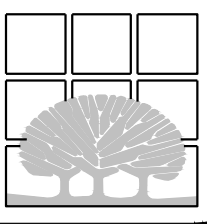
- (1) BASIS OF DESIGN: BROAN, PROVIDE WITH INSULATED HOUSING, BACKDRAFT DAMPER WITH DISCHARGE LOUVER
(2) FAN TO RUN OFF OCCUPANCY SENSOR, PROVIDED AND INSTALLED BY E.C.



FLOOR PLAN - MECHANICAL
SCALE: 1/4" = 1'-0"



FLOOR PLAN - MECHANICAL
SCALE: 1/4" = 1'-0"



GENERAL LIGHTING NOTES:

- CONNECT EMERGENCY LIGHTING TO CIRCUIT FEEDING GENERAL LIGHTING IN THAT AREA.
- EXIT SIGNS TO BE CONNECTED TO UNSWITCHED LIGHTING CIRCUIT OR EMERGENCY LIGHTING CIRCUIT FEEDING THAT AREA.

LIGHTING KEY NOTES:

- PROVIDE MOTION/PHOTOCELL SENSOR TO CONTROL EXTERIOR LIGHT- ACUITY NIO PC KIT OR EQUAL.
- PROVIDE OCCUPANCY SENSOR WALL SWITCH IN ALL FAMILY TOILETS WITH VANDAL-RESISTANT LENS - ACUITY: WSXA OR EQUAL. AUTO ON AND AUTO FULL OFF AFTER 20 MINUTES.
- PROVIDE CEILING OCCUPANCY SENSOR WITH PROPER COVERAGE IN MEN & WOMEN TOILETS - ACUITY: NCM OR EQUAL. AUTO ON AND PARTIAL AUTO OFF AFTER 20 MINUTES. PROVIDE WIRE GUARD OVER SENSOR - ACUITY: WG1 OR EQUAL.

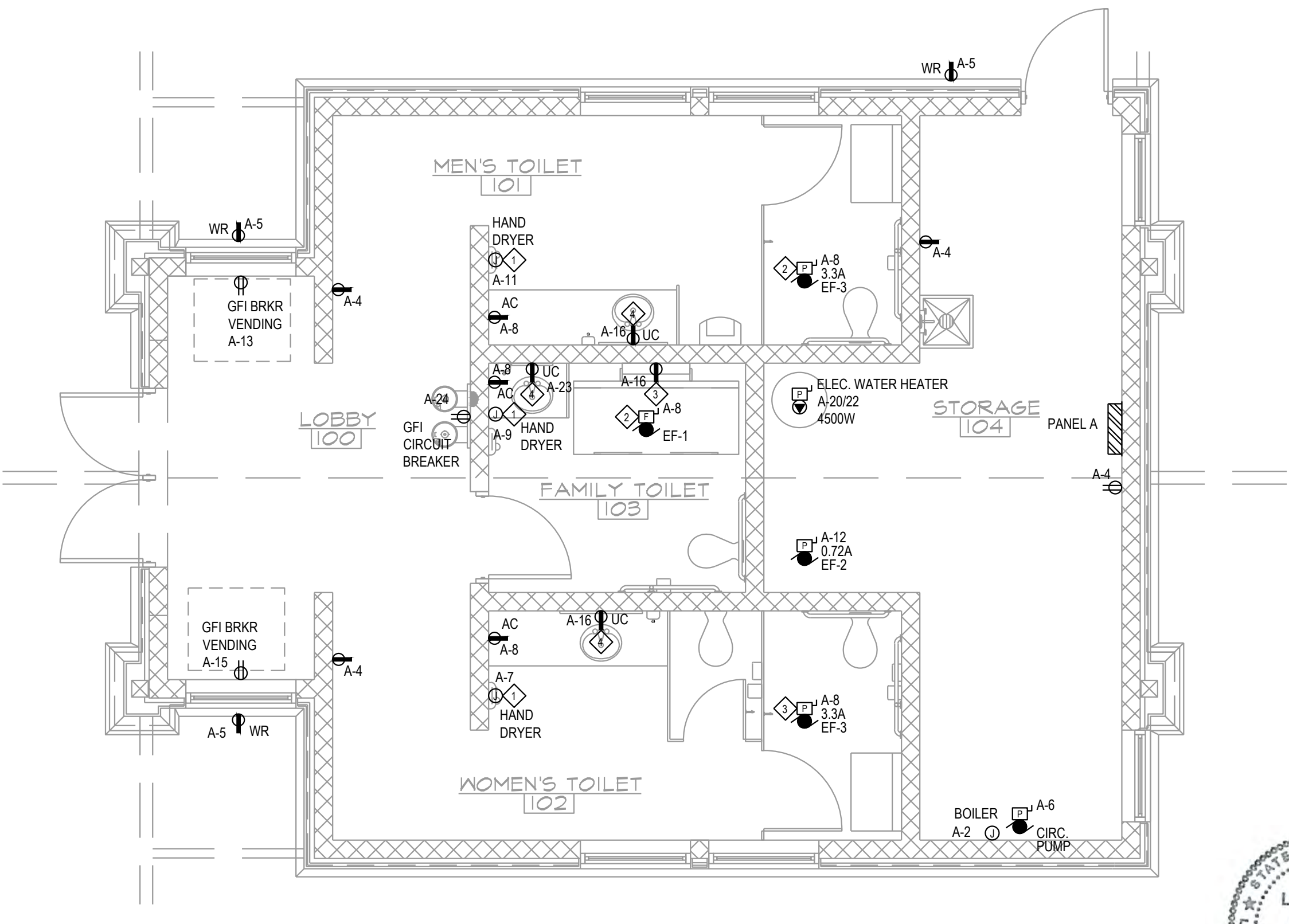
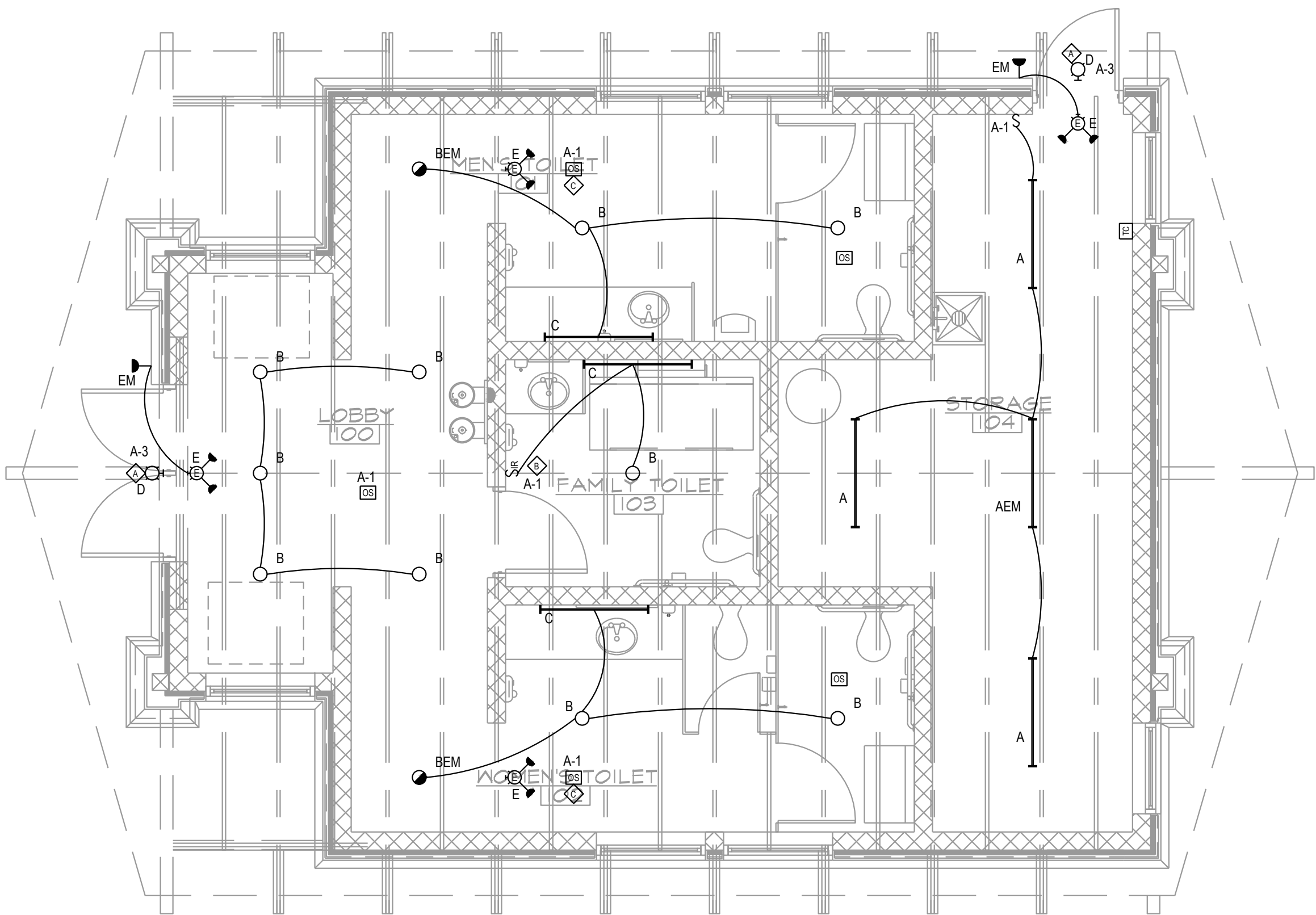
LIGHT FIXTURE LEGEND								
FIXTURE TYPE	DESCRIPTION	MANU.	CATALOG PART#	FINISH	VOLTAGE	LAMPS	Voltage	REMARKS
A	4' VANDAL RESISTANT LED STRIP LIGHT POLYCARBONATE LENS	ACUITY	LVP52 4FT MIN 10 40W/30K 120V CLP VMT	WHITE	120	LED 35000K	40W	
AEM	4' VANDAL RESISTANT LED STRIP LIGHT POLYCARBONATE LENS	ACUITY	LVP52 4FT MIN 10 40W/30K 120V CLP VMT EM310	WHITE	120	LED 35000K	40W	
B	6" VANDAL-RESISTANT DOWNLIGHT POLYCARBONATE LENS IC RATED	KIRLIN	LRC-06VND-IC-1000L-120-RVF-MFL-80CRI-35K	WHITE	120	LED 35000K	10W	
BEM	6" VANDAL-RESISTANT DOWNLIGHT POLYCARBONATE LENS IC RATED	KIRLIN	LRC-06VND-IC-1000L-120-RVF-MFL-80CRI-35K EM	WHITE	120	LED 3500K	10W	
C	4' VANDAL RESISTANT LED STRIP LIGHT POLYCARBONATE LENS WITH BATTERY BACK UP	ACUITY	LVP524-4FT-NODIM-50W-35K-MVOLT-CLP-VMT	WHITE	120/277	LED 35000K	50W	MOUNT ABOVE MIRROR
D	WALL PACK VANDAL RESISTANT	HUBBELL	LNC2-1BL-18L-U-4K-035-3-1-XX-PCU	TBD	120/277	LED 35000K	53.7	CONTROL WITH PHOTOCELL
E	EXIT VANDAL RESISTANT COMBO	HUBBELL	COMPASS CCRSD	WHITE	120/277	LED		
EM	REMOTE HEAD WITH WIREGUARD	HUBBELL	COMPASS CIRS WIGEL	WHITE	120/277V	LED		
WIRE ALL EMERGENCY LIGHTING TO CIRCUIT FEEDING LIGHTING IN AREA AHEAD OF SWITCHING								

GENERAL POWER NOTES:

- MOUNT PANELS, TRANSFORMERS, DISCONNECT SWITCHES, AND COMBINATION MOTOR STARTERS WITH ADEQUATE CLEARANCES IN ACCORDANCE WITH NEC 110.

POWER KEYNOTES:

- ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL HAND DRYERS, EXCEL - XLERATOR MODEL XL-W SURFACE MOUNT, NO-TOUCH CONTROL, WHITE COVER, 115V 20A 1450 W.
- EXHAUST FAN AND LIGHT FIXTURE(S) IN ROOM SHALL BE CONTROLLED TOGETHER. PROVIDE SENSOR RATED FOR MOTOR AND LIGHTING LOAD. REFER TO LIGHTING PLAN FOR CIRCUIT INFORMATION.
- OUTLET FOR ADULT POWERED CHANGING TABLE. MOUNT OUTLET AT STANDARD HEIGHT.
- OUTLET MOUNTED UNDER SINK FOR HARDWIRED SENSOR FAUCETS. PROVIDE GFI BREAKER. CONNECT ALL THREE FAUCETS TO A SINGLE ADAPTOR IN MEN AND WOMEN TOILETS. PROVIDE GANG ADAPTOR KIT AND CABLES SLOAN SFP-35-A. REFER TO P-1 PLAN FOR MODEL NUMBER.



