

# INVITATION TO BID

## CONSTRUCT RESTROOM ADDITION AT LAFAYETTE COMMUNITY CENTER

3026 Minnesota Avenue, Duluth, MN 55802

POSTED: June 16, 2017

Bid #: 17-0424

NOAA Award No. NA16NOS4190119

BIDS DUE: THURSDAY, JULY 6, 2017 @ 2:00 PM CST



PROPERTY & FACILITIES MANAGEMENT DIVISION  
1532 West Michigan Street  
Duluth, MN 55802

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**Purchasing Division**  
100 City Hall, 411 W. 1st Street  
Duluth, MN 55802-1189  
TEL. 218-730-5340  
[purchasing@duluthmn.gov](mailto:purchasing@duluthmn.gov)

## **INVITATION TO BID**

### **CONSTRUCT RESTROOM ADDITION AT LAFAYETTE COMMUNITY CENTER**

**BID NUMBER: 17-0424**

**BID OPENING: THURSDAY, JULY 6, 2017 AT 2:00 PM**

**PROJECT DESCRIPTION:** Construct a restroom addition on the beach side of the Lafayette Community Center. Restroom to include both men's and women's restrooms serviced by a mechanical chase. The addition will be insulated and heated. Please refer to the attached plans for more information.

Please note that this project is funded in part by a NOAA Coastal Zone Management Award; federal contract terms and conditions will be included in the contract.

**PRE-BID/WALK-THROUGH:** A **mandatory** pre-bid walk-through will be conducted on **WEDNESDAY, JUNE 21, 2017 AT 9:00 AM** at the Lafayette Community Center, located at 3026 Minnesota Avenue, Duluth, MN. **All interested bidders must attend.**

**QUESTIONS:** Please submit any questions regarding this project via e-mail to [purchasing@duluthmn.gov](mailto:purchasing@duluthmn.gov). Responses will be provided to all interested bidders as an addendum to this solicitation.

The selected contractor will be issued a construction contract. A copy of the City standard Contract for Construction, General Conditions, and Supplementary Conditions for Federally, State of Minnesota, and/or City Assisted Activities can be found at <http://www.duluthmn.gov/purchasing/forms/>. Notice to Proceed will be issued once the agreement is fully executed.

Bid forms, plans and specifications are on file at the following offices: Duluth Builder's Exchange, Minnesota Builder's Exchange, BXWI-Fox Valley Plan Room, and Blue Book Building and Construction Network.

## **INSTRUCTIONS TO BIDDERS**

All Bidders shall review the City of Duluth General Bid Specifications, which are attached.

All bids must be complete, signed, and transmitted in a sealed envelope plainly marked with the bid number, subject matter, and opening date. Bids may be mailed to the Purchasing Office, City Hall, 411 West 1st Street, Room 100, Duluth, MN 55802 or dropped off in person at the same address. Bids must be received in Purchasing before 2:00 PM local time on the bid opening date.

The City of Duluth reserves the right to split the award where there is a substantial savings to the City, to waive informalities and to reject any and all bids.

**The following documents must be submitted with your bid:**

- 1. Bid Bond** - A certified check or bank draft, payable to the order of the City of Duluth, negotiable U.S. Government Bonds (at par value), or a satisfactory bid bond executed by the bidder and acceptable surety, in an amount equal to five per cent (5%) of the total bid.
- 2. Acknowledgment of Addendum** – any changes to this solicitation will be announced via Addendum. Bidders must indicate that they have reviewed any addendum(s) by initialing and dating on the bid form where indicated. Failure to acknowledge addendum(s) may result in your bid being deemed non-

responsive.

**3. Responsible Contractor** - No construction contract in excess of \$50,000 will be awarded unless the Bidder is a "responsible contractor" as defined in Minnesota Statute §16C.285, subdivision 3. All Bidders submitting a proposal for this project must verify that they meet the minimum criteria specified in the statute by submitting a Responsible Contractor Verification and Certification of Compliance form (attached) with their bid.

The lowest responsible bidder will be required to submit the following items prior to award of a contract. Submitting these documents with your bid will assist in expediting the process.

**1. Insurance** – Contractor must provide proof of Public Liability and Automobile Liability Insurance with limits not less than \$1,500,000 Single Limit prior to the commencement of work. The City of Duluth must be named as an additional insured. Please refer to the draft Contract, Section 7.

**2. Affidavit of Non-Collusion Form**– The successful bidder shall be required to execute the attached affidavit stating that he/she has not entered into a collusive agreement with any other person, firm, or corporation in regard to any bid submitted.

**3. Performance & Payment Bonds** – The awarded contractor will be required to submit performance and payments bonds in the full amount of the project cost prior to award. Bonds must be on City forms. Copies of these forms may be found at <http://www.duluthmn.gov/purchasing/forms/>

**4. Affirmative Action/EEO** - The contractor must take affirmative action to ensure that the employees and applicants for employment are not discriminated against because of their race, color, creed, sex or national origin, and must meet the affirmative action goals. Contractors are encouraged to subcontract with Disadvantaged Business Enterprises (DBEs) when possible. A current list of certified DBEs is available on the Minnesota Unified Certification website at <http://mnucp.metc.state.mn.us> . Contractor will comply with all applicable Equal Employment Opportunity laws and regulations. Awarded contractor will submit the attached Equal Employment Opportunity (EEO) Affirmative Action Policy Statement & Compliance Certificate.

**5. Project Labor Agreement (PLA)** - A PLA will be required for any bid that is over or could virtually go over \$150,000. A copy of the City standard PLA is attached.

**6. Out of State Contractor** - Unless a State of Minnesota Certificate of Exemption is provided, any out-of-state bidder receiving a bid award will have 8% retained from invoice payments on any contracts over \$50,000. Submit a signed copy of the signed exemption form when submitting Payment and Performance Bonds. This form may be found at: [http://www.revenue.state.mn.us/Forms\\_and\\_Instructions/sde.pdf](http://www.revenue.state.mn.us/Forms_and_Instructions/sde.pdf)

**7. Prevailing Wage** - Not less than the minimum salaries and prevailing wages as set forth in the attached documents must be paid on this project.

The City of Duluth is an Equal Opportunity Employer. Contractor shall comply with all applicable Equal Employment Opportunity laws and regulations.

CITY OF DULUTH

Amanda Ashbach  
Purchasing Agent



## GENERAL BID SPECIFICATIONS

1. **General.** This document covers bids requested by the City of Duluth ("City"), including those requested on behalf of its Agents and Authorities. Each authority may issue their own purchase order or contract and will be responsible for it. The City of Duluth Authorities are as follows:
  - a. Duluth Airport Authority
  - b. Spirit Mountain Recreational Area Authority
  - c. Duluth Entertainment and Convention Center
  - d. Duluth Transit Authority
  - e. Duluth Economic Development Authority
  - f. Duluth Housing and Redevelopment Authority
2. **Investigation by Bidders.** Bidders are responsible for thoroughly reading and understanding the information, instructions, and specifications contained in this Invitation for Bids, and for investigating the site conditions at the Project location(s), if applicable. At the time of the opening of bids, each bidder will be presumed to have read and to be thoroughly familiar with the plans, specifications and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument, or document shall in no way relieve the bidder from any obligation in respect to their bid.
3. **Bidder Questions.** Responses to general questions regarding the Invitation for Bids may be made at the discretion of the City. Every request for such interpretation should be in writing and delivered via e-mail or postal mail to the Purchasing Division before the deadline indicated on the Invitation for Bids, or if no deadline is specified, at least five (5) days prior to the scheduled bid opening. Responses will be issued in writing in the form of an Addenda or e-mail to prospective bidders.
4. **Changes, Corrections & Withdrawal of Bids.** Erasures or other changes to the bid must be initialed and dated, however no special conditions shall be made or included in the bid form by the bidder.

Bidders may make requests to withdraw/replace their bids by notifying the Purchasing Division in writing prior to the bid opening date and time.
5. **Unit Pricing.** If the total bid price is based on unit pricing, the City will verify the extended bid price for each item (obtained by multiplying the unit bid price by the bid item quantity). If any item is incorrectly calculated, the City will use the unit bid price to recalculate the extended item price and the total bid price.
6. **Sales Tax.** Do not include sales tax in the unit price. A sales tax exemption certificate will be provided upon request.
7. **Bid Submission.** All bids must be complete, signed, and transmitted in a sealed envelope plainly marked with the bid number, subject matter, and opening date.

Bids may be mailed to the Purchasing Office, City Hall, 411 West 1st Street, Room 100, Duluth, MN 55802 or dropped off in person at the same address. Bids must be received by Purchasing before 2:00 PM local time on the date specified. Bids will not be accepted via e-mail unless specifically stated in the Invitation for Bids.
8. **Non-Collusion Clause.** By submitting a bid, the bidder, their agent and/or employee(s) hereby affirm that the attached bid or bids have been arrived at by the bidder independently and have been submitted without collusion with, and without agreement, understanding or planned common course of action with any other vendor of materials, supplies, equipment or services described in the Invitation for Bids, designed to limit independent bidding or competition
9. **Award.** Award, if made, will be to the responsible bidder submitting the lowest bid which complies with the conditions of the Invitation for Bids and specifications. A bid summary will be posted on the City website immediately following the bid opening. Awards for construction services and parts /supplies over \$100,000 must be approved by City Council.
10. **Bidder Qualifications.** Per Sec 41.23(e) of Duluth City Code, price may not be the only consideration for award. The City will make such investigations as deemed necessary to determine the ability, capacity and skill of the bidder to perform the work and perform it in the time specified without delay or interference, the character, integrity, reputation, judgment, experience and efficiency of the bidder, the quality of the bidder's performance of previous contracts or services, and the sufficiency of the financial resources, equipment available and ability of the bidder to perform the contract. Bidders shall furnish to the City all such information and data for this purpose, when requested.
11. **Bid Opening.** The City Purchasing Agent or her designee will conduct a public bid opening in Room 100 immediately following receipt of the bids. Results will be posted online at <http://www.duluthmn.gov/purchasing/bids-request-for-proposals/> once all bids have been reviewed.
12. **Rejection of Bids.** The City of Duluth reserves the right to reject any and all bids and to waive any informalities or irregularities in bids received whenever such rejection or waiver is in its best interests.

The City reserves the right to reject any bid if the evidence obtained by the City through such investigation fails to satisfy the City that the bidder is properly qualified to carry out the obligations of the contract and to complete the work as required by the plans and specifications.
13. **Liquidated Damages for Failure to Enter into Contract.** The successful bidder, upon their failure or refusal to accept a purchase order or execute and deliver the contract, proof of insurance and bonds required within 10 days after receipt of a notice of the acceptance of their bid, shall forfeit to the City, as liquidated damages for such failure or refusal, the security deposited with their bid (if required).
14. **Equal Employment Opportunity.** Contractor will be required to comply with all applicable Equal Employment Opportunity (EEO) laws and regulations. Affirmative action must be taken to insure that the employees and applicants for employment are not discriminated against because of their race, color, creed, sex or national origin. The City of Duluth is an equal opportunity employer.
15. **Quantities.** The City reserves the right to increase or decrease the quantities of items within reason, unless otherwise noted.
16. **Prevailing Wages.** Per Sec 2-26 of Duluth City Code, payment of not less than the prevailing wage and salary rates specified in the contract documents and the conditions of employment with respect to certain categories and classifications of employees is required for all "Public Works" type projects estimated to exceed \$2,000. This does not apply to off-site production and manufacturing of parts and supplies.

The rates set forth under the General Conditions are the minimums to be paid during the life of the contract. It is therefore the responsibility of bidders to inform themselves as to local labor conditions, such as the length of work day and work week, overtime compensation, health and welfare contributions, labor supply, and prospective changes or adjustments of rates.
17. **Validity of Bids:** All bids must remain firm for 60 days from the date of bid opening, unless another period is noted in bid documents or if an extension is agreed upon, in writing prior to the end of the 60-day period.
18. **Insurance.** All vendors doing work on City property, except vendors making routine deliveries, shall submit an insurance certificate verifying insurance coverage as per current city requirements.

**BID FORM**  
**BID # 17-0424**  
**CONSTRUCT RESTROOM ADDITION AT LAFAYETTE COMMUNITY**  
**CENTER**

ITEM	PRICE
Lump sum to provide all labor and materials to construct restroom addition in accordance with the plans and specifications.	\$

\_\_\_\_\_  
TOTAL PRICE IN WRITING

**ACKNOWLEDGMENT OF ADDENDA**

ADDENDUM #	INITIAL/DATE
ADDENDUM #	INITIAL/DATE
ADDENDUM #	INITIAL/DATE
ADDENDUM #	INITIAL/DATE

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name/Title \_\_\_\_\_

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Tel. \_\_\_\_\_ E-Mail \_\_\_\_\_

If your organization is certified as a Disadvantaged Business Enterprise, please check here:

**THIS FORM MUST BE RETURNED WITH YOUR BID**

**PRIME CONTRACTOR RESPONSE**

**RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE**

**STATE PROJECT NUMBER:** \_\_\_\_\_

**This form includes changes by statutory references from the Laws of Minnesota 2015, chapter 64, sections 1-9. This form must be submitted with the response to this solicitation. A response received without this form, will be rejected.**

<p>Minn. Stat. § 16C.285, Subd. 7. <b>IMPLEMENTATION.</b> ... any prime contractor or subcontractor or motor carrier that does not meet the minimum criteria in subdivision 3 or fails to verify that it meets those criteria is not a responsible contractor and is not eligible to be awarded a construction contract for the project or to perform work on the project...</p>	
<p>Minn. Stat. § 16C.285, Subd. 3. <b>RESPONSIBLE CONTRACTOR, MINIMUM CRITERIA.</b> "Responsible contractor" means a contractor that conforms to the responsibility requirements in the solicitation document for its portion of the work on the project and verifies that it meets the following minimum criteria:</p>	
<p>(1)</p>	<p>The Contractor:</p> <ul style="list-style-type: none"><li>(i) is in compliance with workers' compensation and unemployment insurance requirements;</li><li>(ii) is in compliance with Department of Revenue and Department of Employment and Economic Development registration requirements if it has employees;</li><li>(iii) has a valid federal tax identification number or a valid Social Security number if an individual; and</li><li>(iv) has filed a certificate of authority to transact business in Minnesota with the Secretary of State if a foreign corporation or cooperative.</li></ul>
<p>(2)</p>	<p>The contractor or related entity is in compliance with and, during the three-year period before submitting the verification, has not violated section 177.24, 177.25, 177.41 to 177.44, 181.13, 181.14, or 181.722, and has not violated United States Code, title 29, sections 201 to 219, or United States Code, title 40, sections 3141 to 3148. For purposes of this clause, a violation occurs when a contractor or related entity:</p> <ul style="list-style-type: none"><li>(i) repeatedly fails to pay statutorily required wages or penalties on one or more separate projects for a total underpayment of \$25,000 or more within the three-year period, provided that a failure to pay is "repeated" only if it involves two or more separate and distinct occurrences of underpayment during the three-year period;</li><li>(ii) has been issued an order to comply by the commissioner of Labor and Industry that has become final;</li><li>(iii) has been issued at least two determination letters within the three-year period by the Department of Transportation finding an underpayment by the contractor or related entity to its own employees;</li><li>(iv) has been found by the commissioner of Labor and Industry to have repeatedly or willfully violated any of the sections referenced in this clause pursuant to section 177.27;</li><li>(v) has been issued a ruling or findings of underpayment by the administrator of the Wage and Hour Division of the United States Department of Labor that have become final or have been upheld by an administrative law judge or the Administrative Review Board; or</li><li>(vi) has been found liable for underpayment of wages or penalties or misrepresenting a construction worker as an independent contractor in an action brought in a court having jurisdiction. Provided that, if the contractor or related entity contests a determination of underpayment by the Department of Transportation in a contested case proceeding, a violation does not occur until the contested case proceeding has concluded with a determination that the contractor or related entity underpaid wages or penalties;*</li></ul>