Ottawa Sands Park Restroom Building
Ottawa County Parks & Recreation



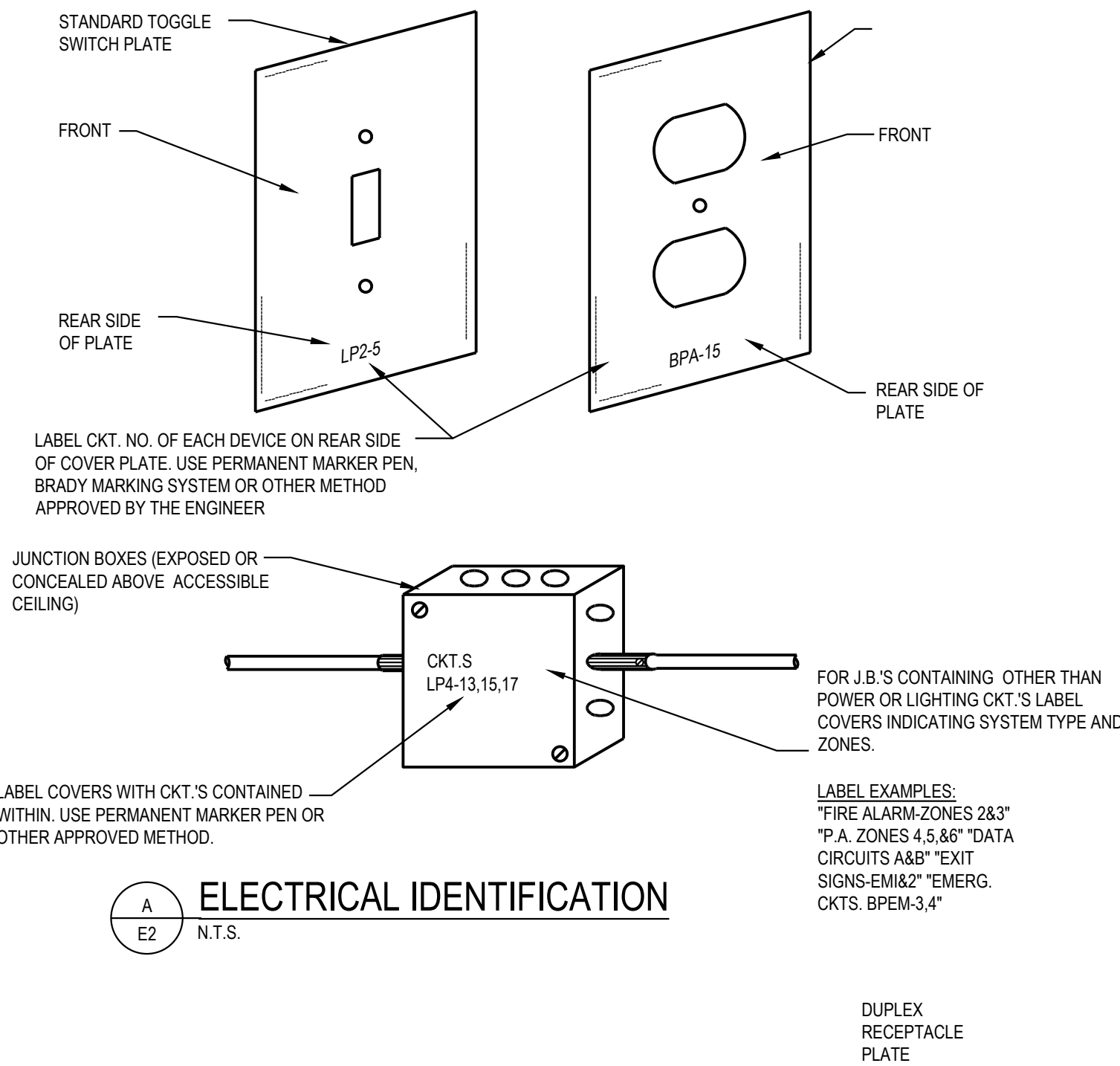
MCSA GROUP, INC.
Landscape Architecture • Park & Recreation Planning • Architecture
Downtown Planning • Interior Design • Sports Facility Planning
529 Greenwood Avenue S.E. • East Grand Rapids, MI 49506
616-451-3346 • FAX: 616-451-1935 • EMAIL: tas@mcsagroup.com

SCALE:
1/4"=1'-0"

Floor Plan - Power/Lighting

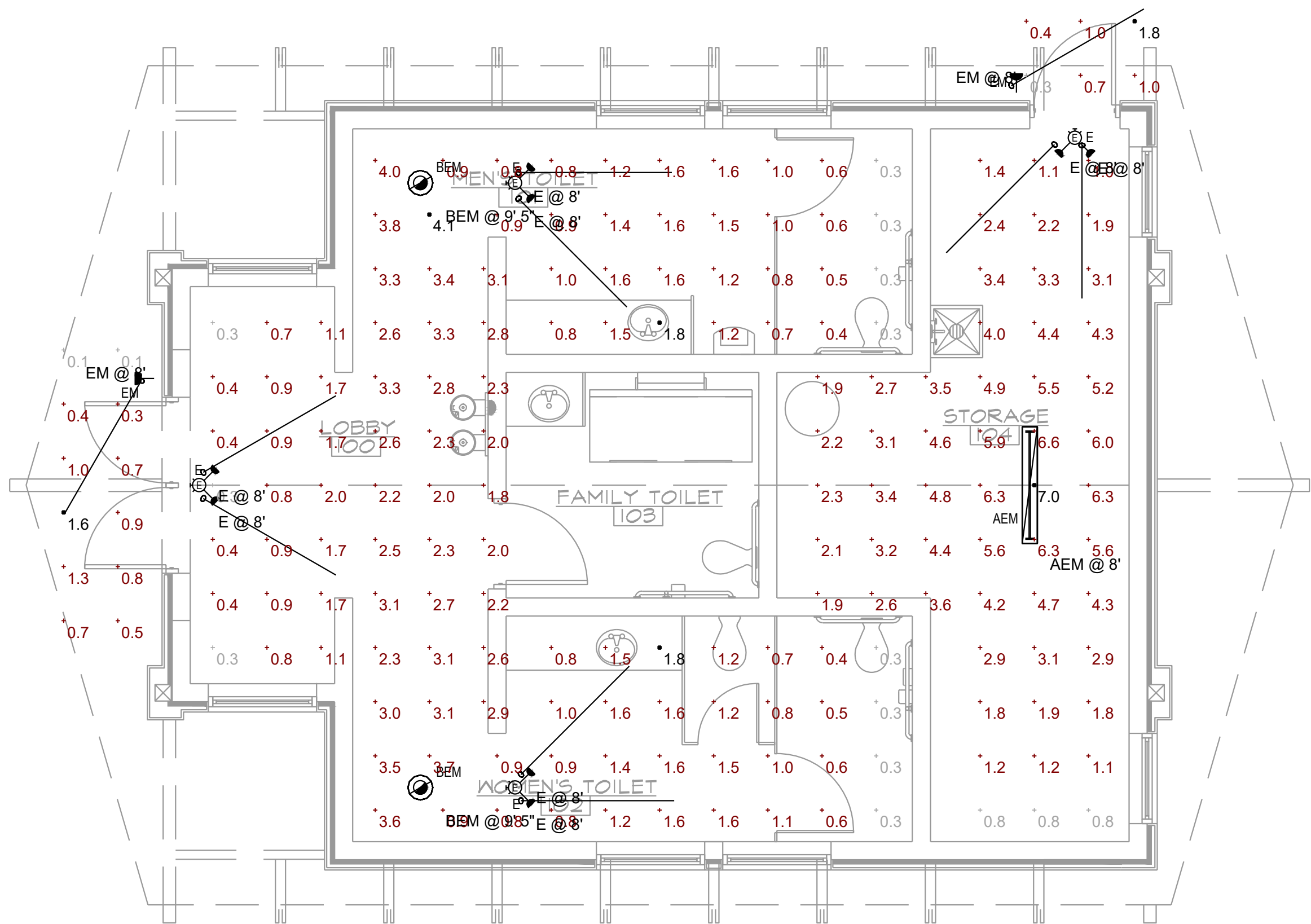
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Bid Set

PROJECT NO.
1227
SHEET NO.
E1



ELECTRICAL SYMBOL LEGEND		
SYMBOL	DESCRIPTION	MTG. HT. TO CL
S S3	SINGLE POLE OR 3-WAY SWITCH-SPECIFICATION GRADE	46"
S D	DIMMER SWITCH	46"
S IR	IR SWITCH	46"
OS	OCCUPANCY SENSOR	
PC	PHOTO CELL	
TC	TIME CLOCK	---
WR	WATER RESISTANT GROUND FAULT CIRCUIT INTERRUPTER WITH WEATHERPROOF WHILE IN USE COVER	18"
⌚	DUPLEX OUTLET-SPEC. GRADE CIRCLE AROUND SYMBOL= CEILING MOUNTED	18"
⌚	SPECIAL SINGLE RECEPTACLE	18"
⌚	SPECIAL OUTLET-CHARACTERISTICS AS NOTED ON PLANS	AS NOTED
⌚	JUNCTION BOX-4" SQ. BOX W/ 2 GANG RAISED COVER, 1"C. UP WALL TO CLG. SPACE UNLESS OTHERWISE NOTED	AS NOTED
F	FUSED DISCONNECT SWITCH-FDS-HEAVY DUTY	46"
F	NON-FUSED DISCONNECT SWITCH-NFDS-HEAVY DUTY	46"
F	SW. AND PLUGFUSE HOLDER- BUSSMANN "SSU" & FUSESTAT FUSE	AT EQUIP.
⌚	SINGLE PHASE ELECTRIC MOTOR	---
⌚	SURFACE OR FLUSH MTD. BRANCH CIRCUIT PANELBOARD	72" TO TOP
T	TRANSFORMER	---
⌚	PUSH BUTTON	46"
⌚	THERMOSTAT. E.C TO ROUGH-IN SINGLE GANG BOX AND 1/2"C. TO ACCESSIBLE CEILING SPACE.	46"
⌚	HUMIDISTAT. E.C TO ROUGH-IN SINGLE GANG BOX AND 1/2"C. TO ACCESSIBLE CEILING SPACE.	46"
⊗	RECESSED DOWNLIGHT LUMINAIRE	---
⊙	SURFACE LUMINAIRE	---
⊙	PENDANT LUMINAIRE	---
⌚	WALL MOUNTED LUMINAIRE	---
⌚	SITE LIGHTING LUMINAIRE	---
⌚	STRIP LUMINAIRE	---
⌚	PARTIALLY SHADED LUMINAIRE OR WITH "E" SUFFIX ARE EMERGENCY	---
⌚	EXIT SIGN - WALL MOUNTED OR CEILING MOUNTED ARROWS INDICATE PATH OF EGRESS	---
⌚	REMOTE EMERGENCY HEAD	---
⌚	BATTERY EMERGENCY LUMINAIRE	---
⌚	CEILING SPEAKER	---
⌚	CARD READER	46"
⌚	SECURITY DOOR CONTACT	AT DOOR HEAD
⌚	SECURITY CAMERA - "W" DENOTES WALL MOUNTED	TYPICALLY CLG MOUNTED

SYMBOL NOTES:
1. "AC" DENOTES ABOVE COUNTER. COORDINATE HEIGHT WITH ARCHITECT.
2. "H" DENOTES HORIZONTAL MOUNTING OF DEVICE.
3. "W" DENOTES WALL MOUNTED AT 46" AFF.
4. "B" DENOTES MOUNTED IN BASE.
5. "F" DENOTES MOUNTED IN FACE OF CABINETS.



FLOOR PLAN - PHOTOMETRICS
SCALE: 1/4" = 1'-0"

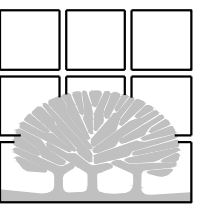
Schedule									
Symbol	Label	Image	QTY	Manufacturer	Catalog	Number	Lamp	LLF	Description
⌚	BEM		2	Luminaire LED	ARV13 25W 40K OP	144	17	0.34	Luminaire LED, Inc. - Round ceiling surface mount luminaire. Product ID: ARV13-25W-4000K OP Brown painted aluminum cast housing with linear prismatic white plastic bowl lens. 144 LEDs mounted in circular array on white PCB mounted on white painted base plate. One AC Electronics LED driver. Model AC-250700AUZ. Operating at 120 Vac and 60 Hz with dimming disconnected.
⌚	AEM		1	COLUMBIA LIGHTING	LXEM-3SLW-RFP-EDU	1	3850	0.34	LXEM Led Enclosed and Gasketed, Extreme Environment 7" x 51" led with ribbed frosted polycarbonate lens Data Scaled from Test# 16.02870
⊙	E	EXIT	4	Lithonia Lighting	LHQM LED	1	Absolute	1	QUANTUM LED EMERGENCY COMBO (ONE HEAD ONLY)
⊙	EM		2	Lithonia Lighting	ELA Q L0304	1	80	1	ELM2 LED REMOTE LAMP HEAD

Statistics						
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
LOBBY EXTERIOR	+	0.7 fc	1.6 fc	0.1 fc	16.0:1	7.0:1
MEN'S 101	+	1.9 fc	1.9 fc	0.3 fc	6.0:1	3.3:1
STORAGE 104	+	3.4 fc	7.0 fc	0.8 fc	8.6:1	4.3:1
STORAGE EXTERIOR	+	0.9 fc	1.8 fc	0.3 fc	6.0:1	3.0:1
WOMEN'S 102	+	1.0 fc	1.8 fc	0.3 fc	6.0:1	3.3:1
LOBBY 106	+	2.1 fc	4.1 fc	0.3 fc	13.7:1	7.0:1

Ottawa Sands Park Restroom Building
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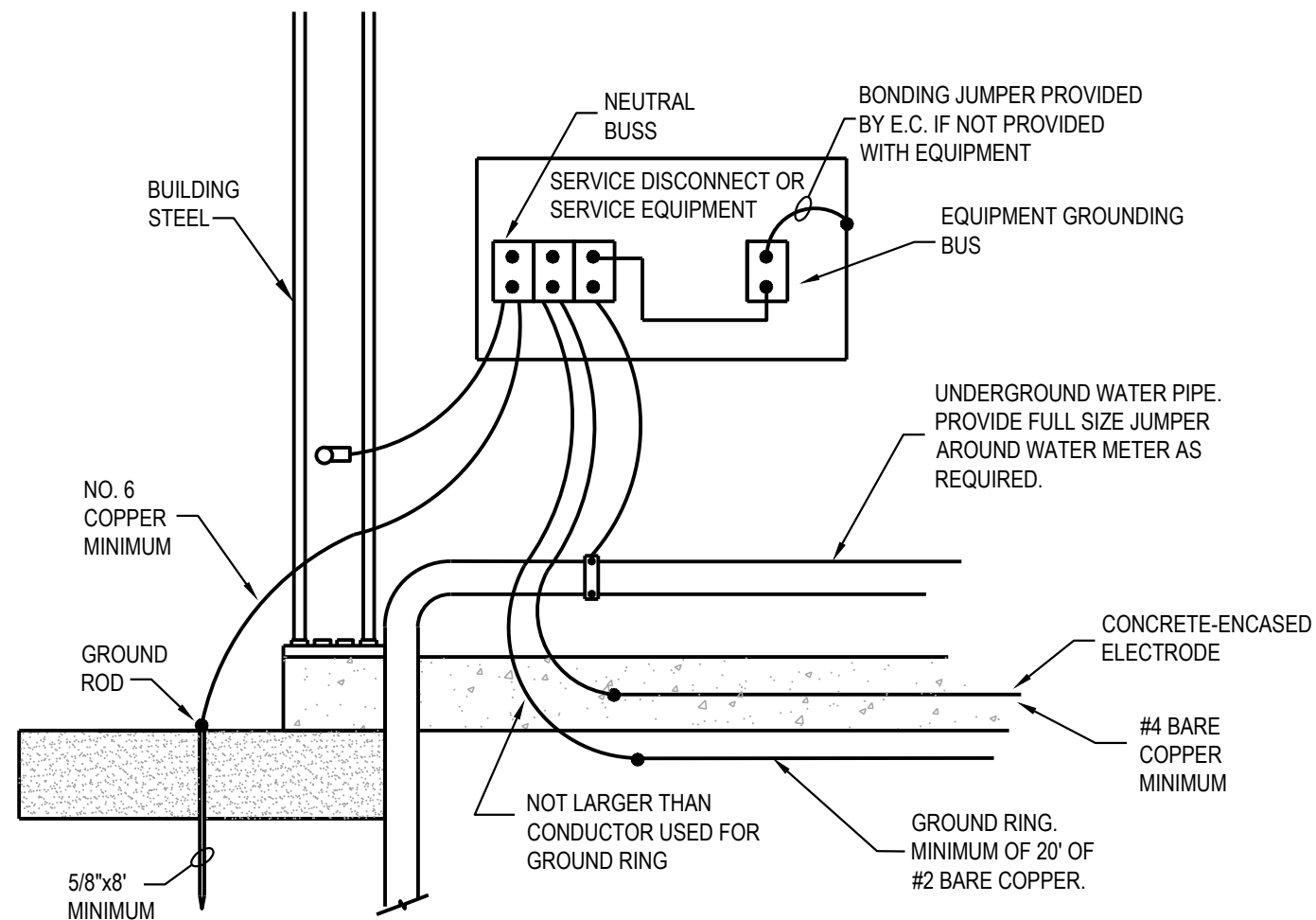
SCALE:

Legend, Details & One Line

DATE
11-08-2023
REVISIONS
Bid Set

PROJECT NO.
1227
SHEET NO.
E2



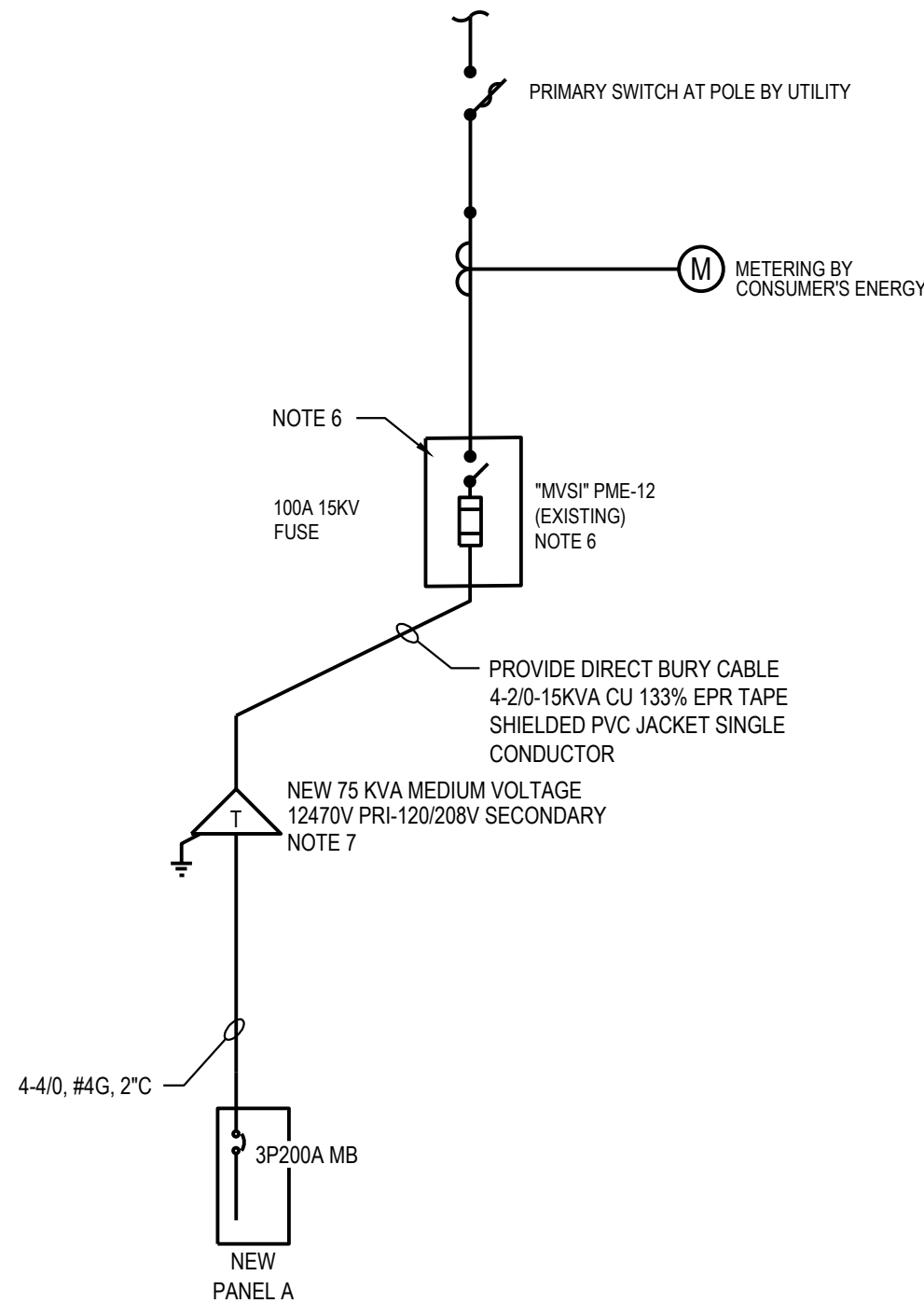


GROUNDING ELECTRODE SYSTEM

- REFER TO NATIONAL ELECTRIC CODE FOR ALL REQUIREMENTS FOR A PROPERLY GROUNDED SYSTEM.
- ALL GROUND CONDUCTORS TO BE SIZED ACCORDING TO ART. 250 OF THE NATIONAL ELECTRIC CODE.

ONE LINE GENERAL NOTES:

- REFER TO WIRE SIZING CHART. COPPER OR ALUMINUM MAY BE UTILIZED AT CONTRACTORS DISCRETION UNLESS NOTED OTHERWISE. COORDINATE ROUTING WITH TRADES ON SITE.
- PROVIDE HAZARD LABELS PER CODE MEETING ANSI Z535.4
- PANELBOARD MANUFACTURER IS REQUIRED TO RUN ARC FLASH CALCULATIONS AND PROVIDE LABELING ON PANELS PER NEC 70 2011 CODE.
- ELECTRICAL CONTRACTOR SHALL PROVIDE ALL DISCONNECTS (HEAVY DUTY) AND FUSES UNLESS OTHERWISE NOTED. COORDINATE WITH MECHANICAL EQUIPMENT FOR EXACT FUSE SIZES.
- MEASURE GROUND GRID RESISTANCE WITH EARTH GROUND TEST METER AND INSTALL ADDITIONAL GROUND RODS AND CONDUCTORS AS REQUIRED UNTIL RESISTANCE TO GROUND COMPLIES WITH CODE.
- MEDIUM VOLTAGE SWITCH IS EXISTING. ELECTRICAL CONTRACTOR INSTALL DIRECT BURIED CABLE FROM SWITCH TO NEW MEDIUM VOLTAGE 75 KVA TRANSFORMER. REFER TO DRAWING E4 FOR THE LOCATION ON THE SITE.
- NEW 75 KVA TRANSFORMER IS PROVIDED BY OTHERS, INSTALLED BY ELECTRICAL CONTRACTOR.



120/208V 3Ø 4W ONE-LINE DIAGRAM

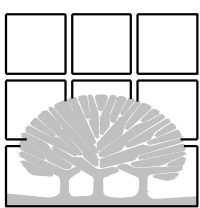
CONDUCTOR AND CONDUIT SIZING					
COPPER WIRE		ALUMINUM WIRE		COPPER WIRE	
MAX. OCCUP.	(3) COND + G DESCRIPTION	(3) COND + G DESCRIPTION	(4) COND + G (LINEAR LOADS) DESCRIPTION	(4) COND + G** (NON-LINEAR LOADS) DESCRIPTION	ALUMINUM WIRE DESCRIPTION
20	#12 #125, 12°C		#12 #125, 12°C	#12 #125, 12°C	
30	#10 #105, 34°C		#10 #105, 12°C	#8 #105, 34°C	
40	#8 #105, 34°C		#8 #105, 34°C	#8 #105, 34°C	
50	#8 #105, 34°C		#8 #105, 34°C	#8 #105, 1°C	
60	#8 #105, 1°C		#8 #105, 1°C	#8 #105, 114°C	
70	#8 #85, 1°C		#8 #85, 114°C	#8 #85, 114°C	
80	#8 #85, 1°C		#8 #85, 114°C	#8 #85, 114°C	
90	#8 #85, 114°C		#8 #85, 114°C	#8 #85, 114°C	
100	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
110	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
125	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
150	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
175	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
200	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
225	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
250	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
300	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
350	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
400	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
500	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
600	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
700	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
800	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
1000	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	
1200	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	#8 #85, 114°C	



Ottawa Sands Park Restroom Building
Ottawa County Parks & Recreation



MCSA GROUP, INC.
Landscape Architecture • Park & Recreation Planning • Architecture
Downtown Planning • Interior Design • Sports Facility Planning
529 Greenwood Avenue S.E. • East Grand Rapids, MI 49506
616-451-3346 • FAX: 616-451-1935 • EMAIL: tas@mcsagroup.com

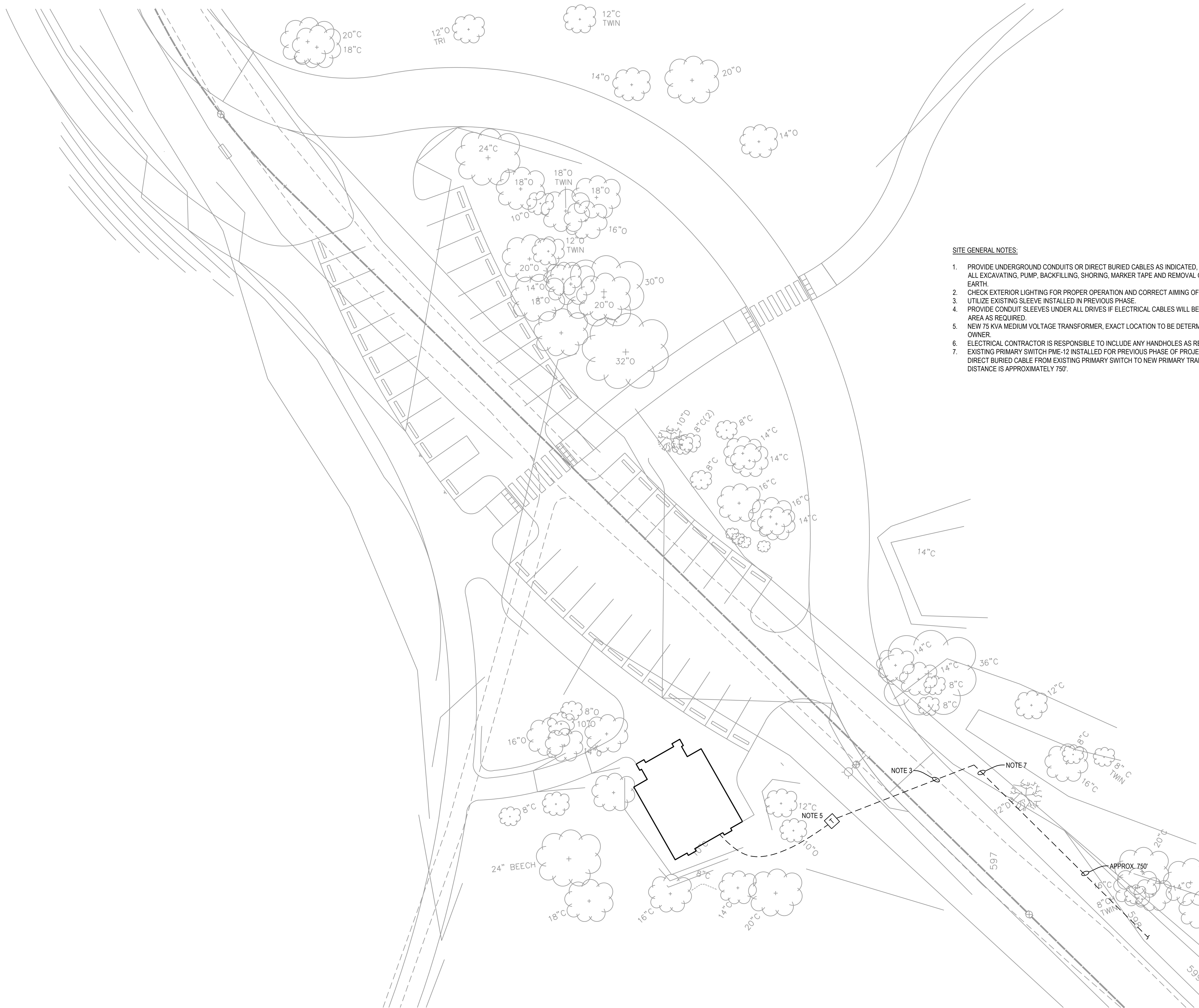


SCALE:

Legend, Details & One Line

DATE
11-08-2023
REVISIONS
Bid Set

PROJECT NO.
1227
SHEET NO.
E3



- SITE GENERAL NOTES:**
1. PROVIDE UNDERGROUND CONDUITS OR DIRECT BURIED CABLES AS INDICATED, INCLUDING ALL EXCAVATING, PUMP, BACKFILLING, SHORING, MARKER TAPE AND REMOVAL OF SURPLUS EARTH.
 2. CHECK EXTERIOR LIGHTING FOR PROPER OPERATION AND CORRECT AIMING OF FIXTURES.
 3. UTILIZE EXISTING SLEEVE INSTALLED IN PREVIOUS PHASE.
 4. PROVIDE CONDUIT SLEEVES UNDER ALL DRIVES IF ELECTRICAL CABLES WILL BE RUN IN THE AREA AS REQUIRED.
 5. NEW 75 KVA MEDIUM VOLTAGE TRANSFORMER, EXACT LOCATION TO BE DETERMINED BY OWNER.
 6. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO INCLUDE ANY HANDHOLES AS REQUIRED.
 7. EXISTING PRIMARY SWITCH PNE-12 INSTALLED FOR PREVIOUS PHASE OF PROJECT. PROVIDE DIRECT BURIED CABLE FROM EXISTING PRIMARY SWITCH TO NEW PRIMARY TRANSFORMER. DISTANCE IS APPROXIMATELY 750'.