(3)	The contractor or related entity is in compliance with and, during the three-year period before submitting the verification, has not violated section 181.723 or chapter 326B. For purposes of this clause, a violation occurs when a contractor or related entity has been issued a final administrative or licensing order;*
(4)	The contractor or related entity has not, more than twice during the three-year period before submitting the verification, had a certificate of compliance under section 363A.36 revoked or suspended based on the provisions of section 363A.36, with the revocation or suspension becoming final because it was upheld by the Office of Administrative Hearings or was not appealed to the office;*
(5)	The contractor or related entity has not received a final determination assessing a monetary sanction from the Department of Administration or Transportation for failure to meet targeted group business, disadvantaged business enterprise, or veteran-owned business goals, due to a lack of good faith effort, more than once during the three-year period before submitting the verification;*
	* Any violations, suspensions, revocations, or sanctions, as defined in clauses (2) to (5), occurring prior to July 1, 2014, shall not be considered in determining whether a contractor or related entity meets the minimum criteria.
(6)	The contractor or related entity is not currently suspended or debarred by the federal government or the state of Minnesota or any of its departments, commissions, agencies, or political subdivisions that have authority to debar a contractor; and
(7)	All subcontractors and motor carriers that the contractor intends to use to perform project work have verified to the contractor through a signed statement under oath by an owner or officer that they meet the minimum criteria listed in clauses (1) to (6).

Minn. Stat. § 16C.285, Subd. 5. **SUBCONTRACTOR VERIFICATION.**

A prime contractor or subcontractor shall include in its verification of compliance under subdivision 4 a list of all of its first-tier subcontractors that it intends to retain for work on the project. Prior to execution of a construction contract, and as a condition precedent to the execution of a construction contract, the apparent successful prime contractor shall submit to the contracting authority a supplemental verification under oath confirming compliance with subdivision 3, clause (7). Each contractor or subcontractor shall obtain from all subcontractors with which it will have a direct contractual relationship a signed statement under oath by an owner or officer verifying that they meet all of the minimum criteria in subdivision 3 prior to execution of a construction contract with each subcontractor.

If a prime contractor or any subcontractor retains additional subcontractors on the project after submitting its verification of compliance, the prime contractor or subcontractor shall obtain verifications of compliance from each additional subcontractor with which it has a direct contractual relationship and shall submit a supplemental verification confirming compliance with subdivision 3, clause (7), within 14 days of retaining the additional subcontractors.

A prime contractor shall submit to the contracting authority upon request copies of the signed verifications of compliance from all subcontractors of any tier pursuant to subdivision 3, clause (7). A prime contractor and subcontractors shall not be responsible for the false statements of any subcontractor with which they do not have a direct contractual relationship. A prime contractor and subcontractors shall be responsible for false statements by their first-tier subcontractors with which they have a direct contractual relationship only if they accept the verification of compliance with actual knowledge that it contains a false statement.

Subd. 5a. **Motor carrier verification.** A prime contractor or subcontractor shall obtain annually from all motor carriers with which it will have a direct contractual relationship a signed statement under oath by an owner or officer verifying that they meet all of the minimum criteria in subdivision 3 prior to execution of a construction contract with each motor carrier. A prime contractor or subcontractor shall require each such motor carrier to provide it with immediate written notification in the event that the motor carrier no longer meets one or more of the minimum criteria in subdivision 3 after submitting its annual verification. A motor carrier shall be ineligible to perform work on a project covered by this section if it does not meet all the minimum criteria in subdivision 3. Upon request, a prime contractor or subcontractor shall submit to the contracting authority the signed verifications of compliance from all motor carriers providing for-hire transportation of materials, equipment, or supplies for a project.



Minn. Stat. § 16C.285, Subd. 4. **VERIFICATION OF COMPLIANCE.**

A contractor responding to a solicitation document of a contracting authority shall submit to the contracting authority a signed statement under oath by an owner or officer verifying compliance with each of the minimum criteria in subdivision 3, with the exception of clause (7), at the time that it responds to the solicitation document.

A contracting authority may accept a signed statement under oath as sufficient to demonstrate that a contractor is a responsible contractor and shall not be held liable for awarding a contract in reasonable reliance on that statement. A prime contractor, subcontractor, or motor carrier that fails to verify compliance with any one of the required minimum criteria or makes a false statement under oath in a verification of compliance shall be ineligible to be awarded a construction contract on the project for which the verification was submitted.

A false statement under oath verifying compliance with any of the minimum criteria may result in termination of a construction contract that has already been awarded to a prime contractor or subcontractor or motor carrier that submits a false statement. A contracting authority shall not be liable for declining to award a contract or terminating a contract based on a reasonable determination that the contractor failed to verify compliance with the minimum criteria or falsely stated that it meets the minimum criteria. A verification of compliance need not be notarized. An electronic verification of compliance made and submitted as part of an electronic bid shall be an acceptable verification of compliance under this section provided that it contains an electronic signature as defined in section 325L.02, paragraph (h).

**CERTIFICATION**

**By signing this document I certify that I am an owner or officer of the company, and I swear under oath that:**

- 1) My company meets each of the Minimum Criteria to be a responsible contractor as defined herein and is in compliance with Minn. Stat. § 16C.285, and**
- 2) if my company is awarded a contract, I will submit Attachment A-1 prior to contract execution, and**
- 3) if my company is awarded a contract, I will also submit Attachment A-2 as required.**

**Authorized Signature of Owner or Officer:**

**Printed Name:**

**Title:**

**Date:**

**Company Name:**

NOTE: Minn. Stat. § 16C.285, Subd. 2, (c) If only one prime contractor responds to a solicitation document, a contracting authority may award a construction contract to the responding prime contractor even if the minimum criteria in subdivision 3 are not met.

**ATTACHMENT A-1**

**FIRST-TIER SUBCONTRACTORS LIST**

**SUBMIT PRIOR TO EXECUTION OF A CONSTRUCTION CONTRACT**

**STATE PROJECT NUMBER:** \_\_\_\_\_

Minn. Stat. § 16C.285, Subd. 5. A prime contractor or subcontractor shall include in its verification of compliance under subdivision 4 a list of all of its first-tier subcontractors that it intends to retain for work on the project. Prior to execution of a construction contract, and as a condition precedent to the execution of a construction contract, the apparent successful prime contractor shall submit to the contracting authority a supplemental verification under oath confirming compliance with subdivision 3, clause (7). Each contractor or subcontractor shall obtain from all subcontractors with which it will have a direct contractual relationship a signed statement under oath by an owner or officer verifying that they meet all of the minimum criteria in subdivision 3 prior to execution of a construction contract with each subcontractor.

<b>FIRST TIER SUBCONTRACTOR NAMES* (Legal name of company as registered with the Secretary of State)</b>	<b>Name of city where company home office is located</b>

\*Attach additional sheets as needed for submission of all first-tier subcontractors.

<b>SUPPLEMENTAL CERTIFICATION FOR ATTACHMENT A-1</b>	
<p><b>By signing this document I certify that I am an owner or officer of the company, and I swear under oath that:</b></p> <p><b>All first-tier subcontractors listed on attachment A-1 have verified through a signed statement under oath by an owner or officer that they meet the minimum criteria to be a responsible contractor as defined in Minn. Stat. § 16C.285.</b></p>	
<b>Authorized Signature of Owner or Officer:</b>	<b>Printed Name:</b>
<b>Title:</b>	<b>Date:</b>
<b>Company Name:</b>	

**ATTACHMENT A-2**

**ADDITIONAL SUBCONTRACTORS LIST**

**PRIME CONTRACTOR TO SUBMIT AS SUBCONTRACTORS ARE ADDED TO THE PROJECT**

**STATE PROJECT NUMBER:** \_\_\_\_\_

This form must be submitted to the Project Manager or individual as identified in the solicitation document.

Minn. Stat. § 16C.285, Subd. 5. ... If a prime contractor or any subcontractor retains additional subcontractors on the project after submitting its verification of compliance, the prime contractor or subcontractor shall obtain verifications of compliance from each additional subcontractor with which it has a direct contractual relationship and shall submit a supplemental verification confirming compliance with subdivision 3, clause (7), within 14 days of retaining the additional subcontractors. ...

<b>ADDITIONAL SUBCONTRACTOR NAMES* (Legal name of company as registered with the Secretary of State)</b>	<b>Name of city where company home office is located</b>

\*Attach additional sheets as needed for submission of all additional subcontractors.

<b>SUPPLEMENTAL CERTIFICATION FOR ATTACHMENT A-2</b>	
<p><b>By signing this document I certify that I am an owner or officer of the company, and I swear under oath that:</b></p> <p><b>All additional subcontractors listed on Attachment A-2 have verified through a signed statement under oath by an owner or officer that they meet the minimum criteria to be a responsible contractor as defined in Minn. Stat. § 16C.285.</b></p>	
<b>Authorized Signature of Owner or Officer:</b>	<b>Printed Name:</b>
<b>Title:</b>	<b>Date:</b>
<b>Company Name:</b>	

**AFFIDAVIT AND INFORMATION REQUIRED OF BIDDERS**

Affidavit of Non-Collusion:

I hereby swear (or affirm) under penalty of perjury:

- 1) That I am the bidder (if the bidder is an individual), a partner in the bidder (if the bidder is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the bidder is a corporation);
- 2) That the attached bid or bids have been arrived at by the bidder independently and have been submitted without collusion with and without agreement, understanding, or planned common course of action with any other vendor of materials, supplies, equipment or services described in the invitation to bid, designed to limit independent bidding or competition;
- 3) That the contents of the bid or bids have not been communicated by the bidder or its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid or bids and will not be communicated to any such person prior to the official opening of the bid or bids;
- 4) That a family relationship between a City of Duluth employee and bidder/proposer are in non-collusion; and
- 5) That I have fully informed myself regarding the accuracy of the statements made in this affidavit.

Signed: \_\_\_\_\_

Firm Name: \_\_\_\_\_

Subscribed and sworn to me before this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_

NOTARY PUBLIC \_\_\_\_\_

My commission expires: \_\_\_\_\_

Bidder's Federal Identification Number \_\_\_\_\_

**EQUAL EMPLOYMENT OPPORTUNITY EEO AFFIRMATIVE ACTION  
POLICY STATEMENT & COMPLIANCE CERTIFICATE**

**TO: City of Duluth, MN      PROJECT NUMBER & DESCRIPTION \_\_\_\_\_**

**FROM: \_\_\_\_\_**

(Vendor's name, address, telephone number)

**A) Employment:** It is the policy of the above named FIRM to afford equal opportunity for employment to all individuals regardless of race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance and/or disability. The FIRM will take affirmative action to ensure that we will: (1) recruit, hire, and promote all job classifications without regard to race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability, except where sex is a bona fide occupational qualification; (2) base decisions on employment so as to further the principle of equal employment opportunity; (3) ensure that promotion decisions are in accord with the principles of equal employment opportunity by imposing only valid requirements for promotional opportunities; (4) ensure that all personnel actions such as compensation, benefits, transfers, layoffs, return from layoff, FIRM sponsored training, education tuition assistance, social and recreational programs will be administered without regard to race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability. The FIRM also intends full compliance with Veteran affirmative action requirements. Additionally, minority and female employees shall be encouraged to participate in all FIRM activities and refer applicants.

I have designated (name) \_\_\_\_\_ to direct the establishment of and to monitor the implementation of personnel procedures to guide the FIRM's affirmative action program. Where PROJECTS exceed \$500,000, this official shall also serve as the liaison officer that administers the FIRM's "Minority Business Enterprise Program." This official is charged with designing and implementing audit and reporting systems that will keep management informed on a monthly basis of the status of the equal opportunity area.

Supervisors have been made to understand that their work performance is being evaluated on the basis of their equal opportunity efforts and results, as well as other criteria. It shall be the responsibility of the FIRM and its supervisors to take actions to prevent harassment of employees placed through affirmative action efforts.

**B) Reports:** Unless exempted by law and regulation, the FIRM shall make available and file those reports related to equal opportunity as may be required by the City of Duluth and State and Federal compliance agencies. Requirements and Reports are defined in 41CFR60 "Compliance Responsibility for Equal Opportunity" published by the U. S. Department of Labor which is incorporated herein by reference. Additional requirements are defined in various State and Federal Civil Rights Legislation and Rules promulgated thereunder.

**C) Nonsegregated Facilities:** The FIRM certifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The FIRM certifies that it will not maintain or provide for its employees any segregated facilities at any of its establishments and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The FIRM agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this certificate. As used in this Certification, the term "segregated

facilities” means any waiting rooms, work area, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation for entertainment area, transportation, and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise.

- D) Affirmative Action Compliance Program:** Unless exempted by regulation and law, the FIRM—if the FIRM has 50 or more employees and if the value of current contracts with the City of Duluth exceeds \$50,000—shall prepare and maintain a written affirmative action compliance program that meets the requirement as set forth in 41CFR60.
- E) Non-Compliance:** The FIRM certifies that it is not currently in receipt of any outstanding letters of deficiencies, show cause, probable cause, or other such notification of non-compliance with EEO Laws and Regulations.
- F) Employment Goals - “Construction” Projects:** It shall be the goal of the FIRM if the PROJECT is of a construction nature that in all on-site employment generated that no less than 3% of the on-site workforce will be minority employees and that no less than 7% of the on-site workforce will be female employees. Further, it is the goal of the FIRM if the PROJECT is of a construction nature that in all on-site employment generated that no less than 3% of the work hours generated shall be worked by minority employees and that no less than 7% of the work hours generated shall be worked by female employees.
- G) Subcontractors:** The FIRM will for all its PROJECT subcontractors regardless of tier (unless exempted by law and regulation) that received in excess of \$2,500 require that: (1) the subcontractor shall execute an “EEO Statement and Certification” similar in nature to this “Statement and Certification”, (2) said documentation to be maintained on file with the FIRM or subcontractor as may be appropriate.

Executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ by:

\_\_\_\_\_  
Printed name and title

\_\_\_\_\_  
Signature

**NOTE:** In addition to the various remedies prescribed for violation of Equal Opportunity Laws, the penalty for false statements is prescribed in 18 U.S.C. 1001.

**CITY OF DULUTH  
ADDITIONAL CONDITIONS FOR NATIONAL OCEANIC AND ATMOSPHERIC  
ADMINISTRATION (NOAA) FUNDED PROJECTS**

This project is grant funded through the National Coastal Zone Management Program. The awarded Contractor shall comply with the following additional conditions:

**1. NOAA Award Number**

The contractor shall include the NOAA Award Number on all paperwork submitted in relation to this project, including but not limited to invoices, pay applications, certified payrolls, etc. The NOAA Award Number for this project is **NA16NOS4190119**.

**2. Invoicing**

All invoices shall be itemized and include the following information:

- a. Name and address of Contractor
- b. Name of invoice recipient and organization (City of Duluth)
- c. Date of purchase or work
- d. Description of item(s) or work purchased
- e. Quantity of item(s) or work purchased
- f. Unit price for each item
- g. Total amount spent for each item

The contractor shall submit an invoice for all purchases and work performed through June 30th separately, as the NOAA grant's fiscal year ends June 30th. This invoice shall be submitted to the City no later than July 10<sup>th</sup>.

**3. Project Documentation**

The contractor shall be responsible for providing photographic documentation of the progress of the project.

- a. Photos shall be taken at each milestone; or at minimum at least once per week.
- b. Photo file names shall include the subject matter and a time stamp.
- c. Photos shall be submitted with each pay application. Failure to do so will delay processing the pay application.

In addition, the Contractor shall provide any and all additional information required by NOAA, if requested by the City.

**4. Permits**

All applicable permits shall be obtained by the Contractor and turned in to the City Project Coordinator before work related to the permit commences.

**5. Invasive Species Prevention**

The Minnesota Department of Natural Resources (MNDNR) requires grantees (the City) and Contractors to take active steps to prevent or limit the introduction, establishment, and spread of invasive species. Contractors and subcontractors shall prevent invasive species from entering into, spreading within, or leaving a project site by performing the following preventive measures:

- a. Contractor shall inspect all equipment, vehicles, gear, and/or clothing at the project site for soil, aggregate material, mulch, vegetation (including seeds) or animals upon arrival to the job site and prior to leaving the job site. If any soil, aggregate material, mulch, vegetation (including seeds) or animals are found, they must be removed/cleaned using

**CITY OF DULUTH**  
**ADDITIONAL CONDITIONS FOR NATIONAL OCEANIC AND ATMOSPHERIC**  
**ADMINISTRATION (NOAA) FUNDED PROJECTS**

a brush or broom, compressed air or a pressure washer at the staging area. The contractor shall dispose of material cleaned from equipment and clothing onsite. If the material cannot be disposed of onsite, secure material prior to transport in a sealed container, covered truck, or wrap the material with a tarp and legally dispose of the material offsite.

- b. When moving materials:
- i. Do not plant or introduce prohibited or regulated invasive species or other invasive species as listed on the MNDNR website (<http://www.dnr.state.mn.us/invasives/dnrlands.html>) and in the MNDNR's Operational Order 113 Invasive Species List ([http://files.dnr.state.mn.us/assistance/grants/habitat/heritage/oporder\\_113.pdf](http://files.dnr.state.mn.us/assistance/grants/habitat/heritage/oporder_113.pdf) see page 2).
  - ii. Use only mulch, soil, gravel, etc. that is invasive species-free or has a very low likelihood of having invasive species. When possible, use certified weed-free products such as weed-free seed or hay.
  - iii. Inspect transplanted vegetation for signs of any other plant material and/or animals, that may be attached to the vegetation and remove any that are found.
  - iv. Do not move soil or raw wood products that may harbor invasive species from infested sites.
- c. Parking, staging areas, and travel routes shall not be within areas known to have infestations of invasive species.

**6. Pollinator Best Management Practices**

Both the MNDNR and the City have adopted guidelines to ensure an appropriate diversity of native species and to provide habitat for pollinators throughout the growing season. For that reason, the majority of plants called out in the plans are flowering forbs that will provide nectar for native bees. In addition, the seed mix specified for restoring areas disturbed by construction consists of native species and includes several different pollinator-friendly species.

Contractors shall follow the MNDNR pollinator best practices and guidelines. Please refer to the MNDNR website for more information [http://www.dnr.state.mn.us/pollinator\\_resources/index.html](http://www.dnr.state.mn.us/pollinator_resources/index.html)

**7. Other Environmental Impacts – Piping Plover**

The piping plover was designated a state endangered species in Minnesota in 1984. Contractor shall immediately notify the City Project Coordinator, and cease all work on the project if evidence of piping plover nesting areas or nesting activity is discovered that will be affected by the project.

**8. Whistleblower Protection Rights**

All employees of grantees, contractors and subcontractors working on this project will be subject to the whistleblower rights and remedies in the pilot program on Award Recipient employee whistleblower protections established at [41 U.S.C. 4712](#) by section 828 of the National Defense Authorization Act for Fiscal Year 2013 (Pub.L. 112-239).



**CITY OF DULUTH**  
**ADDITIONAL CONDITIONS FOR NATIONAL OCEANIC AND ATMOSPHERIC**  
**ADMINISTRATION (NOAA) FUNDED PROJECTS**

- a. Contractors shall inform its employees in writing, in the predominant language of the workforce, of employee whistleblower rights and protections under 41 U.S.C.4712, which states that an employee of a contractor, subcontractor, or grantee may not be discharged, demoted, or otherwise discriminated against as a reprisal for disclosing to a person or body described in 4712(a)(2) information that the employee reasonably believes is evidence of gross mismanagement of a Federal contract or grant, a gross waste of Federal funds, an abuse of authority relating to a Federal contract or grant, a substantial and specific danger to public health or safety, or a violation of law, rule, or regulation related to a Federal contract (including the competition for or negotiation of a contract) or grant.
- b. Contractors shall insert the substance of this clause, including these paragraphs a and b, in all subcontracts over the simplified threshold, which is currently \$150,000.

General Decision Number: MN170041 05/26/2017 MN41

Superseded General Decision Number: MN20160041

State: Minnesota

Construction Type: Building

County: St Louis County in Minnesota.

**BUILDING CONSTRUCTION PROJECTS** (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/06/2017
1	01/20/2017
2	02/03/2017
3	02/17/2017
4	04/14/2017
5	05/26/2017

ASBE0049-007 06/01/2016

Rates	Fringes
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ASBESTOS WORKER/HEAT & FROST INSULATOR (Includes the application of all insulating materials, protective coverings, coatings & finishes to all types of mechanical systems).....	\$ 28.77	24.70
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BOIL0647-007 01/01/2017

Rates	Fringes
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BOILERMAKER.....	\$ 35.65	29.89
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\* BRMN0001-050 05/01/2017

ST LOUIS (Remaining Northern part)

Rates Fringes

TILE SETTER.....\$ 25.20 23.63

\* BRMN0003-008 05/01/2017

ST. LOUIS COUNTY (City of Duluth and South of a line between Townships #54 & #55, 2 miles north of Cotton)

Rates Fringes

BRICKLAYER.....\$ 33.95 23.73

\* BRMN0003-011 05/01/2017

ST. LOUIS (City of Duluth and south of Township Line 55)

Rates Fringes

TILE SETTER.....\$ 25.20 23.63

\* BRMN0016-002 05/01/2017

ST. LOUIS COUNTY (North of a line between Townships #54 & #55, 2 miles north of Cotton)

Rates Fringes

BRICKLAYER.....\$ 32.83 24.85

CARP0068-005 07/01/2012

Rates Fringes

SOFT FLOOR LAYER.....\$ 30.94 11.75

CARP0361-012 05/01/2016

DULUTH AREA including Alborn, Arnold, Bartlett, Birch, Brookstone, Canyon, Clinton, Culver, Floodwood, Gowan, Island, Kelsey, Lakewood, Meadowlands, Munger, Palmers, Payne, Prasit, Shaw, Taft)

Rates Fringes

CARPENTER (Including Acoustical Installation,

Drywall Hanging, Form Work &  
Overhead Door Installation).....\$ 29.97      16.96

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CARP0606-001 05/01/2015

EXCLUDING DULUTH AREA

Rates      Fringes

CARPENTER (Including  
Acoustical Installation,  
Drywall Hanging, Form Work &  
Overhead Door Installation).....\$ 29.45      14.37

-----  
ELEC0242-012 05/29/2016

ST. LOUIS (South part bounded on the north by the north line of  
Kelsey Township extended east & west)

Rates      Fringes

ELECTRICIAN.....\$ 34.92      25.05

-----  
ELEC0294-006 05/29/2016

ST. LOUIS (North part bounded on the south by the south line of  
Ellsburg Township, extended east & west)

Rates      Fringes

ELECTRICIAN.....\$ 35.60      71.72%

-----  
ENGI0049-045 05/01/2016

Rates      Fringes

OPERATOR: Power Equipment

GROUP 1.....	\$ 39.14	18.40
GROUP 2.....	\$ 38.80	18.40
GROUP 3.....	\$ 37.39	18.40
GROUP 4.....	\$ 37.05	18.40
GROUP 5.....	\$ 36.13	18.40
GROUP 6.....	\$ 34.62	18.40
GROUP 7.....	\$ 33.50	18.40
GROUP 8.....	\$ 31.49	18.40

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Truck & Crawler Crane with 200' of Boom & Over,  
including Jib (\$.50 premium with 300' of Boom & over,  
including jib); & Tower Crane 250' & Over.

GROUP 2: Truck & Crawler Crane with 150' of Boom, up to but not including 200' of Boom, including Jib; & Tower Crane 200' & Over.

GROUP 3: Traveling Tower Crane; Truck & Crawler Crane, up to but not including 150' of Boom, including Jib; Tower Crane (Stationary) up to 200'; All-Terrain Vehicle Crane, Boom Truck over 100 ft.

GROUP 4: Backhoe/Track/Trackhoe, Hoist (3 drums or more); Overhead Crane (inside building perimeter), Excavator.

GROUP 5: Asphalt Spreader, Bulldozer, Curb Machine, Drill, Forklift, Compressor 450 CFM or over (2 or more machines); Boom Truck up to 100 ft, Loader over 1 cu yd, Hoist (1 or 2 drums); Mechanic; Milling Machine, Roller, Scraper, Tractor over D2.

GROUP 6: Bobcat/Skid Loader, Loader up to 1 cu. yd., Tractor D2 or similar size.

GROUP 7: Compressor 600 CFM or over, Crane Oiler.

GROUP 8: Oiler.

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IRON0512-018 06/05/2016

Rates Fringes

IRONWORKER, ORNAMENTAL,  
REINFORCING, AND STRUCTURAL.....\$ 31.54 24.90

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LABO1091-011 01/01/2016

Rates Fringes

LABORER (ASBESTOS ABATEMENT)  
Removal from Floors, Walls  
& Ceilings.....\$ 29.20 17.43

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LABO1091-013 05/01/2012

ST. LOUIS (South of T 55 N)

Rates Fringes

Laborers:

GROUP 1.....	\$ 21.95	14.93
GROUP 2.....	\$ 22.10	14.93
GROUP 3.....	\$ 22.35	14.93
GROUP 4.....	\$ 22.65	14.93

LABORER CLASSIFICATIONS

GROUP 1: Common or General, Asphalt Shoveler, Carpenter  
Tender, Form Stripping

GROUP 2: Vibrating Plate

GROUP 3: Pipelayer

GROUP 4: Mason Tender (Brick, Cement/Concrete)

-----  
LABO1097-008 05/01/2012

ST.LOUIS (North of T 55N)

Rates Fringes

LABORER

GROUP 1.....	\$ 20.62	16.25
GROUP 2.....	\$ 21.02	16.25

LABORERS CLASSIFICATIONS

GROUP 1 - Common or General, Asphalt Shoveler, Carpenter  
Tender, Form Stripping, Mason Tender (Brick,  
Cement/Concrete)

GROUP 2 - Pipelayer, Vibrating Plate

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PAIN0106-001 05/02/2016

Rates Fringes

GLAZIER.....	\$ 30.17	17.47
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FOOTNOTE:

1 to 4 years service - 1 week paid vacation; 5 to 11 years -  
2 weeks paid vacation; 11 years or more - 3 weeks paid  
vacation

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PAIN0106-013 05/02/2016

Rates Fringes

Painters:

New:

Brush, Roller.....	\$ 29.86	16.35
Spray, Drywall		
Finisher/Taper.....	\$ 30.46	16.35

Repaint:

Brush, Roller.....	\$ 28.36	16.35
Spray, Drywall		

Finisher/Taper.....\$ 28.96 16.35

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PLAS0633-024 05/01/2016

ST. LOUIS (North of White Face River) COUNTIES

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 29.46 15.77

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PLAS0633-059 05/01/2016

CARLTON & ST. LOUIS (South of T 55N) COUNTIES

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 30.86 17.13

-----  
PLUM0011-019 05/02/2016

ST. LOUIS (South of an east-west line drawn through Cotton)

Rates Fringes

PLUMBER/PIPEFITTER.....\$ 39.07 18.73

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PLUM0589-007 05/01/2016

ST. LOUIS (North of an East- West line drawn through Cotton)

Rates Fringes

PLUMBER/PIPEFITTER

Contracts \$90,000.00 and  
under.....\$ 39.25 18.66

Contracts over \$90,000.00...\$ 39.25 18.66

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ROOF0096-024 07/01/2016

ST. LOUIS (South of Hwy 16, excluding City of Forbes)

Rates Fringes

ROOFER.....\$ 33.00 15.12

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ROOF0096-025 05/01/2016

ST. LOUIS (Remaining Northern two-thirds)

Rates Fringes

ROOFER.....\$ 29.00 11.82

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SHEE0010-045 05/01/2016

ST. LOUIS (Southern one-third)

Rates Fringes

SHEET METAL WORKER (Including HVAC Duct Installation).....\$ 31.87 25.09

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SHEE0010-056 05/01/2016

ST. LOUIS (Northern two-thirds)

Rates Fringes

SHEET METAL WORKER (Including HVAC Duct Installation).....\$ 30.51 23.90

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SUMN2009-050 07/27/2009

Rates Fringes

LABORER: Landscape.....\$ 12.88 4.61

TRUCK DRIVER: Dump Truck.....\$ 19.15 5.70

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).



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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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## WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE  
FUNDED CONSTRUCTION PROJECTS



**THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE**

**Construction Type: Commercial**

**County Number: 69**

County Name: ST. LOUIS

Effective: 2016-12-27 Revised: 2017-05-08

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate.

Violations should be reported to:

Department of Labor and Industry  
Prevailing Wage Section  
443 Lafayette Road N  
St Paul, MN 55155  
(651) 284-5091  
[DLI.PrevWage@state.mn.us](mailto:DLI.PrevWage@state.mn.us)

\* Indicates that adjacent county rates were used for the labor class listed.

**County: ST. LOUIS (69)**

<b>LABOR CODE AND CLASS</b>	<b>EFFECT DATE</b>	<b>BASIC RATE</b>	<b>FRINGE RATE</b>	<b>TOTAL RATE</b>
<b>LABORERS (101 - 112) (SPECIAL CRAFTS 701 - 730)</b>				
101 LABORER, COMMON (GENERAL LABOR WORK)	2016-12-27	24.14	16.92	41.06
102 LABORER, SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	2016-12-27	24.14	16.92	41.06

103	LABORER, LANDSCAPING (GARDENER, SOD LAYER AND NURSERY OPERATOR)	2016-12-27	20.62	16.25	36.87
104*	FLAG PERSON	2016-12-27	24.14	16.92	41.06
105*	WATCH PERSON	FOR RATE CALL 651-284-5091 OR EMAIL <u><a href="mailto:DLI.PRE VWAGE@STATE.MN.US">DLI.PRE VWAGE@STATE.MN.US</a></u>			
106	BLASTER	2016-12-27	24.84	16.92	41.76
107	PIPELAYER (WATER, SEWER AND GAS)	2016-12-27	31.73	17.02	48.75
108	TUNNEL MINER	FOR RATE CALL 651-284-5091 OR EMAIL <u><a href="mailto:DLI.PRE VWAGE@STATE.MN.US">DLI.PRE VWAGE@STATE.MN.US</a></u>			
109	UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)	2016-12-27	29.93	17.02	46.95
110	SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.	2016-12-27	24.14	16.92	41.06
111	TRAFFIC CONTROL PERSON (TEMPORARY SIGNAGE)	FOR RATE CALL 651-284-5091 OR EMAIL <u><a href="mailto:DLI.PRE VWAGE@STATE.MN.US">DLI.PRE VWAGE@STATE.MN.US</a></u>			

**SPECIAL EQUIPMENT (201 - 204)**

201	ARTICULATED HAULER	2016-12-27	36.13	18.40	54.53
		2017-05-01	37.83	18.65	56.48

202	BOOM TRUCK	2016-12-27	36.13	18.40	54.53
		2017-05-01	37.83	18.65	56.48
203	LANDSCAPING EQUIPMENT, INCLUDES HYDRO SEEDER OR MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS	2016-12-27	35.65	17.15	52.80
204*	OFF-ROAD TRUCK	2016-12-27	36.13	18.40	54.53
		2017-05-01	37.83	18.65	56.48
205	PAVEMENT MARKING OR MARKING REMOVAL EQUIPMENT (ONE OR TWO PERSON OPERATORS); SELF-PROPELLED TRUCK OR TRAILER MOUNTED UNITS.	2016-12-27	26.91	19.87	46.78

#### **HIGHWAY/HEAVY POWER EQUIPMENT OPERATOR**

<b>GROUP 2</b>		2016-12-27	32.92	17.20	50.12
306	GRADER OR MOTOR PATROL				
308	TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)				
<b>GROUP 3</b>		2016-12-27	33.84	18.90	52.74
		2017-05-01	34.04	19.70	53.74
309	ASPHALT BITUMINOUS STABILIZER PLANT				
310	CABLEWAY				
312	DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)				
314	DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER				
316	LOCOMOTIVE CRANE OPERATOR				
320	TANDEM SCRAPER				
322	TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)				
<b>GROUP 4</b>		2016-12-27	33.54	18.90	52.44

- 323 AIR TRACK ROCK DRILL
- 324 AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)
- 325 BACKFILLER OPERATOR
- 327 BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER)
- 328 BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON)
- 329 BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS
- 330 CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS
- 331 CHIP HARVESTER AND TREE CUTTER
- 332 CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE
- 334 CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)
- 335 CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND SCREENING PLANT
- 336 CURB MACHINE
- 337 DIRECTIONAL BORING MACHINE
- 338 DOPE MACHINE (PIPELINE)
- 340 DUAL TRACTOR
- 341 ELEVATING GRADER
- 345 GPS REMOTE OPERATING OF EQUIPMENT
- 347 HYDRAULIC TREE PLANTER
- 348 LAUNCHER PERSON (TANKER PERSON OR PILOT LICENSE)
- 349 LOCOMOTIVE (HIGHWAY AND HEAVY ONLY)
- 350 MILLING, GRINDING, PLANING, FINE GRADE, OR TRIMMER MACHINE
- 352 PAVEMENT BREAKER OR TAMPING MACHINE (POWER DRIVEN) MIGHTY MITE OR SIMILAR TYPE
- 354 PIPELINE WRAPPING, CLEANING OR BENDING MACHINE
- 356 POWER ACTUATED HORIZONTAL BORING MACHINE, OVER SIX INCHES
- 357 PUGMILL
- 359 RUBBER-TIRED FARM TRACTOR WITH BACKHOE INCLUDING ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 360 SCRAPER
- 361 SELF-PROPELLED SOIL STABILIZER
- 362 SLIP FORM (POWER DRIVEN) (PAVING)
- 363 TIE TAMPER AND BALLAST MACHINE
- 365

TRACTOR, WHEEL TYPE, OVER 50 H.P. WITH PTO UNRELATED TO LANDSCAPING (HIGHWAY AND HEAVY ONLY)

367 TUB GRINDER, MORBARK, OR SIMILAR TYPE

**GROUP 5 \*** 2016-12-27 18.77 8.18 26.95

370 BITUMINOUS ROLLER (UNDER EIGHT TONS)

371 CONCRETE SAW (MULTIPLE BLADE) (POWER OPERATED)

372 FORM TRENCH DIGGER (POWER)

375 HYDRAULIC LOG SPLITTER

376 LOADER (BARBER GREENE OR SIMILAR TYPE)

377 POST HOLE DRIVING MACHINE/POST HOLE AUGER

379 POWER ACTUATED JACK

381 SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR)

382 SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND OVER

383 SHOULDERING MACHINE (POWER) APSCO OR SIMILAR TYPE INCLUDING SELF-PROPELLED SAND AND CHIP SPREADER

384 STUMP CHIPPER AND TREE CHIPPER

385 TREE FARMER (MACHINE)

**GROUP 6** 2016-12-27 29.55 16.08 45.63

387 CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER

389 DREDGE DECK HAND

391 GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING)

393 LEVER PERSON

395 POWER SWEEPER

396 SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS

397 TRACTOR, WHEEL TYPE, OVER 50 H.P., UNRELATED TO LANDSCAPING

## COMMERCIAL POWER EQUIPMENT OPERATOR

**GROUP 1** 2016-12-27 39.14 18.40 57.54

2017-05-01 40.04 19.45 59.49

501 HELICOPTER PILOT (COMMERCIAL CONSTRUCTION ONLY)

502 TOWER CRANE 250 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)

503 TRUCK CRAWLER CRANE WITH 200 FEET OF BOOM AND OVER, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)



<b>GROUP 2</b>	2016-12-27	38.80	18.40	57.20
	2017-05-01	39.70	19.45	59.15
504	CONCRETE PUMP WITH 50 METERS/164 FEET OF BOOM AND OVER (COMMERCIAL CONSTRUCTION ONLY)			
505	PILE DRIVING WHEN THREE DRUMS IN USE (COMMERCIAL CONSTRUCTION ONLY)			
506	TOWER CRANE 200 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)			
507	TRUCK OR CRAWLER CRANE WITH 150 FEET OF BOOM UP TO AND NOT INCLUDING 200 FEET, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)			
<b>GROUP 3</b>	2016-12-27	37.39	18.40	55.79
	2017-05-01	38.29	19.45	57.74
508	ALL-TERRAIN VEHICLE CRANES (COMMERCIAL CONSTRUCTION ONLY)			
509	CONCRETE PUMP 32-49 METERS/102-164 FEET (COMMERCIAL CONSTRUCTION ONLY)			
510	DERRICK (GUY & STIFFLEG) (COMMERCIAL CONSTRUCTION ONLY)			
511	STATIONARY TOWER CRANE UP TO 200 FEET			
512	SELF-ERECTING TOWER CRANE 100 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)			
513	TRAVELING TOWER CRANE (COMMERCIAL CONSTRUCTION ONLY)			
514	TRUCK OR CRAWLER CRANE UP TO AND NOT INCLUDING 150 FEET OF BOOM, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)			
<b>GROUP 4</b>	2016-12-27	37.05	18.40	55.45
	2017-05-01	37.95	19.45	57.40
515	CRAWLER BACKHOE INCLUDING ATTACHMENTS (COMMERCIAL CONSTRUCTION ONLY)			
516	FIREPERSON, CHIEF BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)			
517	HOIST ENGINEER (THREE DRUMS OR MORE) (COMMERCIAL CONSTRUCTION ONLY)			
518	LOCOMOTIVE (COMMERCIAL CONSTRUCTION ONLY)			
519	OVERHEAD CRANE ( INSIDE BUILDING PERIMETER) (COMMERCIAL CONSTRUCTION ONLY)			
520	TRACTOR . BOOM TYPE (COMMERCIAL CONSTRUCTION ONLY)			
<b>GROUP 5</b>	2016-12-27	36.13	18.40	54.53
	2017-05-01	37.03	19.45	56.48
521	AIR COMPRESSOR 450 CFM OR OVER (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)			
522	CONCRETE MIXER (COMMERCIAL CONSTRUCTION ONLY)			
523	CONCRETE PUMP UP TO 31 METERS/101 FEET OF BOOM			

- 524 DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL WHEN USED FOR CAISSON FOR ELEVATOR OR BUILDING CONSTRUCTION (COMMERCIAL CONSTRUCTION ONLY)
- 525 FORKLIFT (COMMERCIAL CONSTRUCTION ONLY)
- 526 FRONT END, SKID STEER 1 C YD AND OVER
- 527 HOIST ENGINEER ( ONE OR TWO DRUMS) (COMMERCIAL CONSTRUCTION ONLY)
- 528 MECHANIC-WELDER (ON POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)
- 529 POWER PLANT (100 KW AND OVER OR MULTIPLES EQUAL TO 100KW AND OVER) (COMMERCIAL CONSTRUCTION ONLY)
- 530 PUMP OPERATOR AND/OR CONVEYOR (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)
- 531 SELF-ERECTING TOWER CRANE UNDER 100 FEET MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)
- 532 STRADDLE CARRIER (COMMERCIAL CONSTRUCTION ONLY)
- 533 TRACTOR OVER D2 (COMMERCIAL CONSTRUCTION ONLY)
- 534 WELL POINT PUMP (COMMERCIAL CONSTRUCTION ONLY)

<b>GROUP 6</b>	2016-12-27	34.62	18.40	53.02
	2017-05-01	35.52	19.45	54.97

- 535 CONCRETE BATCH PLANT (COMMERCIAL CONSTRUCTION ONLY)
- 536 FIREPERSON, FIRST CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)
- 537 FRONT END, SKID STEER UP TO 1 C YD
- 538 GUNITE MACHINE (COMMERCIAL CONSTRUCTION ONLY)
- 539 TRACTOR OPERATOR D2 OR SIMILAR SIZE (COMMERCIAL CONSTRUCTION ONLY)
- 540 TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER

<b>GROUP 7</b>	2016-12-27	33.50	18.40	51.90
	2017-05-01	34.40	19.45	53.85

- 541 AIR COMPRESSOR 600 CFM OR OVER (COMMERCIAL CONSTRUCTION ONLY)
- 542 BRAKEPERSON (COMMERCIAL CONSTRUCTION ONLY)
- 543 CONCRETE PUMP/PUMPCRETE OR COMPLACO TYPE (COMMERCIAL CONSTRUCTION ONLY)
- 544 FIREPERSON, TEMPORARY HEAT SECOND CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)
- 545 OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS AND MILLING MACHINES, OR OTHER SIMILAR POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)
- 546 PICK UP SWEEPER (ONE CUBIC YARD HOPPER CAPACITY) (COMMERCIAL CONSTRUCTION ONLY)
- 547 PUMP AND/OR CONVEYOR (COMMERCIAL CONSTRUCTION ONLY)

**GROUP 8 \***

FOR RATE CALL 651-284-5091 OR  
 EMAIL  
[DLI.PREVWAGE@STATE.MN.US](mailto:DLI.PREVWAGE@STATE.MN.US)

- 548 ELEVATOR OPERATOR (COMMERCIAL CONSTRUCTION ONLY)
- 549 GREASER (COMMERCIAL CONSTRUCTION ONLY)
- 550 MECHANICAL SPACE HEATER (TEMPORARY HEAT NO BOILER LICENSE REQUIRED)  
(COMMERCIAL CONSTRUCTION ONLY)

**TRUCK DRIVERS**

<b>GROUP 1</b>	2016-12-27	29.70	15.65	45.35
	2017-05-01	30.25	16.60	46.85
601 MECHANIC . WELDER				
602 TRACTOR TRAILER DRIVER				
603 TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER OPERATED WINCHES)				
<b>GROUP 2</b>	2016-12-27	29.15	15.65	44.80
	2017-05-01	29.70	16.60	46.30
604 FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK				
<b>GROUP 3</b>	2016-12-27	29.05	15.65	44.70
	2017-05-01	29.60	16.60	46.20
605 BITUMINOUS DISTRIBUTOR DRIVER				
606 BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION)				
607 THREE AXLE UNITS				
<b>GROUP 4 *</b>	2016-12-27	25.10	10.85	35.95
608 BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER)				
609 DUMP PERSON				
610 GREASER				
611 PILOT CAR DRIVER				
612 RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS				
613 TWO AXLE UNIT				
614 SLURRY OPERATOR				
615 TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER)				
616 TRACTOR OPERATOR, UNDER 50 H.P.				