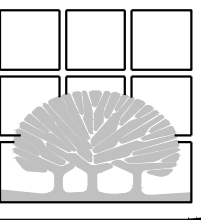
SITE PLAN - POWER / LIGHTING
SCALE: 1"=20'-0"



Ottawa Sands Park Restroom Building
Ottawa County Parks & Recreation



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529 Greenwood Avenue S.E. • East Grand Rapids, MI 49506
616-451-3346 • FAX: 616-451-1935 • EMAIL: tas@mcsagroup.com



SCALE:
1"=20'-0"

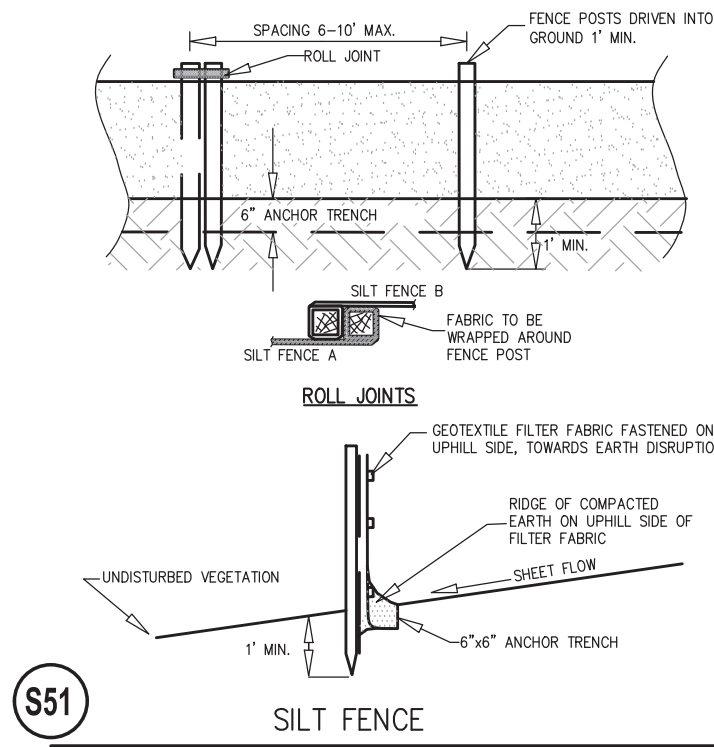
Site Plan - Power

DATE	11-08-2023
REVISIONS	
Bid Set	

PROJECT NO.	1227
SHEET NO.	E4

P:\2023\2023176 Ottawa Sands Restroom Building\Working Drawings\2023176 ES1.dwg, 10/3/2023 11:31:53 AM, cll
G:_Library\block\dwg\stamp24x36.dwg -2022 @ 8:30 am

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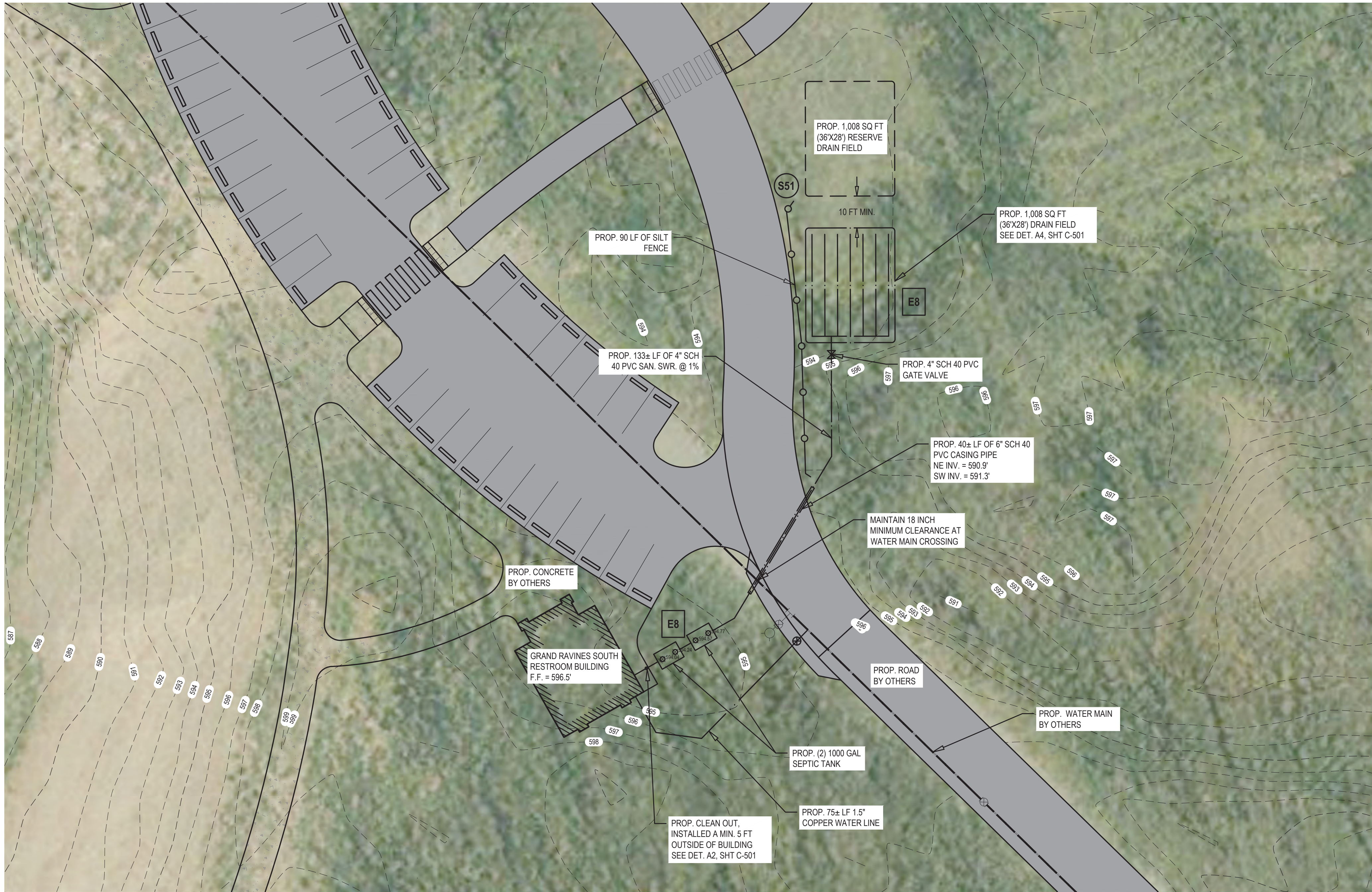


S.E.S.C. LEGEND
MICHIGAN UNIFIED KEYING SYSTEM

E8	PERMANENT SEEDING		Stabilization method utilized on sites where earth change has been completed (final grading attained).
S51	SILT FENCE		Use adjacent to critical areas, to prevent sediment laden sheet flow from entering these areas.



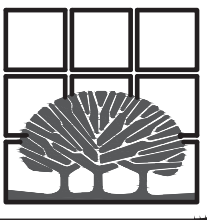
0' 10' 20' 40'
SCALE 1" = 20'



Ottawa Sands Park Restroom Building
Ottawa County Parks & Recreation



MCSA GROUP, INC.
Landscape Architecture • Park & Recreation Planning • Architecture
Downtown Planning • Interior Design • Sports Facility Planning
529 Greenwood Avenue S.E. • East Grand Rapids, MI 49506
616-451-3346 • FAX: 616-451-1935 • EMAIL: tas@mcsagroup.com



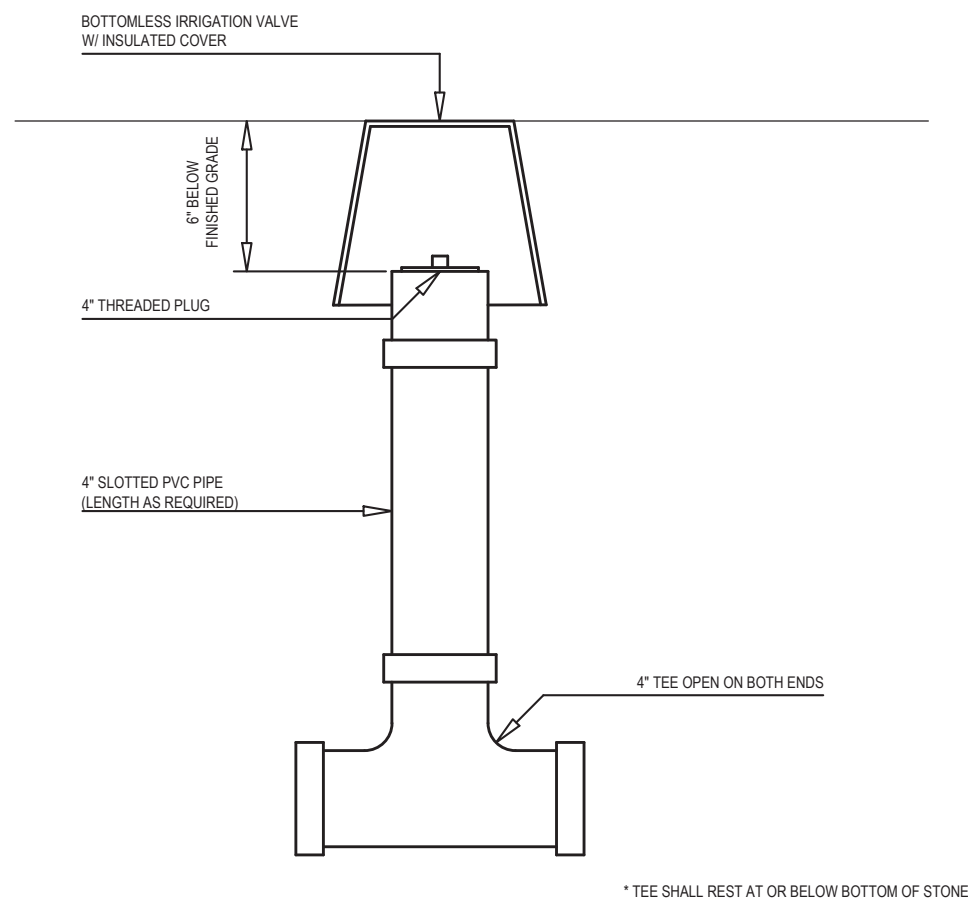
SCALE:
1" = 20'

HOLLAND
ENGINEERING

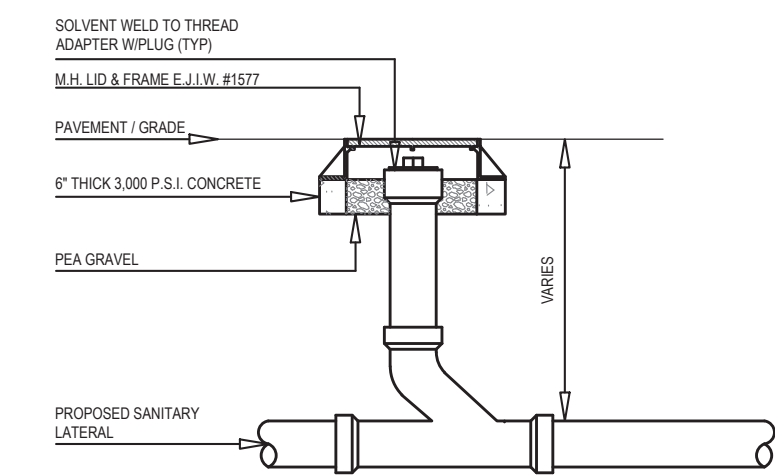
220 Hoover Boulevard
Holland, Michigan 49423-3766
www.hollandengineering.com
T 616-392-5938 F 616-392-2116