**SPECIAL CRAFTS**

701*	HEATING AND FROST INSULATORS	2016-12-27	40.31	16.75	57.06
702	BOILERMAKERS	2016-12-27	35.15	27.02	62.17
703	BRICKLAYERS	2016-12-27	32.91	22.82	55.73
704	CARPENTERS	2016-12-27	29.97	16.96	46.93
705	CARPET LAYERS (LINOLEUM)	2016-12-27	33.00	14.39	47.39
		2017-06-01	34.40	14.39	48.79
706	CEMENT MASONS	2016-12-27	30.86	17.13	47.99
707	ELECTRICIANS	2016-12-27	34.92	25.06	59.98
		2017-06-03	35.83	25.71	61.54
708	ELEVATOR CONSTRUCTORS	2016-12-27	45.87	29.99	75.86
		2017-01-01	46.90	36.78	83.68
709	GLAZIERS	2016-12-27	27.62	20.12	47.74
710*	LATHERS	2016-12-27	29.97	16.96	46.93
712	IRONWORKERS	2016-12-27	31.54	24.90	56.44
714	MILLWRIGHT	2016-12-27	33.44	15.61	49.05
		2017-05-07	35.29	15.61	50.90
715	PAINTERS (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)	2016-12-27	26.91	19.87	46.78
716	PILEDRIIVER (INCLUDING VIBRATORY DRIVER OR EXTRACTOR FOR PILING AND SHEETING OPERATIONS)	2016-12-27	34.57	18.16	52.73

717	PIPEFITTERS . STEAMFITTERS	2016-12-27	39.07	18.73	57.80
718	PLASTERERS	2016-12-27	31.49	17.88	49.37
719	PLUMBERS	2016-12-27	39.07	18.73	57.80
720	ROOFER	2016-12-27	28.50	11.79	40.29
721	SHEET METAL WORKERS	2016-12-27	31.87	25.54	57.41
722	SPRINKLER FITTERS	2016-12-27	35.08	17.77	52.85
		2017-01-01	36.33	18.49	54.82
723	TERRAZZO WORKERS	2016-12-27	37.58	16.83	54.41
724	TILE SETTERS	2016-12-27	24.41	23.02	47.43
725*	TILE FINISHERS	2016-12-27	17.91	18.02	35.93
726	DRYWALL TAPER	2016-12-27	26.91	19.87	46.78
727	WIRING SYSTEM TECHNICIAN	2016-12-27	36.90	14.97	51.87
		2017-07-01	37.82	14.97	52.79
728	WIRING SYSTEMS INSTALLER	2016-12-27	25.84	12.40	38.24
		2017-07-01	26.49	12.40	38.89
729	ASBESTOS ABATEMENT WORKER	2016-12-27	29.20	17.43	46.63
		2017-01-01	29.95	18.03	47.98
730	SIGN ERECTOR	2016-12-27	27.10	13.42	40.52

PROJECT LABOR AGREEMENT

NO STRIKE, NO LOCKOUT

**PUBLIC SECTOR**

**CITY OF DULUTH**

**&**

**Vendor**

**Project name**

**Project No.**

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## **AGREEMENT**

This Project Labor Agreement (hereinafter, the “Agreement”), effective as of the date of attestation by the City Clerk, by and between the various contractors engaged in the construction of facilities to be known as the (Project). The parties to this Agreement are the Building and Construction Trades Council, on behalf of its affiliated Local Unions (hereinafter “Union” or “Unions”), the City of Duluth (hereinafter “Owner”) and Contractor (hereinafter “Construction Manager/General Manager,” “Contractor,” and “Contractors”).

It is understood by the parties to this Agreement that it is the policy of the Owner that the construction work covered by this Agreement shall be contracted to Contractors who agree to be bound by the terms of this Agreement. Therefore, the Union agrees that other Contractors may execute the Agreement for the purpose of covering that work. The Construction Manager/General Contractor shall monitor compliance with this Agreement by all Contractors who through their execution of this Agreement, together with their subcontractors, have become bound hereto.

The term “Contractor” shall include all Contractors and subcontractors of whatever tier engaged in on-site construction work within the scope of this Agreement.

The Union and all signatory Contractors agree to abide by the terms and conditions contained in this Agreement with respect to the administration of the Agreement by the Owner and the performance of the construction by the Contractor of the Project. This Agreement represents the complete understanding of the parties, and it is further understood that no Contractor party is required to sign any other agreement as a condition of performing work within the scope of this Agreement. No practice, understanding or agreement between a Contractor and a Union party which is not explicitly set forth in this Agreement shall be binding on any other party unless endorsed in writing by the Project Contractor.



## **ARTICLE I - PURPOSE**

The (Project), an undertaking of the Owner, is a public project which will employ numbers of skilled and unskilled workers. Construction of the Project will entail utilization of the construction industry in an area having multiple labor contracts and employer associations. Consequently, conflicts within labor-management relations could cause delay or disruption of the efficient completion of the project unless maximum cooperation of all segments of the construction industry is obtained. This Agreement is to establish as the minimum standards on the Project the hours and working conditions as those prevailing for the largest number of workers engaged in the same classes of work within the area.

It is in the public interest that the Project progress and be completed in an expeditious and efficient manner, free of disruption or delay of any kind. Therefore, it is essential to secure optimum productivity and to eliminate any delays in the work. In recognition of the special needs of this Project and to maintain a spirit of harmony, labor-management peace and stability during the term of this Project Labor Agreement, the parties agree to establish effective and binding methods for the settlement of all misunderstandings, disputes or grievances which may arise. Therefore, the Unions agree not to engage in any strike, slowdown or interruption of work and the Contractor agrees not to engage in any lockout.

## **ARTICLE II - SCOPE OF THE AGREEMENT**

Section 1. This Agreement, hereinafter designated as the “Project Labor Agreement” or “Agreement,” shall apply and is limited to all construction work included in all Bid Categories for the (Project), under the direction of the signatory Contractors and performed by those Contractor(s) of whatever tier which have contracts awarded for such work on and after the effective date of this Agreement with regard to the Project.

Such Project is generally described as the construction of: **Project**

Section 2. It is agreed that all direct subcontractors of a Contractor, of whatever tier, who have been awarded contracts for work covered by this Agreement on or after the effective date of this Agreement shall be required to accept and be bound by the terms and conditions of the Project Labor Agreement.

Section 3. The provisions of this Project Labor Agreement shall apply to all craft employees represented by any Union listed in Schedule A hereto attached and shall not apply to other field personnel or managerial or supervisory employees as defined by the National Labor Relations Act.

Section 4. All employees covered by this Agreement shall be classified in accordance with work performed and paid the base hourly wage rates for those classifications as specified in the attached Schedule A.

Section 5. The Contractors agree to pay contributions to the established employee benefit funds in the amounts designated in the appropriate Schedule A.

Contractors that are not signatory to a collective bargaining agreement beyond the scope of this Agreement (“PLA contractor”) may select to participate in the legally established industry health reimbursement arrangement (“HRA”) plan, in lieu of contributing to the respective bona fide benefit funds as designated in Schedule A. The amount of the contribution is based on the difference between the contribution amount of the bona fide Schedule A benefit funds and the cost of the PLA contractor's bona fide non-discretionary plans. Contributions must be made on behalf of named employees. Participating contractors will submit to the Trustees of the HRA trust and plan a copy of their plan, summary plan description, and the premium structure for workers covered under the PLA contractor's bona fide, non-discretionary plans. The value of the PLA contractor's benefit plans is subject to confirmation by the Trustees of the HRA trust and plan. This may include an independent audit according to a policy as established by the Trustees. Contractors are required to submit certified payroll reports to the Trustees or authorized administrator in order to confirm compliance with the terms of the HRA trust and plan.

The Contractors adopt and agree to be bound by the written terms of the legally-established Trust Agreements (or in lieu thereof, the aforementioned HRA plan and trust including any policies) specifying the detailed basis on which payments are to be made into, and benefits paid out of, such Trust Funds. The Contractors authorize the parties to such Trust Agreements to appoint trustees and successor trustees to administer the Trust funds and hereby ratify and accept the Trustees so appointed as if made by the Contractors.

Section 6. In the event of any conflict between any provisions of this Agreement and in the Local Area Agreements, the terms of this Agreement will be applied. In other words, where a subject covered by the provisions of this Project Labor Agreement is also covered by the Local Area Agreement the provisions of this Project Labor Agreement shall prevail. Where a subject is covered by the Local Area Agreement and not covered by this Project Labor Agreement, the Local Area Agreement provisions shall prevail.

Section 7. This Agreement shall only be binding on the signatory parties hereto and shall not apply to the parents, affiliates, subsidiaries, or other ventures of any such party.

Section 8. This Agreement shall be limited to work historically recognized as construction work. Nothing contained herein shall be construed to prohibit, restrict, or interfere with the performance of any other operation, work or function which may occur in or around the Project site or be associated with the development of the Project, or with the ongoing operations of the Owner.

Section 9. It is understood that the liability of any Contractor and the liability of the separate Unions under this Agreement shall be several and not joint. The Union agrees that this Agreement does not have the effect of creating any joint employment status between or among Owner and any Contractor.

Section 10. All workers delivering fill, sand, gravel, crushed rock, transit/concrete mix, asphalt or other similar materials and all workers removing any materials from the construction site as required by the specifications are subject to the provisions of the Minnesota state prevailing wage law and are entitled to the appropriate area standard wage. For purposes of this contract, such materials are for specified future use and per Minnesota state prevailing wage law delivery and pickup of the above-listed materials constitutes incorporation.

### **ARTICLE III - UNION RECOGNITION AND REPRESENTATION**

Section 1. The Contractor recognizes the Union as the sole and exclusive bargaining representative of all craft employees working on facilities within the scope of this Agreement.

Section 2. Authorized representatives of the Union shall have access to the Project, provided they do not interfere with the work of employees and further provided that such representatives fully comply with the posted visitor and security and safety rules of the Project.

### **ARTICLE IV - LABOR HARMONY CLAUSE**

The contractor shall furnish labor that can work in harmony with all other elements of labor employed on that (Project) and shall submit a labor harmony plan to demonstrate how this will be done. "Harmony" shall include the provision of labor that will not, either directly or indirectly, cause or give rise to any work disruptions, slow downs, picketing, stoppages, or any violence or harm to any person or property while performing any work, or activities incidental thereto at the (project). The labor harmony plan should include the company's labor management policies, collective bargaining agreements if any and their expiration dates, past labor relations history, a listing of activities anticipated under this contract that may potentially cause friction with on-site workers, and procedures the company will undertake to eliminate this friction.

The contractor agrees that it shall require every lower-tier subcontractor to provide labor that will work in harmony with all other elements of labor employed in the work, and will include the

provisions contained in the paragraph above, in every lower-tier subcontract let for work under this contract.

The requirement to provide labor that can work in harmony with all other elements of labor employed in the work throughout the contract performance is a material element of this contract. Failure by the contractor or any of its lower tier subcontractors to comply with this requirement shall be deemed a material breach of the contract which will subject the contractor to all rights and remedies the city of Duluth may have, including without limitation the right to terminate the contract.

#### **ARTICLE V - WORK STOPPAGES AND LOCKOUTS**

Section 1. There shall be no strike, picketing, work stoppages, slowdowns or other disruptive, activity for any reason by the Union or employees against any Contractor covered under this Agreement, and there shall be no lockout by the Contractor. Failure of any Union or employee to cross any picket line established by any union, signatory or non-signatory, or any other organization, at or in proximity to the Project site is a violation of this Article.

Section 2. Any party alleging a breach of Section 1, of Article IV shall have the right to petition a court for temporary and permanent injunctive relief. The moving party need not show the existence of irreparable harm, and shall be required to post bond only to secure payment of court costs and attorney fees as may be awarded by the court.

#### **ARTICLE VI - DISPUTES AND GRIEVANCES**

Section 1. This Agreement is intended to provide close cooperation between management and labor. The Construction Manager/General Contractor and the Building and Construction Trades Council shall each assign a representative to this Project for the purpose of assisting the Local Unions, together with the Contractor, to complete the construction of the Project economically, efficiently, continuously and without interruption, delays or work stoppages.

Each Contractor shall hold a pre-job conference with the Union and Construction Manager/General Contractor to clear up any project question and work assignments in which there is thought to be a difference in opinion. Every effort will be made to hold such conference well in advance of actual work performance.

Section 2. The Contractor, Union, and employees collectively and individually, realize the importance to all parties to maintain continuous and uninterrupted performance of the work of the Project, and agree to resolve disputes over grievances in accordance with the arbitration provisions set forth in the Local Area Agreements in effect with the Unions listed in Schedule A attached hereto.

## **ARTICLE VII - JURISDICTIONAL DISPUTES**

Section 1. There will be no strikes, work stoppages, slowdowns, or other disruptive activity arising out of any jurisdictional dispute. Pending the resolution of the dispute, the work shall continue uninterrupted as assigned by the Contractor.

Section 2. Building construction work shall be assigned by the Contractor in accordance with the procedural rules of the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (hereinafter the "Plan"). Any jurisdictional dispute over the Contractor's assignment of work shall be settled in accordance with the provisions of the Plan.

Section 3. Where a jurisdictional dispute involves the International Brotherhood of Teamsters, it shall be referred for resolution to that International Union and the disputing International Union. The resolution of the dispute shall be reduced to writing, signed by the authorized representative of the International Unions and the Contractor. The assignments made by the Contractor shall be followed until such time as the dispute is resolved in accordance with this Section.

## **ARTICLE VIII - NO DISCRIMINATION**

Section 1. The Contractor and Union agree that they will not discriminate against any employee or applicant for employment because of his or her membership or nonmembership in a Union or based upon race, color, religion, sex, national origin or age in any manner prohibited by law or regulation.

Section 2. Any complaints regarding application of the provisions of Section 1 should be brought to the immediate attention of the involved Contractor for consideration and resolution.

Section 3. The use of the masculine or feminine gender in this Agreement shall be construed as including both genders.

## **ARTICLE IX - SAVINGS AND SEPARABILITY**

It is not the intention of the parties to violate any laws governing the subject matter of this Agreement. The parties hereto agree that in the event any provisions of the Agreement are finally held determined to be illegal or void as being in contravention of any applicable law, the remainder of the Agreement shall remain in full force and effect unless the part or parts so found to be void are wholly inseparable from the remaining portions of this Agreement. Further, the contractor and Union agree that if and when any and all provisions of this Agreement are finally held or determined to be illegal or void by Court of competent jurisdiction, the parties will promptly enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the requirements of an applicable law and the intent of the parties hereto.

## **ARTICLE X - DURATION OF THE AGREEMENT**

The Project Labor Agreement shall be effective as of the date of attestation by the City Clerk, and shall continue in effect for the duration of the Project construction work described in Article

II hereof. Construction of any phase, portion, section or segment of the project shall be deemed complete when such phase, portion, section or segment has been turned over to the Owner and has received the final acceptance from the Owner's representative.

Since there are provisions herein for no strikes or lockouts in the event any changes are negotiated and implemented under a Local Area Agreement during the term of this Agreement, the Contractor agrees that, except as specified herein, such changes shall be recognized and shall apply retroactively to the termination date in the particular Local Agreement involved. Each Contractor which has a Local Agreement with a Union at the time that its contract at the project commences shall continue it in effect with each said Union so long as the Contractor remains on the project. In the event any such Local Area Agreement expires, the Contractor shall abide by all of the terms of the expired Local Agreement until agreement is reached on a new Local Agreement, with any changes being subject to the provisions of this Agreement.

The Union agrees that there will be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity affecting the Project by any Union involved in the negotiation of a Local Area Agreement nor shall there be any lockout on this Project affecting the Union during the course of such negotiations.



IN WITNESS WHEREOF, the parties have hereunto set their hands on the date of attestation shown below.

DULUTH BUILDING AND  
CONSTRUCTION TRADES COUNCIL

**VENDOR**

By: \_\_\_\_\_

By: \_\_\_\_\_

Its: \_\_\_\_\_  
(Printed Name/Title)

Its: \_\_\_\_\_  
(Printed Name/Title)

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Phone No.: \_\_\_\_\_

CITY OF DULUTH

By: \_\_\_\_\_  
Mayor

Attest:

\_\_\_\_\_  
City Clerk

Date: \_\_\_\_\_

\_\_\_\_\_  
City Auditor

Date: \_\_\_\_\_

\_\_\_\_\_  
Assistant City Attorney

Date: \_\_\_\_\_

## SCHEDULE "A"

- A-1 Asbestos Workers Local 49
- A-2 Boilermakers Local 647
- A-3 BAC Local 1 Chapter 3 Duluth & Iron Range
- A-4 Carpenters Local 361
- A-5 Cements Masons/Plasterers Local 633
- A-6 Elevator Constructors Local 9
- A-7 Glaziers Local 106
- A-8 IBEW Local 242
- A-9 Iron Workers Local 512
- A-10 Laborers Local 1091
- A-11 Millwrights & Machinery Erectors Local 1348
- A-12 Operating Engineers Local 49
- A-13 Painters & Allied Trades Local 106
- A-14 Plumbers & Steamfitters Local 11
- A-15 Roofers Local 96
- A-16 Sheet Metal Workers Local 10
- A-17 Sprinkler Fitters Local 669
- A-18 Teamsters Local 346

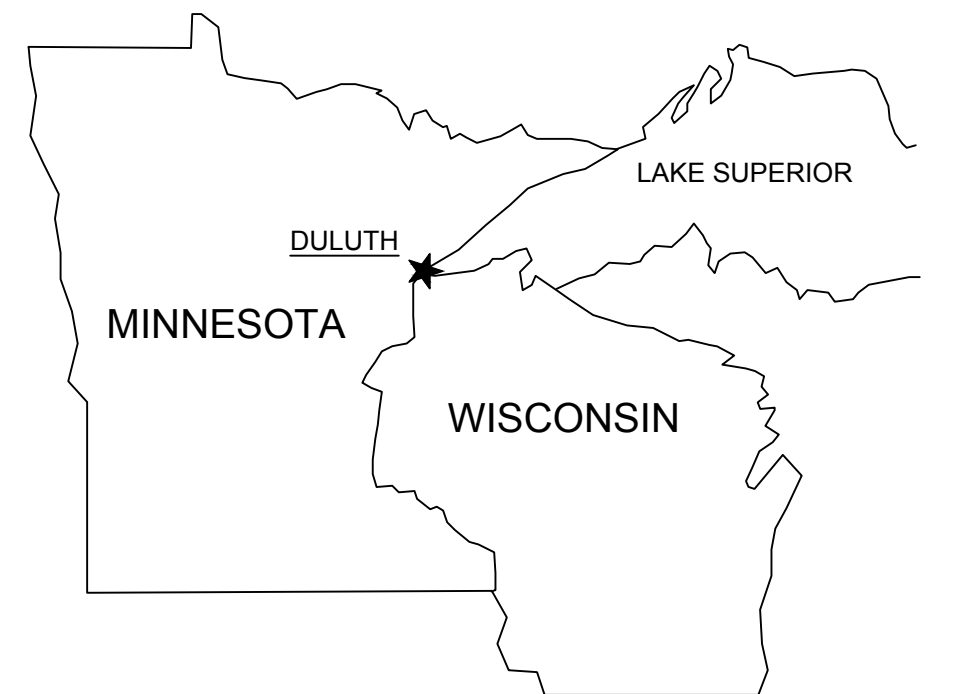
Template



# CITY OF DULUTH

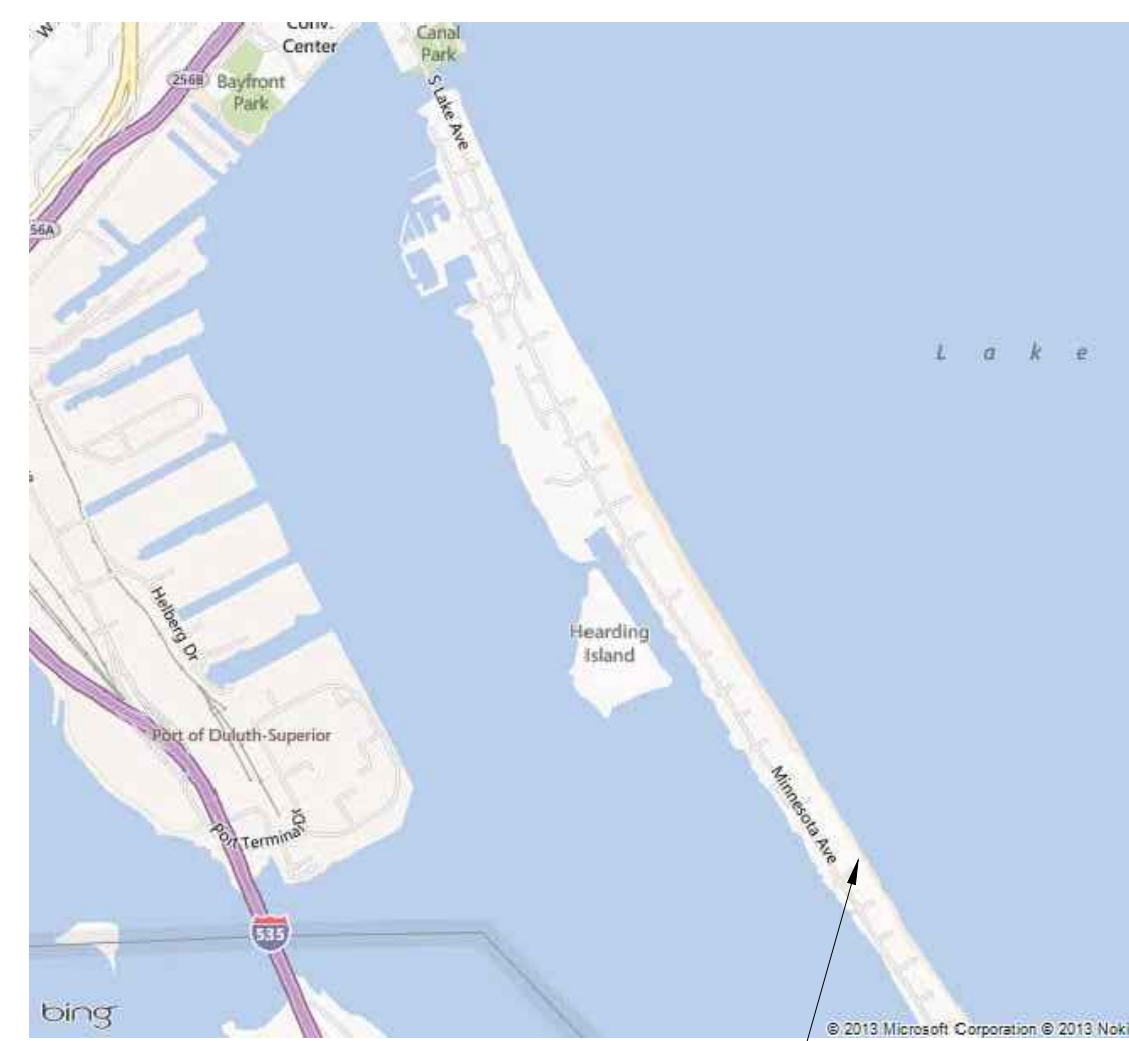
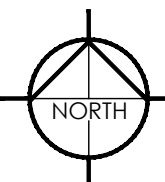
# LAFAYETTE COMMUNITY CENTER

3026 MINNESOTA AVENUE, DULUTH, MINNESOTA 55802



VICINITY MAP

NOT TO SCALE

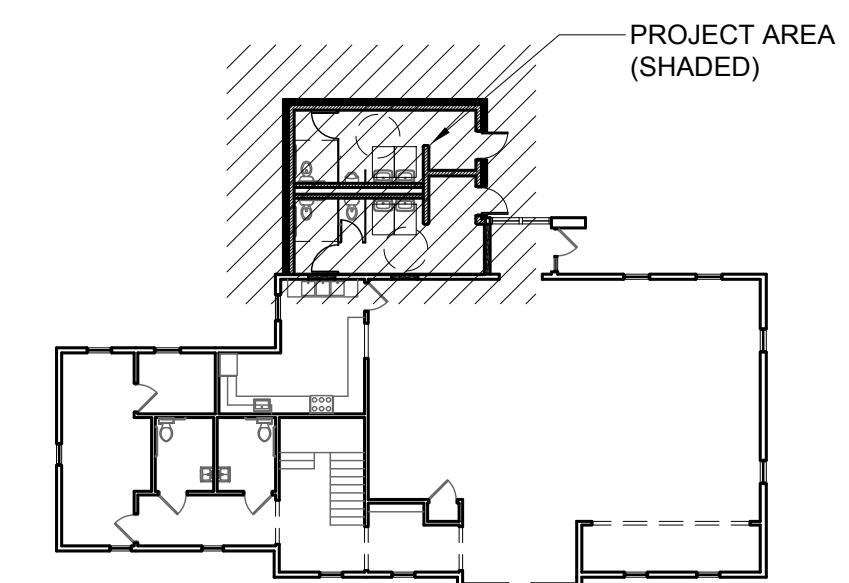


PROJECT LOCATION MAP

NOT TO SCALE

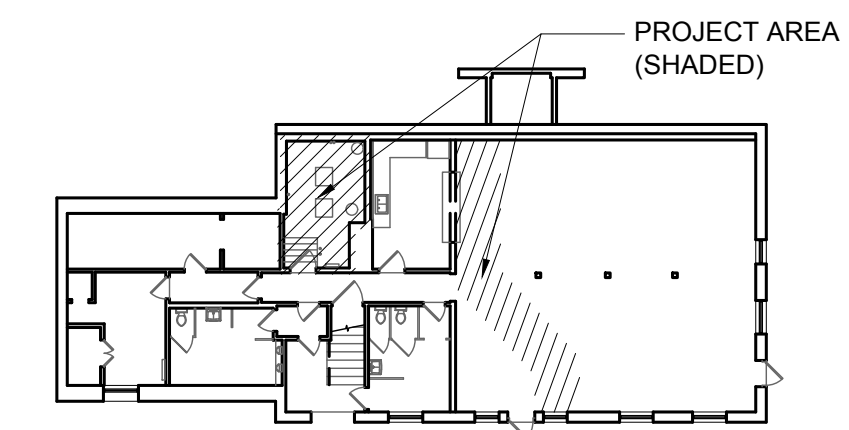
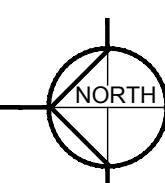


SHEET INDEX	
SHEET	DESCRIPTION
COV	SHEET INDEX
<b>LANDSCAPE</b>	
SW0.1	SITWORK COVER SHEET
SW1.0	SITE SURVEY / EXISTING CONDITIONS
SW1.1	DEMOLITION PLAN
SW1.2	SWPPP & EROSION CONTROL PLAN
SW1.3	SWPPP NARRATIVE
SW2.1	SITE & GRADING PLAN
SW2.2	LANDSCAPE PLAN
SW3.1	SITWORK DETAILS
<b>STRUCTURAL</b>	
S1.0	STRUCTURAL NOTES / ABBREVIATIONS / SHEET INDEX
S2.0	FOUNDATION & FRAMING PLANS / SECTIONS / DETAILS
<b>ARCHITECTURAL</b>	
A0.1	FIRST FLOOR DEMOLITION PLAN
A1.0	FIRST FLOOR LIFE SAFETY PLAN / CODE SUMMARY
A1.1	FIRST FLOOR REMODEL PLAN / WALL TYPES
A2.1	EXTERIOR ELEVATIONS
A4.1	BUILDING SECTIONS
A4.2	SECTIONS
A4.3	DETAILS
A6.1	INTERIOR ELEVATIONS / ROOM FINISH SCHEDULE / DOOR SCHEDULE / DOOR TYPES / FRAME TYPES
A7.1	ROOF PLAN / ROOF DETAILS
A8.1	REFLECTED CEILING PLAN
<b>MECHANICAL</b>	
M1.1	PLUMBING PLANS AND RISERS
M2.1	HEATING AND VENTILATION PLAN
<b>ELECTRICAL</b>	
E1.1	ELECTRICAL PLAN



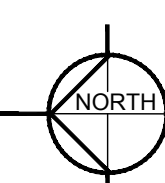
FIRST FLOOR KEY PLAN

NOT TO SCALE



BASEMENT KEY PLAN

NOT TO SCALE



PROJECT TEAM	
<b>PROJECT OWNER</b>	
CONTACT: ROBERT HURD - CONSTRUCTION PROJECT COORDINATOR	
PROPERTY & FACILITIES MANAGEMENT CITY OF DULUTH 1532 WEST MICHIGAN STREET DULUTH, MINNESOTA 55802	
PH (218) 730-4416 E-MAIL: rhurd@DuluthMN.gov	
<b>ARCHITECT</b>	<b>MECHANICAL / ELECTRICAL</b>
ARCHITECT: RYAN ERSPAMER	ELECTRICAL: DAVID JORDAN, P.E. MECHANICAL: MICHAEL WASHBURN, P.E.
ARCHITECTURAL RESOURCES, INC. 126 EAST SUPERIOR STREET DULUTH, MN 55802	ARCHITECTURAL RESOURCES, INC. 704 EAST HOWARD STREET HIBBING, MN 55746
PH (218) 727-8481 FAX (218) 727-8483 E-MAIL: ryan.erspamer@arimn.com	PH (218) 263-6868 FAX (218) 722-6803 E-MAIL: david.jordan@arimn.com michael.washburn@arimn.com
<b>LANDSCAPE ARCHITECT</b>	<b>STRUCTURAL</b>
ARCHITECT: ANDREA WEDUL	CONTACT: MARK UDD
ARCHITECTURAL RESOURCES, INC. 126 EAST SUPERIOR STREET DULUTH, MN 55802	NORTHLAND CONSULTING ENGINEERS 102 S. 21ST AVENUE WEST DULUTH, MN 55806
PH (218) 727-8481 FAX (218) 727-8483 E-MAIL: andrea.wedul@arimn.com	PH (218) 727-5995 FAX (218) 727-7779 E-MAIL: mark@nce-duluth.com



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CITY OF DULUTH  
LAFAYETTE  
COMMUNITY CENTER



DULUTH, MINNESOTA

PROJECT NO.: 16-076

DATE: 05-MAY-17

DRAWN BY: BL / KJS

REVISIONS:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*Ryan Erspamer*  
RYAN ERSPAMER ARCHITECT 49444 REG. NO.

*Andrea Wedul*  
ANDREA WEDUL LANDSCAPE ARCHITECT 52704 REG. NO.

*Mark Udd*  
MARK UDD ENGINEER 40443 REG. NO.

*Michael R. Washburn*  
MICHAEL R. WASHBURN ENGINEER 52709 REG. NO.

*David Jordan*  
DAVID JORDAN ENGINEER 42696 REG. NO.