DATE
11-08-2023
REVISIONS
BID SET

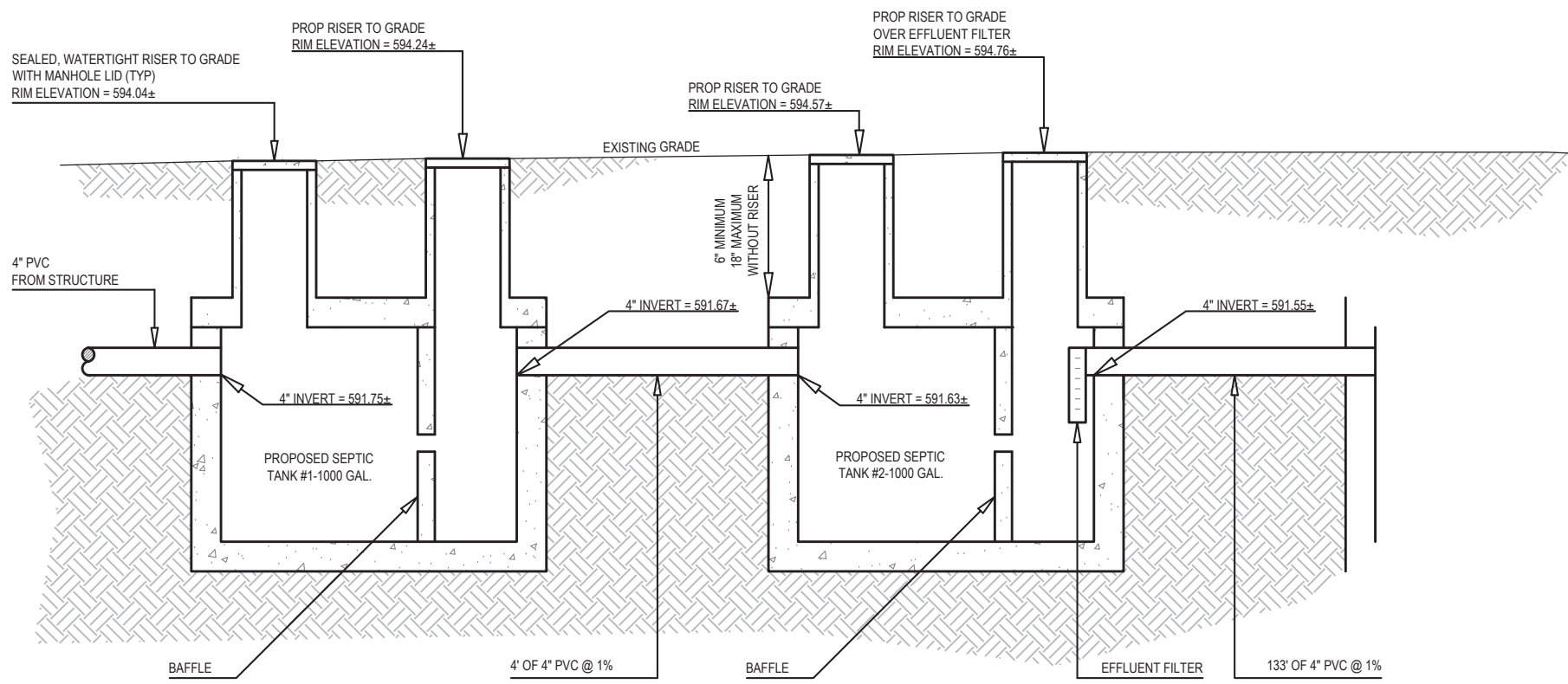
PROJECT NO.
1227
SHEET NO.
C-101



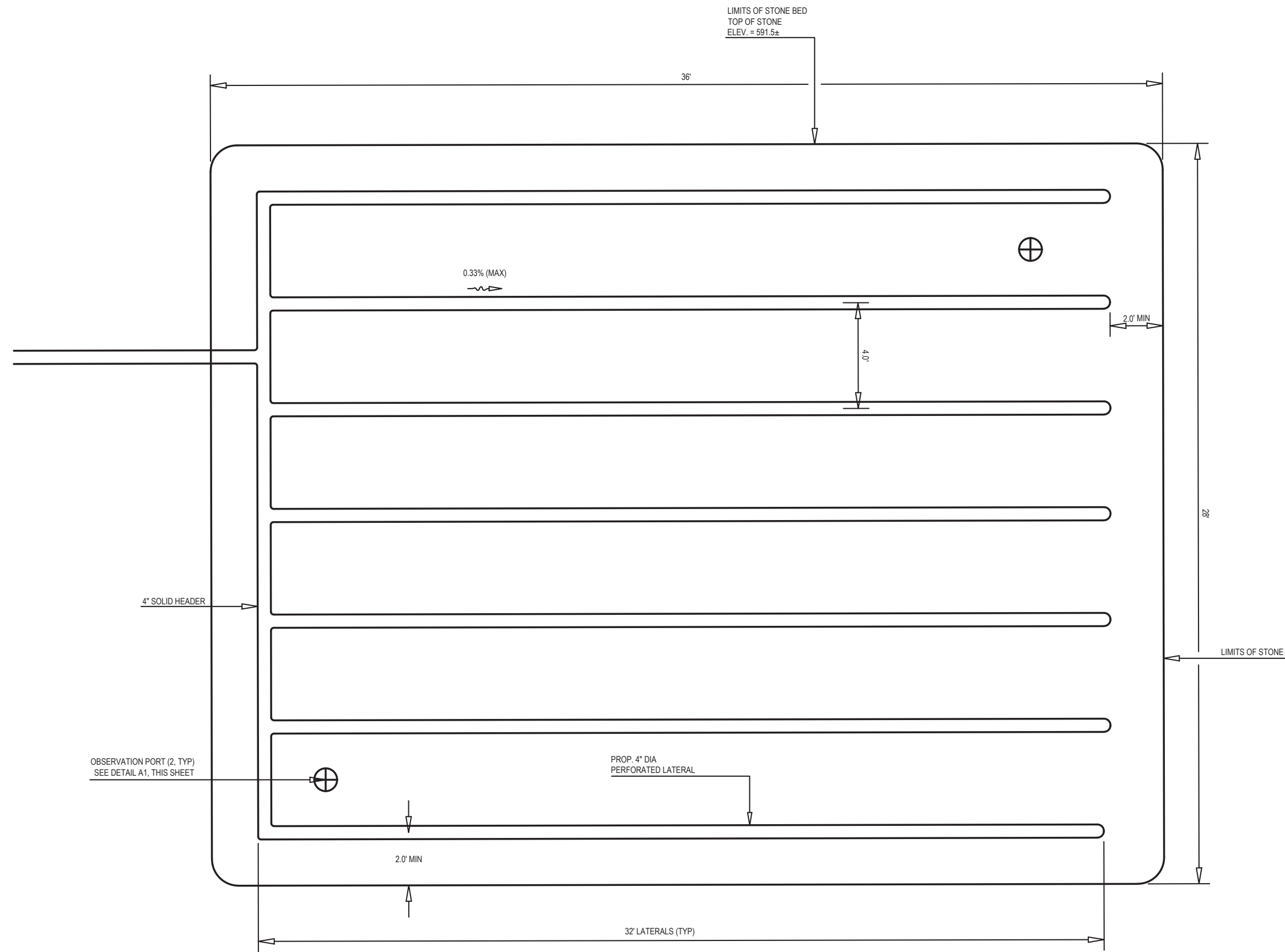
1 OBSERVATION PORT



2 SANITARY LATERAL CLEAN OUT



3 SEPTIC TANK



4 DRAIN FIELD

SESC NOTES:

1. CONTRACTOR SHALL OBTAIN ALL STATE AND LOCAL PERMITS AS NECESSARY FOR CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE TO ACQUIRE THE OTTAWA COUNTY SOIL EROSION AND SEDIMENTATION CONTROL PERMIT AND COMPLY WITH ALL PERMIT REQUIREMENTS AND WITH ALL STANDARDS AND REQUIREMENTS OF THE AGENCIES HAVING JURISDICTION.
3. BEST MANAGEMENT PRACTICES SHALL BE UTILIZED DURING AND AFTER CONSTRUCTION FOR TEMPORARY AND PERMANENT SOIL EROSION AND SEDIMENTATION CONTROL MEASURES.
4. CONTRACTOR SHALL PROVIDE A CERTIFIED STORM WATER OPERATOR FROM CONSTRUCTION COMMENCEMENT THROUGH FINAL SITE STABILIZATION.
5. THE TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED WEEKLY AND AFTER EACH SIGNIFICANT RAIN EVENT IN

ACCORDANCE WITH THE EGLE REQUIREMENTS.

6. CALL MISS DIG AT LEAST THREE (3) WORKING DAYS PRIOR TO STARTING ANY EXCAVATION.
7. SOIL EROSION CONTROL MEASURES SHALL BE PLACED PRIOR TO EARTH MOVING OR GROUND DISTURBANCE AND REMAIN IN PLACE UNTIL FINAL RESTORATION HAS BEEN ESTABLISHED.
8. ALL FOREIGN MATERIAL OR DEBRIS FROM JOB SITE WHICH IS DEPOSITED ON PAVED ROADWAY SHALL BE REMOVED IMMEDIATELY.
9. THE PAVED ROADWAY SHALL BE SWEEPED CLEAN AS NEEDED, BUT AT LEAST ONCE A WEEK.
10. SOIL EROSION CONTROL MEASURES ARE THE RESPONSIBILITY OF THE CONTRACTOR DURING CONSTRUCTION AND THE OWNER UPON COMPLETION.
11. CONTRACTOR SHALL PHASE THE PLACEMENT OF THE SOIL EROSION CONTROL MEASURES AS NECESSARY FOR THE SITE IMPROVEMENTS WITHIN

THE LIMITATIONS OF THE ACQUIRED SOIL EROSION CONTROL PERMIT.

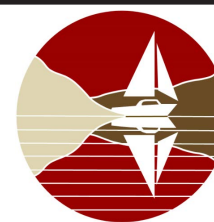
12. STOCKPILE AREAS SHALL BE STABILIZED WITH TEMPORARY OR PERMANENT SEED IN ACCORDANCE WITH THE OTTAWA COUNTY SOIL EROSION AND SEDIMENTATION CONTROL REQUIREMENTS. ALL EXCESS SPOILS SHALL BE REMOVED FROM SITE.
13. ALL EXCESS SPOILS SHALL BE HAULED OFFSITE AND LEGALLY PLACED IN AN UPLAND AREA NOT ENCUMBERED BY WETLANDS OR FLOODPLAIN.
14. THE MINIMUM AMOUNT OF SOIL EROSION AND SEDIMENTATION CONTROL MEASURES ARE SHOWN THE DRAWINGS. CONTRACTOR SHALL PROVIDE ADDITIONAL CONTROL MEASURES, MAINTENANCE, AND/OR STABILIZATION MEASURES AS NECESSARY FOR CONSTRUCTION ACTIVITIES.
15. SEE OTHER SHEETS IN PLAN SET FOR MORE INFORMATION.

SEPTIC SYSTEM NOTES:

1. CONTRACTOR SHALL OBTAIN ALL NECESSARY STATE AND LOCAL PERMITS. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE LOCAL AUTHORITIES STANDARDS AND SPECIFICATIONS.
2. CALL MISS DIG AT LEAST THREE (3) WORKING DAYS PRIOR TO STARTING ANY EXCAVATION.
3. ALL SOILS SHALL BE GRADED TO PROVIDE FOR SMOOTH CONTOURS AND POSITIVE DRAINAGE AWAY FROM BUILDING AND DRAIN FIELD. WATER SHALL NOT POND OVER THE DRAIN FIELD AREA.
4. WHEN ONSITE SOILS CONTAIN CLAYS AND / OR SILTS, CONTRACTOR SHALL AVOID WORKING SOILS WHEN WET IN AN EFFORT TO PREVENT SMEARING AND SEALING OF SAND / SOIL INTERFACE.
5. CONTRACTOR SHALL PROTECT ALL EXISTING AND NEW CONSTRUCTION FROM DAMAGE. SHOULD ANY DAMAGE OCCUR, CONTRACTOR SHALL MAKE ALL NECESSARY REPAIRS AT NO COST TO THE OWNER.
6. ALL CONSTRUCTION AND INSTALLATION SHALL MEET OTTAWA COUNTY HEALTH DEPARTMENT STANDARDS & REQUIREMENTS, MICHIGAN CRITERIA FOR SUBSURFACE SEWAGE DISPOSAL, AND EGLE RULES & REGULATIONS.
7. THE DRAIN FIELD AND SEPTIC SYSTEM SHALL HAVE A MINIMUM OF THE FOLLOWING ISOLATION DISTANCES PER MICHIGAN DEPARTMENT OF PUBLIC HEALTH REQUIREMENTS: 10 FEET FROM ALL PROPERTY AND RIGHT-OF-WAY LINES, 15 FEET FROM BUILDING FOOTINGS (PROVIDED NO FOOTING DRAINS), 100 FEET FROM LAKES AND STREAMS, 100 FEET FROM FLOODPLAINS, AND 50 FEET FROM DRINKING WELLS.
8. PVC JOINTS SHALL MEET ASTM D2564, D2855.
9. DRAIN FIELDS AND ALL DISTURBED AREA SHALL BE TOPSOILED, SEEDED, FERTILIZED, AND MULCHED.
10. OPERATION AND INSTALLATION OF THE DRAIN FIELD MUST BE INSPECTED BY THE OTTAWA COUNTY HEALTH DEPARTMENT AND THE DESIGN ENGINEER BEFORE COVER MATERIAL IS PLACED IF REQUIRED. CONTRACTOR SHALL CONTACT THE DESIGN ENGINEER TO SCHEDULE THE INSPECTION PRIOR TO BACKFILL OF THE DRAIN FIELD.
11. THE EFFLUENT FILTERS SHALL BE INSPECTED AT A MINIMUM ONCE PER YEAR. FILTER SHALL BE CLEANED AS NECESSARY BASED ON INSPECTION OF FILTER.
12. OWNER SHALL LIMIT THE AMOUNT OF IRRIGATION OVER PROPOSED DRAIN FIELD IN ORDER TO MAXIMIZE THE SOIL SATURATION FOR THE SEWAGE TREATMENT THROUGH THE DRAIN FIELD.
13. ALL SEPTIC TANKS SHALL BE TESTED FOR WATER TIGHTNESS IN ACCORDANCE WITH ASTM C1227 SECTION 9.
14. ALL 4" SANITARY SEWER OUTSIDE OF DRAIN FIELD SHALL BE PLACED AT A MINIMUM SLOPE OF 1.0%.
15. DEWATERING SHALL BE COMPLETED IN ACCORDANCE WITH THE OTTAWA COUNTY HEALTH DEPARTMENT AND EGLE STANDARDS AND REQUIREMENTS.
16. BARRIERS SHALL BE PLACED TO PREVENT ANY TYPE OF VEHICULAR TRAFFIC AND/OR SNOW PLACEMENT FROM SNOW PLOWING OVER THE DRAIN FIELD.
17. A ZABLE A100 EFFLUENT FILTER SHALL BE INSTALLED IN THE OUTLET END OF THE SEPTIC TANK.

LAYOUT & UTILITY NOTES:

1. COORDINATE ALL WORK WITH THE OTTAWA COUNTY PARKS AND RECREATION.
2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT ALL NECESSARY PERMITS AND APPROVALS HAVE BEEN ACQUIRED PRIOR TO CONSTRUCTION.
3. CALL MISS DIG AT LEAST THREE (3) WORKING DAYS PRIOR TO STARTING ANY EXCAVATION.
4. CONTRACTOR SHALL CONTACT ENGINEER IF ANY DISCREPANCIES ARE DETERMINED BETWEEN SITE LAYOUT DIMENSIONS AND ACTUAL SITE CONDITIONS.
5. COORDINATE ALL UTILITY CONSTRUCTION WITH UTILITY PROVIDER, AS REQUIRED.
6. CONTRACTOR SHALL VERIFY THAT THERE ARE NO UTILITY CONFLICTS PRIOR TO CONSTRUCTION.
7. SEPTIC SYSTEM SHALL BE CONSTRUCTED IN ACCORDANCE WITH OTTAWA COUNTY HEALTH DEPARTMENT STANDARDS AND REQUIREMENTS.
8. SITE CONTRACTOR RESPONSIBLE TO CONNECT EXISTING AND PROPOSED BUILDING TO WATER AND SEPTIC SYSTEM. REFER TO PLUMBING PLANS FOR CONNECTION LOCATION AND DETAILS.
9. REFER TO ARCHITECTURAL DRAWINGS FOR BUILDING DIMENSIONS. BUILDING SHALL BE STAKED BASED ON FOUNDATION PLAN. CONTRACTOR SHALL NOTIFY ENGINEER IF THERE ARE DISCREPANCIES BETWEEN THE BUILDING AND SITE DRAWINGS.
10. CONTRACTOR SHALL BE RESPONSIBLE TO MEETING THE STANDARDS AND REQUIREMENTS OF THE LOCAL NOISE ORDINANCE FOR ALL CONSTRUCTION PRACTICES.
11. SEE OTHER SHEETS IN PLAN SET FOR MORE INFORMATION.