COV

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## DEMOLITION & PROTECTION LEGEND:

	EXIST DECIDUOUS TREE, TO REMOVE		SITE FEATURE FOR REMOVAL		TREELINE TO BE REMOVED
	EXIST DECIDUOUS TREE, TO REMAIN & PROTECT		CONCRETE WALK, TO REMAIN & PROTECT		TREELINE, EXISTING & PROPOSED
	EXIST EVERGREEN TREE, TO REMOVE		CONCRETE WALK, TO REMOVE		BLDG OR STRUCTURE
	EXIST EVERGREEN TREE, TO REMAIN & PROTECT		EXISTING CONTOUR, MAJOR		CURB & GUTTER
	TREE PROTECTION		EXISTING CONTOUR, MINOR		PLANTING BEDS, TO PROTECT
	EXIST VEGETATION FOR REMOVAL		SILT FENCE		TREE & BRUSH REMOVAL
	EXIST VEGETATION FOR REMOVAL BY OTHERS (NIC)		STEEP SLOPE, RESTRICTED ACCESS		LIMIT OF WORK / CONSTRUCTION LIMITS
	DECK REMOVAL		RETAINING WALL REMOVAL		CHAIN LINK FENCE
	BITUMINOUS, TO REMAIN				

## LIST OF ABBREVIATIONS:

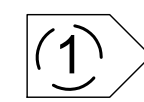
AD AREA DRAIN	EXIST EXISTING	OZ OUNCE
ALUM ALUMINUM	FD FLOOR DRAIN	PCC PRE-CAST CONCRETE
ANOD ANODIZED	FFE FINISHED FLOOR ELEVATION	PLUMB PLUMBING
APPRX APPROXIMATELY	FLR FLOOR	PLYD PLYWOOD
BITUM BITUMINOUS	FL FLOW LINE	PRO PROPOSED
BSMT BASEMENT	FO FACE OF	PT PRESSURE-TREATED
BYND BEYOND	FND FOUNDATION	PVC POLYVINYL CHLORIDE
BOC BASE OF CURB	GA GAUGE	RBR RUBBER
BO BASE OF	GALV GALVANIZED	RD ROOF DRAIN
CB CATCH BASIN	HC HOLLOW CORE	REQD REQUIRED
CIP CAST-IN-PLACE	HM HOLLOW METAL	SIM SIMILAR
CHNL CHANNEL	HSS HOLLOW STRUCTURAL STEEL	SPD STANDARD PROCTOR DENSITY
CJ CONTROL JOINT	HP HIGH POINT	SPEC SPECIFIED/SPECIFICATION
CLG CEILING	HR HOUR	S/S STAINLESS STEEL
CLR CLEAR	HVAC HEATING, VENTILATING, & COOLING	STL STEEL
CMU CONCRETE MASONRY UNIT	H HIGH	STRCT STRUCTURE/STRUCTURAL
COL COLUMN	HWD HARDWOOD	TO TOP OF
CONC CONCRETE	INSUL INSULATED/INSULATION	TOC TOP OF CURB
CONT CONTOUR(S)	INV INVERT	TYP TYPICAL
CNDN CONDITION(S)	LCN LOCATION	UNO UNLESS NOTED OTHERWISE
CTYD COURTYARD	LP LOW POINT	U/S UNDERSIDE
DIA DIAMETER	MAX MAXIMUM	W/ WITH
DIM DIMENSION	MECH MECHANICAL	W WIDTH/WIDE
DI DRAIN INLET	MFR MANUFACTURER(S)	WD WOOD
DN DOWN	MH MANHOLE	# POUNDS (ENGLISH)
DR DOOR	MIN MIN	& AND
DTL DETAIL	MO MASONRY OPENING	@ AT
DWG DRAWING(S)	MTL MATERIAL	Ø DIAMETER
EA EACH	NIC NOT IN CONTRACT	
EJ EXPANSION JOINT	NOM NOMINAL	
ELEV ELEVATION	NTS NOT TO SCALE	
ELEC ELECTRICAL	OC ON-CENTER	
EPDM ETHYLENE PROPYLENE DIENE M-CLASS	OD OUTER DIAMETER	
EQ EQUAL		

## SYMBOLS LEGEND:

	DRAWING NAME	DRAWING TITLE SYMBOL	EXAMPLE: SECTION #7 ON SHEET SW3.1
	SECTION SYMBOL	EXAMPLE: SECTION #6 ON SHEET SW5.1	
	ELEVATION SYMBOL	EXAMPLE: DRAWING #7 ON SHEET SW3.1	
	DETAIL SYMBOL	EXAMPLE: DRAWING #7 ON SHEET SW3.1	
	ELEVATION MARKER	EXAMPLE: FFE ELEVATION AT 100'-0"	
	DIMENSION SYMBOLS		
	CENTERLINE		
	DIAMETER		
	FLOW LINE		
	REVISION CLOUD W/ MARKER		
	BLDG WALL SURFACE		
	COLUMN REFERENCE GRIDLINE		
	SPOT ELEVATION, EXIST (IN FT)		
	SPOT ELEVATION, PROPOSED (IN FT)		
	KEYED NOTE		
	CONTOUR LABEL, EXIST (IN FT)		
	CONTOUR LABEL, PRO (IN FT)		
	NORTH (TRUE) ARROW		

## REFERENCE NOTE LEGEND:

SAMPLE DRAWING KEYED REFERENCE CALLOUT:

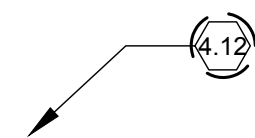


SAMPLE DRAWING REFERENCE NOTE:

1 BEGIN 150LF 6H CHAIN LINK FENCE. SEE DETAIL 3/SW4.1.

## KEYNOTE LEGEND:

SAMPLE DRAWING KEYNOTE CALLOUT:



SAMPLE KEYNOTE TABLE:

4.0 SITE MATERIAL KEYNOTES	MATERIAL KEYNOTE	DETAIL/SHEET	SPEC SECTION
	4.1 PAVING TYPE 1	2/SW4.1	32 13 00
	4.2 PAVING TYPE 2	3/SW4.1	32 12 00
	4.3 PAVING TYPE 3	4/SW4.1	32 14 00
	4.4 PAVING TYPE 4	5/SW4.1	32 11 00

## SITE MATERIALS LEGEND:

	CONCRETE		EARTH, EXISTING		RUBBERIZED SURFACE		ALUMINUM
	BITUMINOUS, SECTION		TOPSOIL		GEOGRID		STEEL
	BITUMINOUS, PLAN		FINISH WOOD, DECKING		MULCH, ROCK		BRONZE
	AGGREGATE BASE		LUMBER, ROUGH		MULCH, WOOD		BRICK
	PEA GRAVEL, DRAINAGE BASE		LUMBER, BLOCKING		PLYWOOD		FINISH STONE
	SAND		CMU		EXPANSION JOINT		RIGID INSULATION

## LINETYPE LEGEND:

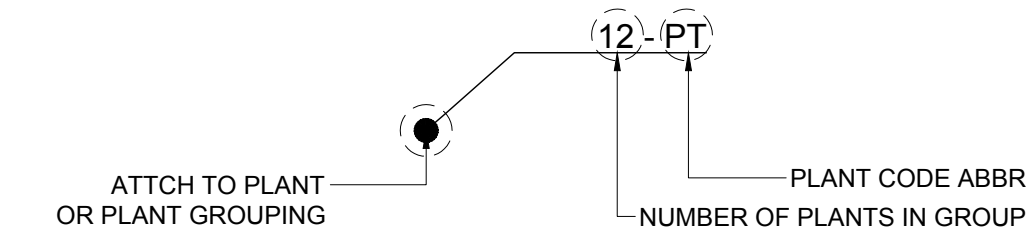
	PROPERTY BOUNDARY		TREE LINE, PROPOSED		EXISTING FEATURE
	FENCE LINE		CONTOUR LINE, EXISTING		PROPOSED FEATURE
	BUILDING		CONTOUR LINE, PROPOSED		CURB & GUTTER
	DRAIN TILE		GEOTEXTILE		LIMIT OF WORK
	RAILROAD TRACKS		BREAKLINE		
	SWALE CENTER LINE		SHEET MATCH LINE		
	RETAINING WALL		STRUCTURAL GRID LINE		
	TREE LINE, EXISTING		PATH OF TRAVEL		

## PLANTING LEGEND:

	DECIDUOUS TREE, EXIST		DECIDUOUS SHRUB, EXIST		PERENNIAL, PRO		LANDSCAPE EDGING
	DECIDUOUS TREE, PRO		DECIDUOUS SHRUB, PRO		GROUNDCOVER AREA		
	EVERGREEN TREE, EXIST		EVERGREEN SHRUB, EXIST		SODDING AREA		
	EVERGREEN TREE, PRO		EVERGREEN SHRUB, PRO		SEEDING AREA		

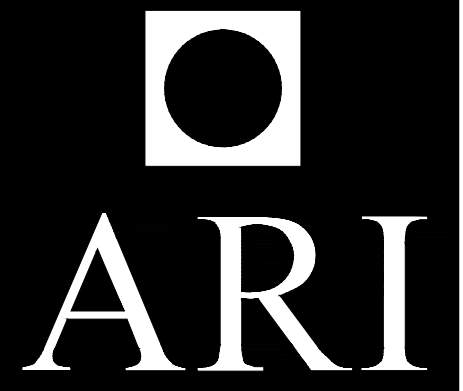
## PLANT IDENTIFICATION KEY:

SAMPLE DRAWING PLANT ID TAG CALLOUT:



## SITWORK (SW) SHEET INDEX

SHEET	DESCRIPTION
SW0.1	SITWORK COVER SHEET
SW1.0	SITE SURVEY / EXISTING CONDITIONS
SW1.1	DEMOLITION PLAN
SW1.2	EROSION CONTROL PLAN/ SWPPP
SW1.3	SWPPP NARRATIVE
SW2.1	SITE & GRADING PLAN
SW2.2	LANDSCAPE PLAN
SW3.1	SITWORK DETAILS



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CITY OF DULUTH  
LAFAYETTE  
COMMUNITY CENTER



DULUTH, MINNESOTA

PROJECT NO.: 16-076

DATE: 05-MAY-17

DRAWN BY: AMW

REVISIONS:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

ANDREA WEDUL  
LANDSCAPE ARCHITECT  
REG. NO. 57284

SITWORK  
COVER  
SHEET

SW  
0.1



DULUTH, MINNESOTA

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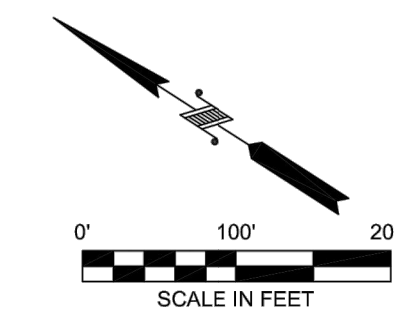
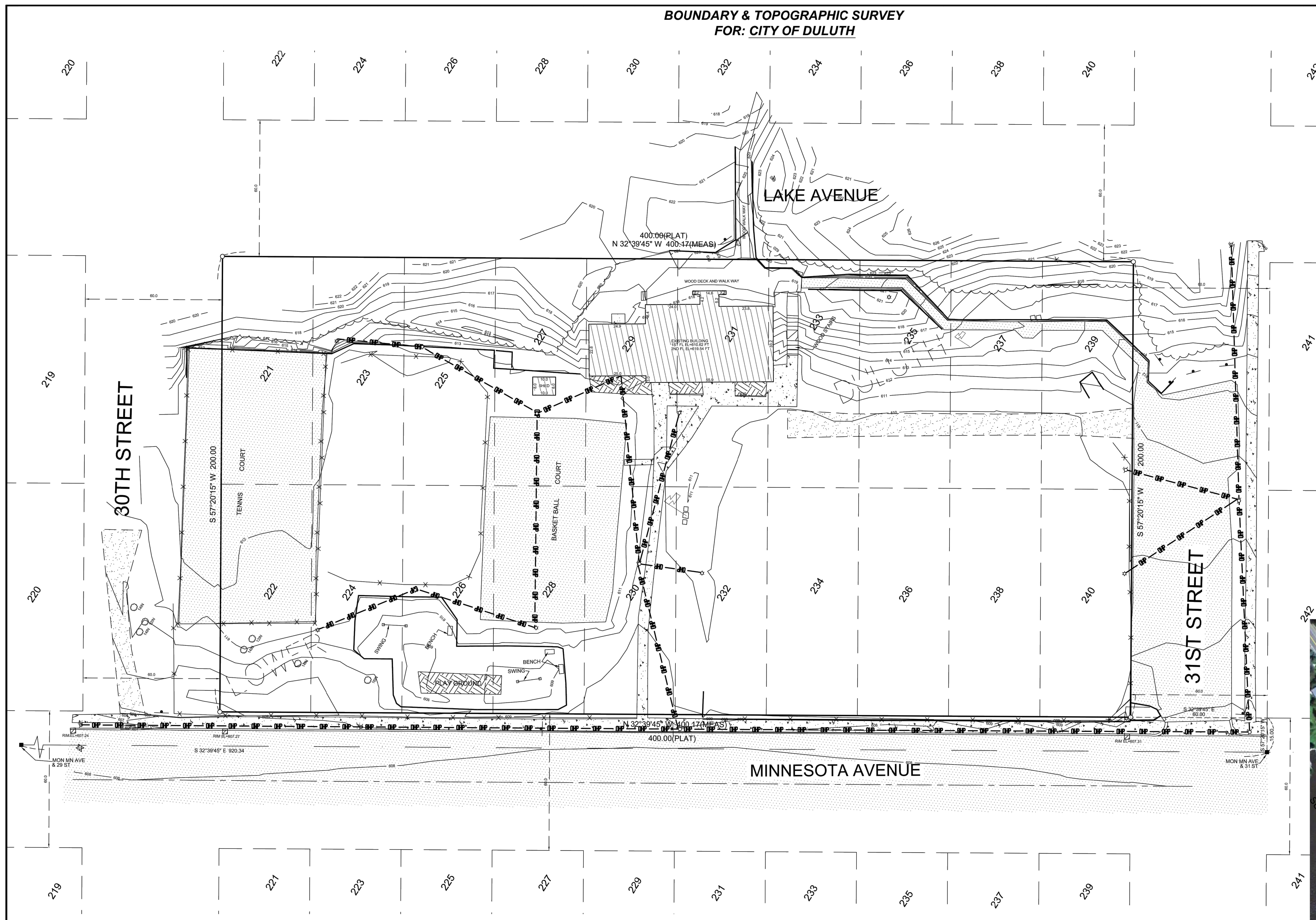
DRAWN BY: N/A

REVISIONS:

**SITE  
SURVEY/  
EXISTING  
CONDITIONS**

**SW  
1.0**

**BOUNDARY & TOPOGRAPHIC SURVEY  
FOR: CITY OF DULUTH**



**LEGEND**

These standard symbols will be found in the drawing.