ADDENDUM NO. 1
for
Ottawa Sands Restroom Building
18280 North Shore Dr., Ferrysburg, MI 49456

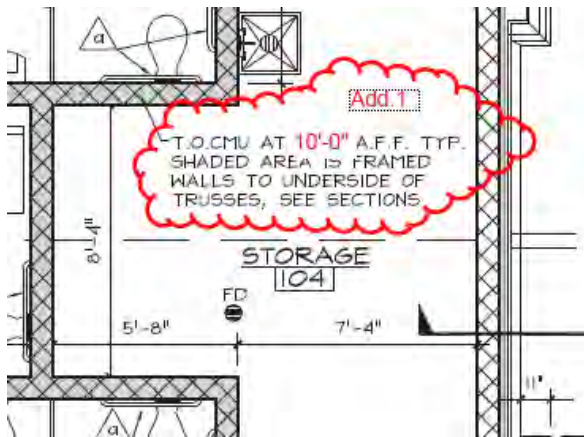
Issued: December 4, 2023

TO: ALL BIDDERS

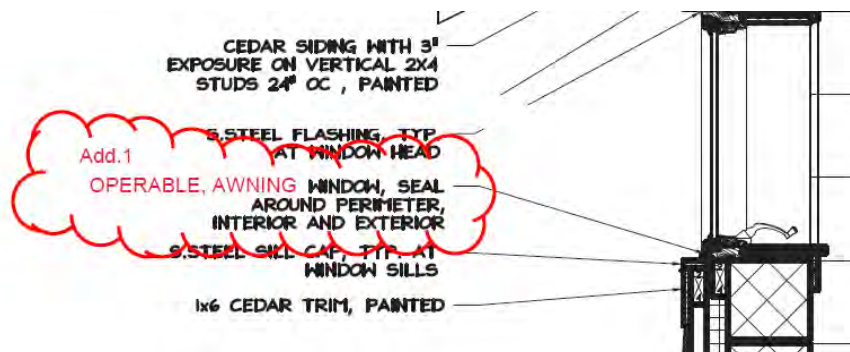
This Addendum 1 forms a part of the contract documents and modifies the original Project Manual as noted below. This Addendum consists of three (3) pages.

DRAWINGS:

1. Sheet A1 (not re-issued): Clarification - Floor Plan note to clarify height of interior cmu walls to read:



2. Sheet A2 & A3 (not re-issued): Clarification - Section 4/A2 & Section 1/A3 note to read: "Operable, awning window, seal around perimeter, interior and exterior". As specified.



ADDENDUM NO. 1

Ottawa Sands Park Restroom Building
December 4, 2023

Page -2-

3. Sheet C101 (not re-issued): Clarifications :

- A. Watermain is currently in place.
- B. The watermain contractor already tapped the watermain and this project contractor will need to connect at the curb stop box.
- C. The road is in place and the conduit for the sewer is also installed in place.
- D. The reserve drain field does not need to be installed or included in this project's bid. The space is only indicated to reserve the area if it's ever needed.

SPECIFICATIONS:

1. Section 04 2200 – Concrete Unit Masonry, 2.2, C. 5:

- A. Acceptable Ground-face (Burnished) cmu manufacturer is Echelon's Trenwyth Trendstone product.

2. Section 07 6100 – Standing Seam Metal Roof Panels:

- A. Acceptable manufacturer / product:
 - 1). Pac-Clad Petersen Aluminum Snap Clad Standing Seam Panel:
 - 24 ga. Az-50 Galvalume Steel
 - 12" wide flat profile panel x 1-3/4" high seam
 - Compliant with all other specified characteristics and warranties
 - 2). Dimensional Metals, Inc. – Inter-Lock IL20 Architectural Panel
 - 24 ga. Galvalume Steel
 - 12" wide flat profile panel x 1-3/4" high seam
 - Compliant with all other specified characteristics and warranties

3. Section 09 6513 – Resilient Base & Accessories: Section is Deleted – No vinyl base needed in scope of this project.

4. Section 23 3713 – Diffusers, Registers and Grilles, 2.1.1:

- A. Acceptable manufacturer Shoemaker Industries products as distributed by Balfrey-Jonston, Inc., dickv@balfrey-jonston.com., (248)- 384-8781.

5. Section 23 5216 – Condensing Boilers, 2.1.A:

- A. Acceptable manufacturer Navien condensing unit boiler Series NHB-055 product as distributed by Balfrey-Jonston, Inc., dickv@balfrey-jonston.com., (248)- 384-8781.

6. Section 26 5113 – Interior Luminaries & 26 5600 – Exterior Luminaries:

- A. Acceptable light fixtures manufacturers/ products.

ADDENDUM NO. 1

Ottawa Sands Park Restroom Building
December 4, 2023

Page -3-

Type	MFG	Part
A	Fail Safe	FVS4-M-4-LD4-STD-30-120-P125-EDD1
AEM	Fail Safe	FVS4-M-4-LD4-STD-30-120-P125-EDD1-EL14W
B	Kirlin	LRC-06VND-IC-1000L-120-RWF-MFL-80CRI-35K
BEM	Kirlin	LRC-06VND-IC-1000L-120-RWF-MFL-80CRI-35K-EM
C	Fail Safe	FVS8-M-4-LD4-1-STD-35K-UNV-P125-EDC1
D	Isolite	OWL-EM-BZ-MB-HX
E	Isolite Quote required to order	CMB-EM-R-U-WH-MTEBP
EM	Isolite Quote required to order	XRH-WH-1-LAMP SOURCE-WGX

End of Addendum 1

Exhibit B

Denny's Excavating Inc.
9399 136th Ave
West Olive, MI
49460

Bidder's Name: _____

PROPOSAL FORM

Ottawa Sands Park Restroom Building

TO: Mr. Curt TerHaar, Coordinator
Ottawa County Parks & Recreation
12220 Fillmore St.
West Olive MI 49460

The undersigned bidder has carefully examined the plans and specifications for the construction of Ottawa Sands Park Restroom Building, in West Olive, Michigan, as prepared by MCSA Group, Inc. and, having carefully examined the existing building and site and completely familiarized himself with local conditions affecting the cost of the work; hereby states that he will provide all necessary labor, equipment, tools, machinery, apparatus and all other means of construction, do all the work and furnish all materials called for by said plans and specifications in the manner prescribed by in accordance with the requirements of the contract, specifications and drawings; and will accept as full and complete payment therefore the Lump Sum Bid Amount Which Is The Summation Of The Cost Of The Work Items 1 through 2 in the Base Bid Total amount of

Five Hundred Ten thousand dollars $\frac{20}{100}$ Dollars
and 00 Cents (\$ 510,000 -)

This is a Lump Sum Bid. The base bid as submitted is for complete construction as shown by the plans, details and specifications.

Ottawa Sands Park Restroom Building Project

BASE BID WORK ITEMS:

Work Items:

Bid Items Amount

Work Item 1. Construction of the Restroom Building,
Work includes general trades,
mechanical, plumbing and electrical work. \$ 420,000 -

Work Item 2. Construction of site utilities to the building
including septic field system, site electrical
service and water service. \$ 90,000 -

Bidder's Name: _____

LIST OF SUBCONTRACTORS

LIST ALL SUBCONTRACTORS: To be completed as part of Bid Proposal.

<u>Name of Subcontractor</u>	<u>Type of Work</u>	<u>Amount</u>
	TBD	

The undersigned agrees as follows:

To do any extra work not covered by the above schedule of prices, which may be ordered by the Architect, and to accept compensation therefore as provided in Section 23 of the General Conditions entitled "Unclassified Work".

Begin work as soon as possible after the contract is executed and perform said work in such a manner as to complete it in accordance with the Contract and to coordinate their work with the other contractors involved.

The undersigned acknowledges the right of the Owner to accept or reject any proposal or part of any proposal submitted.

We hereby acknowledge receipt of the following addenda and have included them in our proposal; Addenda Nos. #1

#1 Dated 12/4/2023
Dated _____

Bidder's Name: _____

Dated this 12th day of December, 2023.

By: Signature of Bidder Dan Lee President

Name of Business Denny's Excavating Inc.

Business Address of Bidder 9399 136th Ave
West Olive MI 49460

Business Telephone of Bidder 616-292-7804

Business Fax Number of Bidder _____

Email Address of Bidder DIRTOR@DAN @ AOL.COM

Incorporated under the laws of the State of Michigan

President DAN LEE

Secretary _____

Treasurer _____

If Non-incorporated: _____

Names and Addresses of Members of the Firm:

End of Section 00 0400 (Proposal Form)



County of Ottawa

Fiscal Service-Purchasing

Exhibit C

12220 Fillmore Street • Room 331 • West Olive, MI, 49460

(616) 738-4670
Fax (616) 738-4897

VENDOR INSURANCE REQUIREMENTS / REQUEST

Please be advised that before any vendor can begin work in a County facility, or before a purchase order can be processed, if applicable, the County requires that you provide evidence of insurance as follows:

WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY

Workers' Compensation Limits	Michigan Statutory
Employers' Liability Limits	\$500,000 Each Accident
	\$500,000 Each Employee
	\$500,000 Aggregate Injury by Disease

COMMERCIAL GENERAL LIABILITY

Each Occurrence	\$1,000,000
Personal & Advertising Injury	\$1,000,000
General Aggregate	\$2,000,000
Products/Completed Operations Aggregate	\$2,000,000
There shall be no Products/Completed Operations or Contractual Liability exclusion.	
The General Aggregate limit shall apply separately per location or project.	

AUTOMOBILE (if applicable)

Residual Liability Limit	\$1,000,000 Each Accident
Personal Injury Protection	Michigan Statutory
Property Protection	Michigan Statutory

PROFESSIONAL LIABILITY (if applicable)

Limit of Liability	\$2,500,000 Aggregate Limit
--------------------	-----------------------------

Please provide a **certificate of insurance** detailing your coverage which meets the above requirements. These coverages shall protect the vendor, its employees, agents, representatives, and subcontractors against claims arising out of the work performed or products provided.

These limits may be provided in single layers or by combinations of primary and excess/umbrella policy layers.

The County of Ottawa and its officers, officials, employees, volunteers and agents are to be additional insureds as respects to the services provided under this agreement. This additional insured status shall not terminate after completion of the services. A certificate of insurance shall be provided and show the required limits, and the above-mentioned listed as additional insureds. A **30-day** notice is required in the event of coverage termination for any reason

Additional Insured Endorsement to the Commercial General Liability policy **must accompany the certificate**, OR the **certificate must state** that the General Liability policy includes a blanket additional insured provision on the primary basis for any entity required by contract or agreement to be an additional insured.

Please forward your evidence of insurance to; OTTAWA COUNTY PURCHASING , 12220 Fillmore St Rm 331, West Olive, MI 49460, purchasing@miottawa.org, Fax Number 616-738-4897



**Ottawa County Parks &
Recreation Commission**

12220 Fillmore
West Olive, Michigan 49460

Proposal Tabulation
Ottawa Sands Day Use Restroom
Tuesday, December 12, 2023, 10:00 am

	COMPANY (BIDDER)	Addendum	Bid Bond	BASE BID	Item 1 - Restroom	Item 2 - Utilities	Comments
1	Denny's Excavating, Inc.	Y	Y	\$510,000.00	\$420,000.00	\$90,000.00	
2	APEX Contractors, Inc.	Y	Y	\$556,500.00	\$486,500.00	\$70,000.00	
3	Mugen Construction, Inc.	Y	Y	\$566,438.00	\$491,188.00	\$75,250.00	
4	Vander Kodde Construction	Y	Y	\$618,630.00	\$556,830.00	\$61,800.00	
5	Carbonsix Construction	Y	Y	\$681,911.00	\$599,477.00	\$82,434.00	
6	First Penninsula Contractors	Y	Y	\$705,438.00	\$637,006.00	\$68,432.00	
7							
8							
9							
10							



DENNEXC-01

GWHITE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

12/15/2023

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

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

PRODUCER Lenz-Balder Insurance, Inc. 340 120th Ave Holland, MI 49424	CONTACT NAME: Jodi Spencer	
	PHONE (A/C, No, Ext): (616) 748-9440 FAX (A/C, No): (616) 748-9441	
	E-MAIL ADDRESS: jspencer@lenzbalderins.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : Fremont Insurance Company	13994
INSURED Denny's Excavating, Inc. 9399 136th Ave West Olive, MI 49460	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

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

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC OTHER:			CPP0108814	4/1/2023	4/1/2024	EACH OCCURRENCE \$ 2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 2,000,000 GENERAL AGGREGATE \$ 4,000,000 PRODUCTS - COMP/OP AGG \$ 4,000,000
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS ONLY <input checked="" type="checkbox"/> NON-OWNED AUTOS ONLY			CAP0038513	4/1/2023	4/1/2024	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input type="checkbox"/> RETENTION \$			CUP0037561	4/1/2023	4/1/2024	EACH OCCURRENCE \$ 4,000,000 AGGREGATE \$
A	<input checked="" type="checkbox"/> WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) <input type="checkbox"/> Y / N If yes, describe under DESCRIPTION OF OPERATIONS below		N / A	WCP0029960	4/1/2023	4/1/2024	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

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

CERTIFICATE HOLDER

CANCELLATION

Ottawa County
12220 Fillmore Street
West Olive, MI 49460

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



Environmental SUSTAINABILITY

Part 115: Notice Of Intent

*mi*Ottawa Department of
Public Health

Kimberly Wolters



Before Starting: Notice of Intent (NOI)

- Must be completed and submitted by July 8th, 2024
- Must be completed by BOC Chair or an Authorized Representative.
- First Step outlined in [Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451](#)
 - Subsection 11: Material Management Plan



NOI

- County Approving Agency (CAA) responsibilities
 - Primary responsible party
 - Responsible implementation
 - Consults with adjacent counties regarding interest in preparing a multicounty MMP
 - Appoints the DPA
 - Appoints an MMPC
 - Oversees DPA's work program
 - Utilizes the MMP Grant funds
 - Approves MMP prior to municipalities

* 1. County Name:

* 2. Entity Name:

**County BOC; Regional Planning Agency; or Authorized Municipality*

* 3. Name of Authorized Signer:

**Name of highest official representative such as the BOC chairperson, Regional Executive Director, appointed entity acting on behalf of municipalities, or an authorized representative.*

* 4. Title of Authorized Signer:

* 5. Accept or Decline County Approval Agency (CAA) responsibilities?

☐ Accept

☐ Decline



NOI

- Multicounty/Single County MMP
 - SWPC suggest Single County
- Understand and accept CAA duties as listed

* 6. County/ies (Check all that apply):

Select all counties that will be included in the planning area. This can be an individual county or select all counties that will be included in your multicounty plan, if applicable.

7. Multicounty Name, if applicable:

* 8. Please check each box below to confirm your understanding and acceptance of the following CAA duties:

- ☐ Primary responsible party
- ☐ Responsible for MMP implementation
- ☐ Appoints Designated Planning Agency (DPA)
- ☐ Oversees the creation and implementation of the DPA's work program
- ☐ Utilizes the MMP Grant funds for MMP development and implementation
- ☐ Approves MMP prior to municipal approval
- ☐ Approves MMP modifications, if needed
- ☐ Certifies to the Department progress toward meeting all components of its materials management goals



NOI

- Documentation of Acceptance

- See provided resolution

- Multicounty Consultation

- Documentation that the CAA submitted to the surrounding counties BOC with a request to respond in 30 days
- Documentation of the outcome of the request or notice

- Submittals shall be in writing. A written notice may be given by electronic mail if the recipient has indicated that the recipient will receive notice by electronic mail and has specified the electronic mail address to which the notice is to be sent.

* 9. Documentation of Acceptance

Please upload resolution and/or official meeting minutes of entity agreeing to accept CAA responsibility. This may include meeting minutes, agreements, resolutions, and/or other documentation.

Choose File

Choose File

No file chosen

* 10. Multicounty Consultation Documentation

NOTE: Consultation with adjacent counties regarding pursuing a multicounty plan is required in order to submit the Notice of Intent.

Please upload documentation of discussions between counties in regards to preparing a multicounty MMP.

Choose File

Choose File

No file chosen



- BOC Chair or Authorized Representative E-signs agreements
- Can identify Designated Planning Agency (DPA) at this time
 - SWPC suggest keeping Kim Wolters, current DPA and Solid Waste Planning Coordinator
 - Have 120 days after filing NOI to select DPA
 - The sooner you have a DPA the sooner you can move through the MMP process

NOI

By submittal of this Notice of Intent, the County Approval Agency commits to complete all tasks and responsibilities identified in Subpart 11 of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, PA 451 of 1994, as amended, within the prescribed timeframes identified in accordance with all applicable laws and regulations.

* 12. Electronic Signature:

Name	<input type="text"/>
Entity/Organization	<input type="text"/>
Address	<input type="text"/>
City/Town	<input type="text"/>
State/Province	<input type="text"/>
ZIP/Postal Code	<input type="text"/>
Email Address	<input type="text"/>
Phone Number	<input type="text"/>

* 13. Have you identified your Designated Planning Agency?

**NOTE: DPAs do not need to be identified until 120 after the NOI is submitted, but it is encouraged to identify them earlier.*

- ☐ Yes
☐ No



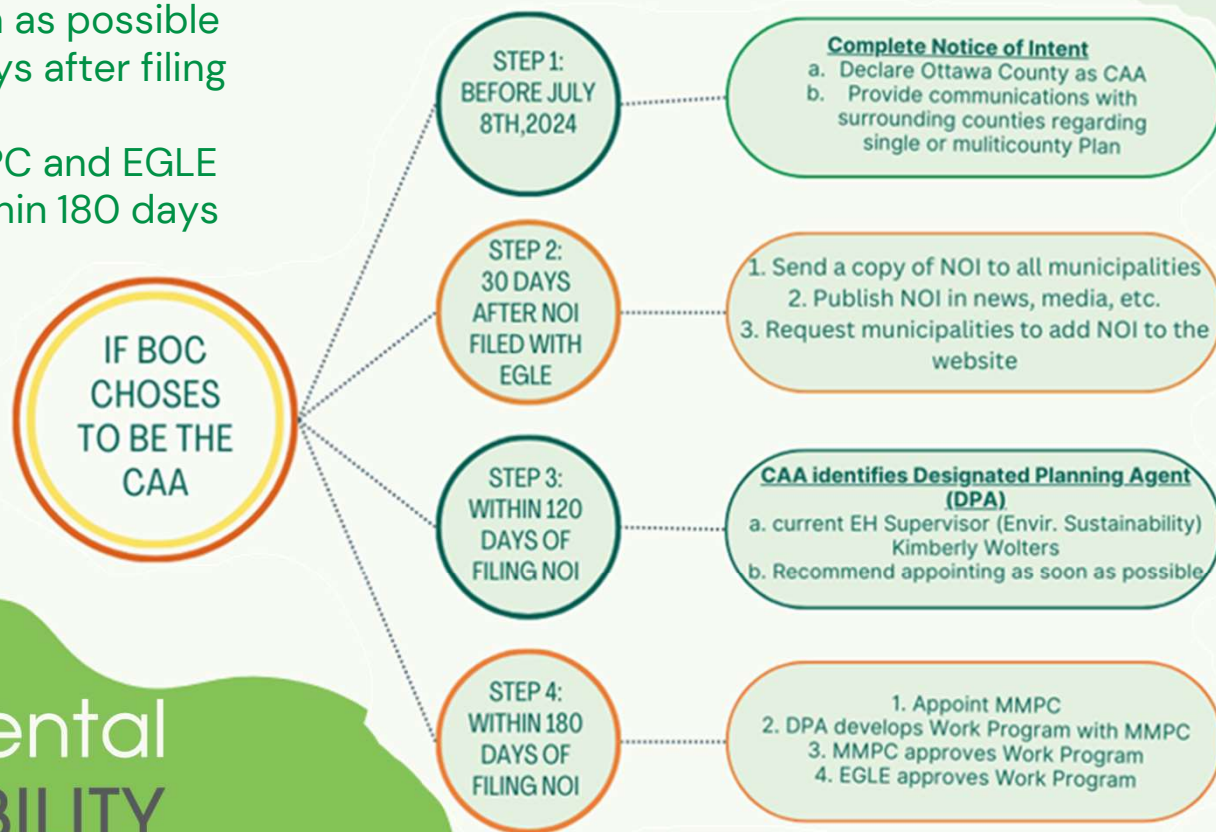
NOI

- If Declining CAA responsibility must still send NOI stating
 - Understand loss of all approval rights over the MMP
 - BOC will notify municipalities within the county of this decision
 - BOC will notify Regional Planning Agency of this decision
- If Decline, County will not
 - Have access to grant funds
 - Will not be able to assign MMPC members
 - Will not be able to create MMP but will still be reasonable for MMP created for County



1. Complete NOI by July 8th, 2024
2. Notify municipalities, media and public of NOI action 30 days after NOI submitted
3. Designated DPA as soon as possible but no later than 120 days after filing NOI
4. Have an appointed MMPC and EGLE approved Work Plan within 180 days of Filing NOI

BOC First Actions



Part 115 EGLE Links

- [NOI PDF](#)
 - Official NOI must be done through official notice form
- [Quick Guide](#)
- [Q&A](#)
- [Planning Approval Process](#)
- [Part 115 Subsection 11](#)





Farmland Protection in Ottawa County

Planning and Policy Committee | February 6, 2024



Permanently Preserved Farmland



by the Ottawa County PDR Program

Preserved 20 by Kruithoff Farms



Top Counties: Land in Farms (acres)

Huron	495,258
Sanilac	436,511
Lenawee	385,784
Tuscola	329,785
Saginaw	327,025

Market value per acre

Huron:	\$1,233
Allegan:	\$2,543
Ottawa:	\$2,948

Top Counties: Market Value of Ag Products

Huron:	\$610,778,000
Allegan:	\$584,373,000
Ottawa:	\$506,662,000

Land in Farms (acres)

Huron:	495,258
Allegan:	229,743
Ottawa:	171,883

PRIMARY THREATS TO FARMLAND

Farmer attrition:

- 4x farmers over 65 compared to farmers under 35

Loss of farms:

- 1997 # of farms was 53,519, dropping to 47,541 in 2017 (average farm size increased by 10 acres)

Conversion:

- MI converted 240,1000 acres of ag land to rural residential from 2001 - 2016

Foreign ownership of land:

- MI had third highest increase of foreign owned land (461,000 acres)

Michigan Farm Bureau Policy

#77 Farmland Protection

We support the creation and **effective implementation of both temporary and permanent farmland protection tools** to stabilize the land base, help maintain the agricultural industry's competitive position, and aggressively increase its economic value to producers and the state. A successful approach to farmland protection will require a combination of strong local leadership and effective state support.

We believe an investment in farmland protection is an investment in the future of agriculture and the next generation of Michigan farmers and citizens. **Farmland protection initiatives should strengthen the agricultural industry** and maintain producer flexibility and control.

Michigan Farm Bureau Policy

#77 Farmland Protection

We support:

- A voluntary, coordinated, and incentive-driven approach at the state and local levels that protects large blocks of farmland and increases the opportunity for economically viable agriculture.
- Reviewing the local revenue-sharing formula and investigating the merits of linking revenue-sharing to effective farmland preservation and urban redevelopment.

We support Michigan Farm Bureau and county Farm Bureaus to continue working with partners to **develop innovative farmland protection funding approaches** at the state and local level, including tax relief based on parcel size and duration of ownership and the **linking of urban development tax credits with greenfield preservation**, in addition to established concepts including conversion fees, millage proposals, tax credits, and recapture penalties.

Farmland Preservation Programs

Locally Led and Permanent:

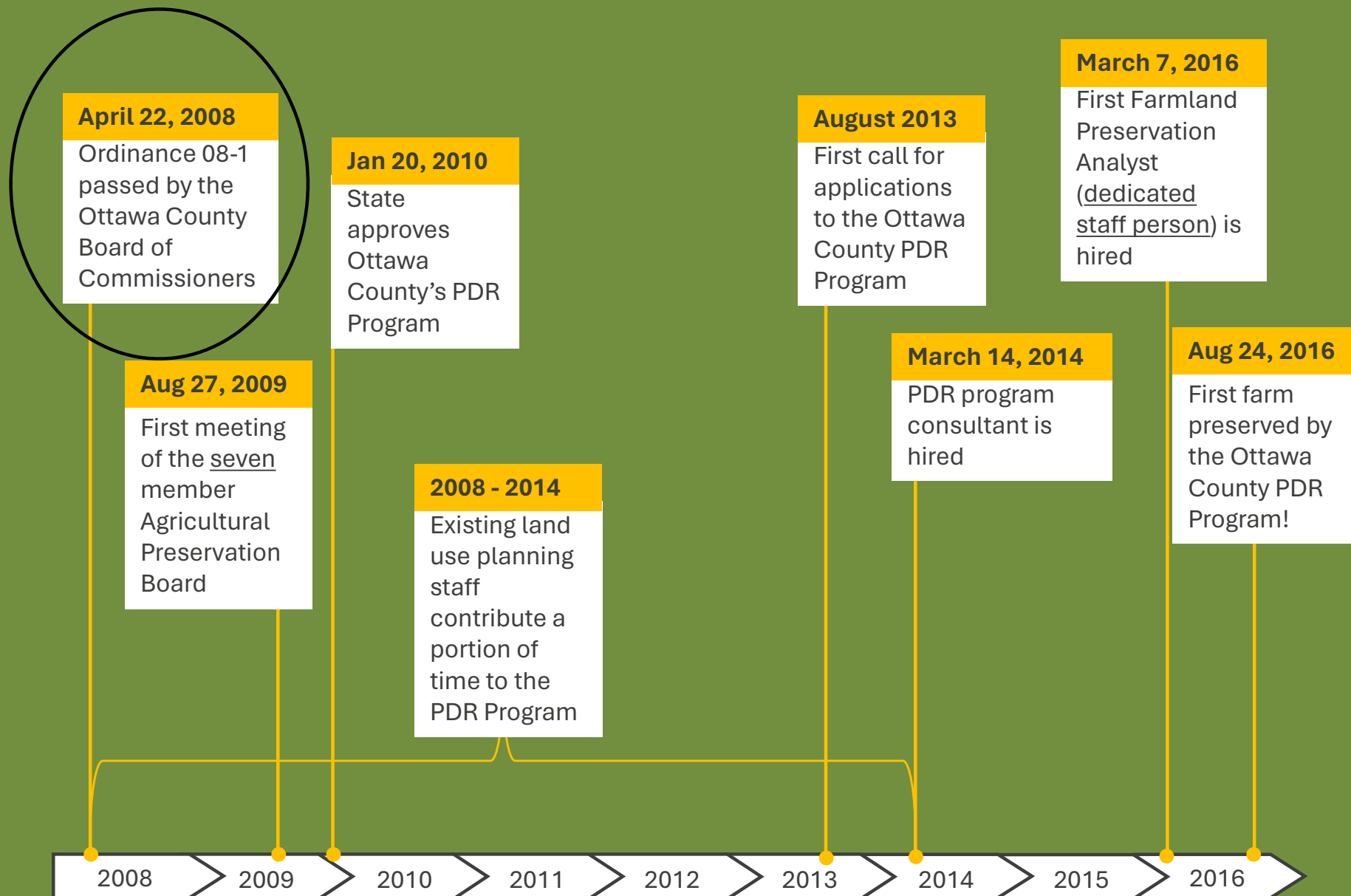
- Purchase of Development Rights (PDR)

State Led and Permanent:

- Donation of Development Rights

State Led and Temporary:

- Farmland Development Rights Agreements (PA116)

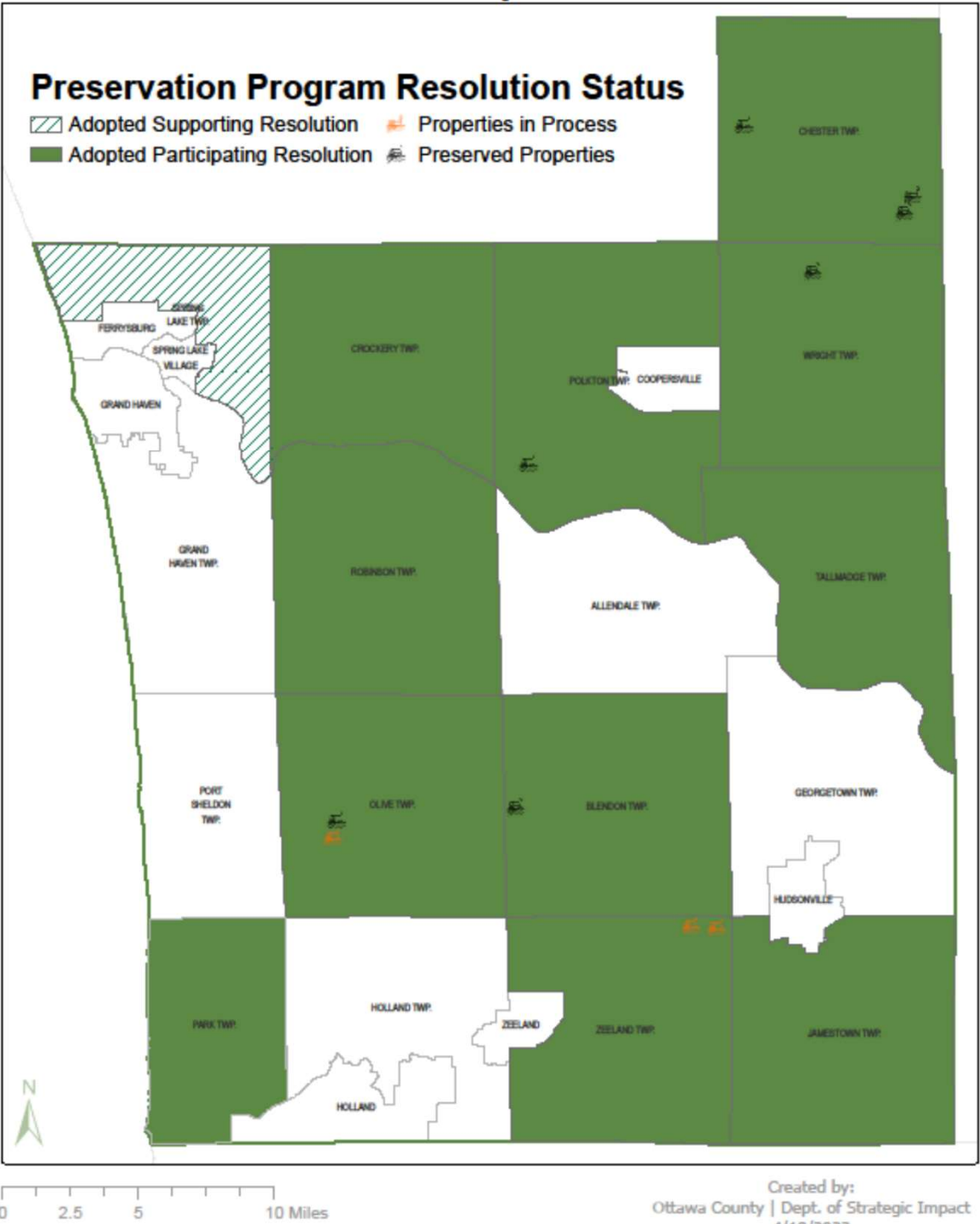


Ottawa County Farmland Development Rights Ordinance

Ordinance No: 13-1 | As Amended July 23, 2013

AN ORDINANCE creating the Ottawa County Farmland Preservation Program which **protects farmland** by acquiring development rights **voluntarily** offered by landowners. This Ordinance authorizes the cash purchase and/or installment purchases of such development rights **through sources other than the County General Fund**, places an agricultural conservation easement on the property which restricts future development, and provides the standards and procedures for the purchase of development rights and the placement of an agricultural conservation easement.

Ottawa County Farmland Preservation Program Resolution Adoption Status



Purchase of Development Rights Program

a guide for Ottawa County townships



Your township, by resolution, supports the Ottawa County Farmland Preservation Program. This means that owners of eligible land in your township can voluntarily apply to sell their development rights to Ottawa County. This process restricts their land to agricultural use in perpetuity and is commonly referred to as a Purchase of Development Rights (PDR) Program. The steps below define the process and the township's role when one of their landowners choose to apply.

1

SUBMIT: Interested landowners submit a completed Purchase of Development Rights application to the County.



2

REVIEW: Ottawa County staff review application for accuracy and verify eligibility. Then, a copy of the application and a cover letter summarizing the suitability of the property for preservation will be sent to the township.



3

CONFIRM*: The township must confirm that for the subject property "the Development Rights Ordinance provisions (see Section 8 of the Ordinance) for the PDR program are consistent with the plan upon which the township zoning is based".

4

APPROVE OR DENY*: The township decides whether to approve or deny the permanent preservation request. A response should be provided within 30 days of receipt of the application.



APPROVED

An authorized township official signs the application, certifying the approval, and returns the signed application to the County. Then the County begins the selection process.

DENIED

Notification of denial should be sent to both the landowner and the Ottawa County Agricultural Preservation Board. Reason for denial should be stated.

* These processes, whether review, board action, etc, are defined by each individual township as they deem appropriate.

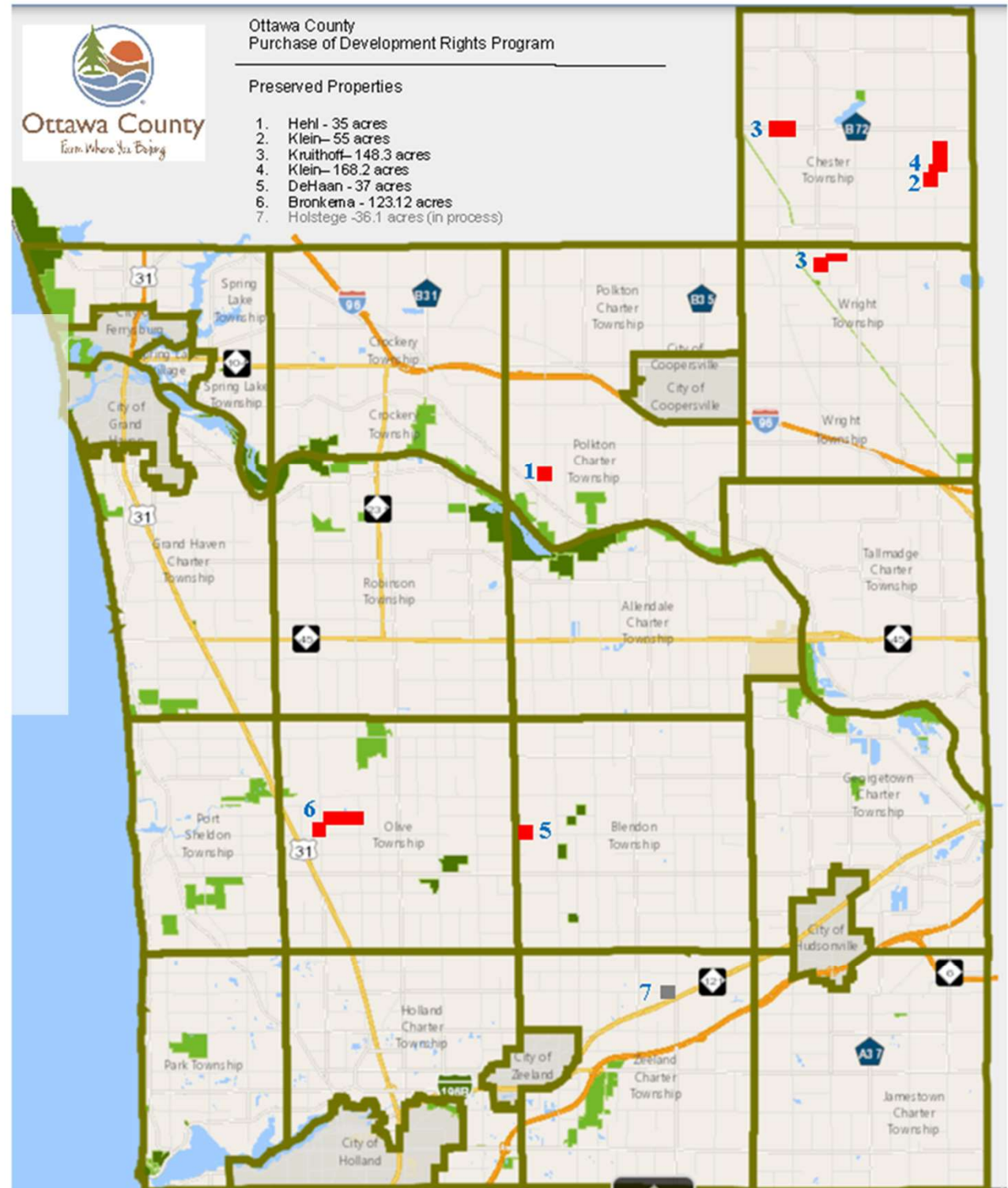
To view the Farmland Development Rights Ordinance or the PDR Application, visit www.miottawa.org/farmland, or contact plan@miottawa.org.

954 acres – locally preserved

654 acres - State preserved

1,618 acres total permanently

preserved acres



Program Data

Acres preserved	566.62	
Value of development rights	\$2,229,389	
Avg Dev Rights/acre	\$3,935	
Landowner Donation	\$643,639	(29%)
Local Program Contribution	\$317,624	(14%)
Grant Funding	\$1,268,126	(57%)







Permanently Preserved Farmland



by the Ottawa County PDR Program

Preserved in 2021 by DeHaan Farm



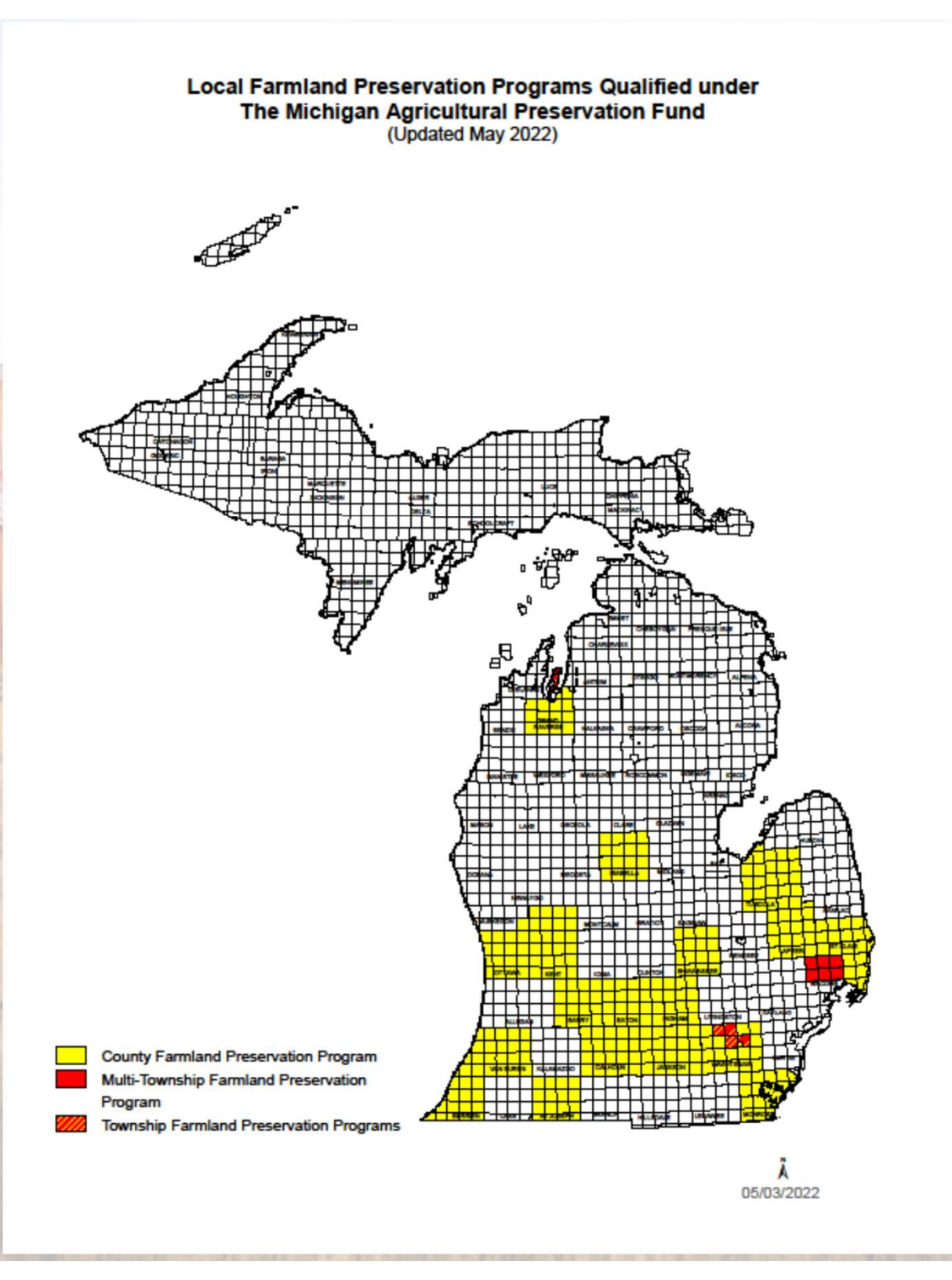
This Farm is
Environmentally
Verified



Preserved Farmland
County PDR Program



22 by the Bronkema Family



Name2	What y	How m	How is your pro	Column1
Ottawa County	2008	567	Paid staff	
Berrien County	2007	119	Paid staff	
Ann Arbor Township	2003	1,284	Paid consultant	
Scio Township	2004	1,536	Paid consultant	
Webster Township	2005	1,902	Paid consultant	
Dexter Township	2022	70	Paid consultant	
Washtenaw County	2000	7,758	Paid staff	
Acme Township	2004	1116.36	Paid consultant	
Eaton County	2005	228.5	Paid staff	
		14580.9		\$55,522,787
				\$3,808

Name2	What y	How m	How is your pr	USDA-NRCS Ag	USDA-NRCS Re	MDARD Michig	Other grants, e	Private donatic	Millages or oth	General Fund a
Ottawa County	2008	567	Paid staff	\$507,990		\$761,136		\$300,814		
Berrien County	2007	119	Paid staff	-	-	\$370,000	\$0	\$0	\$0	\$0
Ann Arbor Township	2003	1,284	Paid consultant	\$3,977,056	\$194,000	\$0	\$0	\$161,917	\$6,000,000	\$0
Scio Township	2004	1,536	Paid consultant	\$3,105,596	\$358,382	\$760,200	\$0	\$1,829,236	\$9,654,009	\$0
Webster Township	2005	1,902	Paid consultant	\$6,154,658	\$0	\$789,658	\$0	\$2,467,384	\$3,565,404	\$0
Dexter Township	2022	70	Paid consultant	\$240,100	\$0	\$245,000	\$0	\$0	\$230,000	\$300,000
Washtenaw County	2000	7,758	Paid staff	\$3,000,000	\$454,000		\$0		\$4,000,000	\$0
Acme Township	2004	1116.36	Paid consultant	\$451,250	\$708,446	\$475,750	\$764,650		\$3,380,096	\$0
Eaton County	2005	228.5	Paid staff	\$0	\$0	\$216,741	\$0	\$99,314	\$0	\$0
		14580.9		\$17,436,650	\$1,714,828	\$3,618,485	\$764,650	\$4,858,665	\$26,829,509	\$300,000

Lancaster County, PA Est. 1988 113,357 acres

A vertical photograph showing a field of tall, dry grasses in the foreground. In the background, there is a line of trees and a fence. The sky is bright and hazy. The image is oriented vertically on the page.



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Our South Dakota Heritage
From One Generation to the Next

An aerial photograph of a rural landscape. The foreground and middle ground are dominated by large, rectangular fields of crops, likely corn. A grid of black lines is overlaid on the landscape, dividing it into sections. Within these sections, numerous small, light-colored house icons are placed, suggesting a planned settlement or development. The background shows more fields, some trees, and a few scattered buildings. A semi-transparent white box with text is centered over the middle of the image.

The best time to plant a tree was 20 years ago.
The best time to protect farmland was 20 years ago.
The second best time is now.
The second best time is now.
~ Chinese Proverb