	EXISTING BUILDING
	GRAVEL
	BITUMINOUS
	LANDSCAPING
	CONCRETE
	OVERHEAD UTILITIES
	RET WALL
	TREE/BRUSH LINE
	FENCE LINE
	POST
	GAS VALVE
	WATER VALVE
	CATCH BASIN
	GUY WIRE
	UTILITY POLE
	FLAG POLE
	LIGHT POLE
	SIGN
	TREE
	CITY SURVEY MONUMENT
	SET REBAR RLS 14374



**NOTES**

BEARINGS ARE BASED ON THE ST. LOUIS COUNTY TRANSVERSE MERCATOR COORDINATE SYSTEM OF '98.

BUILDING DIMENSIONS SHOWN ARE FOR HORIZONTAL & VERTICAL PLACEMENT OF STRUCTURE ONLY.

SEE ARCHITECTURAL PLAN FOR BUILDING & FOUNDATION DIMENSIONS.

NO SPECIFIC SOILS INVESTIGATION HAS BEEN COMPLETED ON THIS LOT BY ALTA SURVEY COMPANY, INC. THE STABILITY OF SOILS TO SUPPORT THE SPECIFIC STRUCTURE PROPOSED IS NOT THE RESPONSIBILITY OF ALTA SURVEY COMPANY, INC. OR THE SURVEYOR.

THIS SURVEY HAS BEEN PREPARED WITHOUT BENEFIT OF A TITLE COMMITMENT OR TITLE OPINION. A TITLE SEARCH FOR RECORDED OR UNRECORDED EASEMENTS WHICH MAY BENEFIT OR ENCOMBER THIS PROPERTY HAS NOT BEEN COMPLETED BY ALTA SURVEY COMPANY, INC.

**LEGAL DESCRIPTION PER CLIENT**

Lots 221, 223, 225, 227, 229, 231, 233, 235, 237 and 239, LOWER DULUTH LAKE AVENUE, according to the recorded plat thereof, St. Louis County, Minnesota.

And:  
Lots 222, 224, 226, 228, 230, 232, 234, 236, 238 and 240, LOWER DULUTH MINNESOTA AVENUE, according to the recorded plat thereof, St. Louis County, Minnesota.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

Date: 4-23-13

Ronald L. Krueger MN License No. 14374

DATE: 4-23-13  
SCALE: 1 IN = 20 FEET  
PROJECT NO: 13-030

**ALTA  
SURVEY COMPANY, INC.**  
Residential/Commercial Land Surveying & Land  
Development/Legal Descriptions  
P.O. BOX 16118 Duluth, MN 55806  
Phone: 218-727-8211 Fax: 218-727-3798

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**CITY OF DULUTH  
LAFAYETTE  
COMMUNITY CENTER**



DULUTH, MINNESOTA

PROJECT NO.: 16-076

DATE: 05-MAY-17

DRAWN BY: AJB/AMW

REVISIONS:

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*Andrea Wedul*  
ANDREA WEDUL 57284  
LANDSCAPE ARCHITECT REG. NO.

**DEMOLITION  
PLAN**

**SW  
1.1**

**DEMOLITION & PROTECTION LEGEND:**

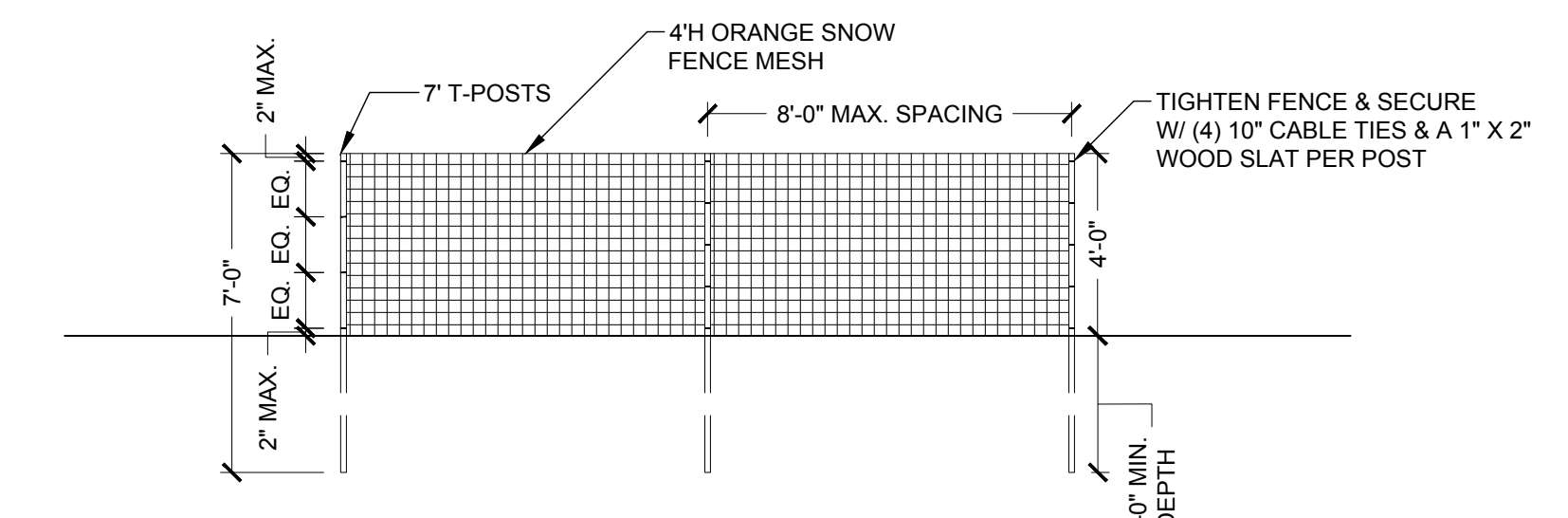
- |                                                |                                      |                                       |
|------------------------------------------------|--------------------------------------|---------------------------------------|
| ✕ EXIST DECIDUOUS TREE, TO REMOVE              | ✕ SITE FEATURE FOR REMOVAL           | ☁ TREELINE EXISTING, TO ADJUST        |
| ⊗ EXIST DECIDUOUS TREE, TO REMAIN & PROTECT    | ▨ CONCRETE WALK, TO REMAIN & PROTECT | ☁ TREELINE, FINAL                     |
| ✕ EXIST EVERGREEN TREE, TO REMOVE              | ▨ CONCRETE WALK, TO REMOVE           | □ BLDG OR STRUCTURE                   |
| ⊗ EXIST DECIDUOUS TREE, TO REMAIN & PROTECT    | ▨ EXISTING CONTOUR, MAJOR            | ▨ CURB & GUTTER                       |
| ⊗ TREE PROTECTION                              | ▨ EXISTING CONTOUR, MINOR            | ▨ PLANTING BEDS, TO PROTECT           |
| ▨ EXIST VEGETATION FOR REMOVAL                 | ▨ SILT FENCE                         | ▨ TREE & BRUSH REMOVAL                |
| ▨ EXIST VEGETATION FOR REMOVAL BY OTHERS (NIC) | ▨ STEEP SLOPE, RESTRICTED ACCESS     | ▨ LIMIT OF WORK / CONSTRUCTION LIMITS |
| ▨ DECK REMOVAL                                 | ▨ RETAINING WALL REMOVAL             | ▨ CHAIN LINK FENCE                    |
| ▨ BITUMINOUS, TO REMAIN                        |                                      |                                       |

**SITE DEMOLITION NOTES:**

1. EXISTING CONDITIONS SITE SURVEY PROVIDED BY ALTA SURVEY COMPANY, INC., P.O. BOX 161138, DULUTH, MN 55806, (218) 727-5211. VERIFY EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT IMMEDIATELY.
2. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES, PRIVATE & PUBLIC, BEFORE COMMENCING WORK (GOPHER STATE ONE CALL 1-800-252-1168). CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MIGHT BE CAUSED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES.
3. CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTATION OF BEST MANAGEMENT PRACTICES (BMP'S) AND COMPLIANCE WITH ALL STATE OF MINNESOTA, COUNTY, AND LOCAL SEDIMENT CONTROL REQUIREMENTS, AND COASTAR-NON-POINT POLLUTION CONTROL PROGRAM.
4. ALL PERIMETER SEDIMENT CONTROLS & STORM WATER INLET PROTECTION SHALL BE IN PLACE & ON LINE / FUNCTIONAL PRIOR TO START OF CONSTRUCTION. REFER TO EROSION CONTROL PLAN. MAINTAIN CONTROLS & REPAIR AS NEEDED THROUGHOUT THE TERM OF CONSTRUCTION.
5. ALL EXISTING TREES TO REMAIN SHALL BE PROTECTED WITH 4' HIGH ORANGE CONSTRUCTION FENCING PER DETAIL 2/SW1.2 ERECTED AT THE DRIP LINE OF THE TREES PRIOR TO THE START OF ANY SITE WORK. NO CONSTRUCTION ACTIVITIES SHALL TAKE PLACE WITHIN THE TREE PROTECTION ZONE WITHOUT PRIOR APPROVAL OF THE LANDSCAPE ARCHITECT.
6. ALL HORIZONTAL AND VERTICAL CONTROL LAYOUT TO BE PROVIDED AND MAINTAINED BY THE CONTRACTOR UNDER THIS CONTRACT.
7. SEE ALSO ARCHITECTURAL DEMOLITION SHEET A0.2.
8. REFER TO SHEETS SW1.2 AND SW1.3 FOR TEMPORARY AND PERMANENT EROSION CONTROL/SWPPP

**KEYED NOTES - DEMOLITION PLAN**

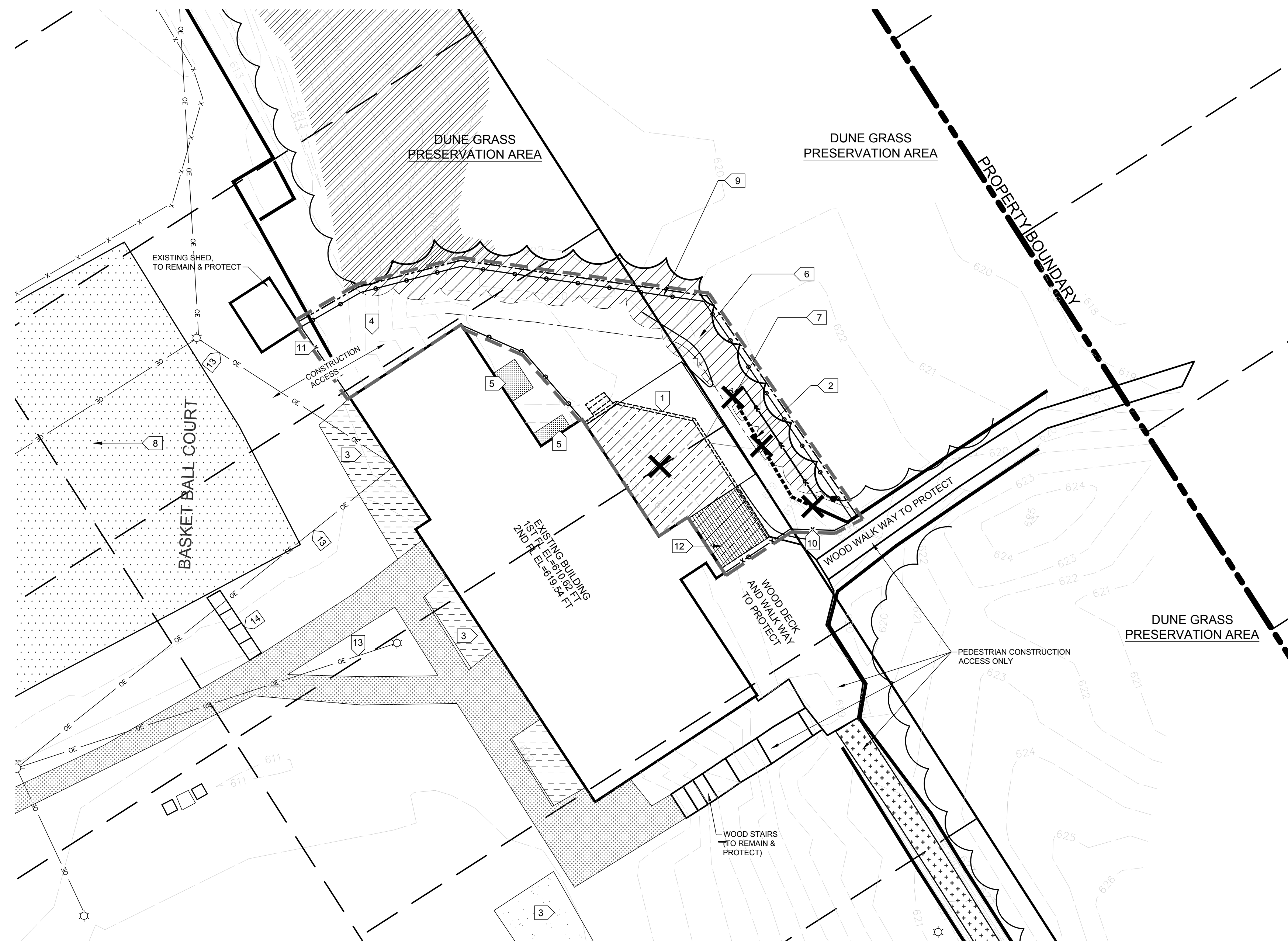
- 1 REMOVE DECK STRUCTURE - TO THE NEAREST SUPPORT
- 2 REMOVE TIMBER RETAINING WALL, DRAINAGE, & BASE & DISPOSE OF PROPERLY.
- 3 LANDSCAPE PLANTING BEDS, TO REMAIN & PROTECT.
- 4 REMOVE VEGETATION FROM CONSTRUCTION ACCESS & DISPOSE OF.
- 5 PROTECT CONCRETE STRUCTURES, TO REMAIN, AT BUILDING.
- 6 REMOVE BRUSH, SEE SPEC
- 7 REMOVE LOG POST
- 8 BASKETBALL COURT ASPHALT, TO PROTECT
- 9 SILT FENCE AT PERIMETER, SEE EROSION CONTROL PLAN & 2/SW1.2
- 10 6'H CHAIN LINK CONSTRUCTION (TEMPORARY) FENCE, CONNECT TO EXISTING AT BOARDWALK & SECURE TO BUILDING W/ RESTRICTED SIGNAGE.
- 11 6'H CHAIN LINK CONSTRUCTION (TEMPORARY) FENCE @ CONSTRUCTION ACCESS W/ RESTRICTED ACCESS SIGNAGE
- 12 EXISTING DECK, TO REMAIN & PROTECT - REMOVE/MODIFY TO ALLOW CONSTRUCTION
- 13 ELECTRICAL (O.H.) TO PROTECT
- 14 CONC. WALK TO REMOVE FOR CONSTRUCTION ACCESS



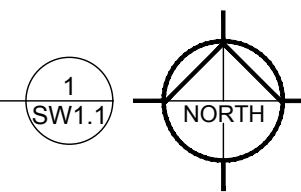
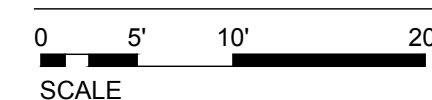
**TREE PROTECTION**

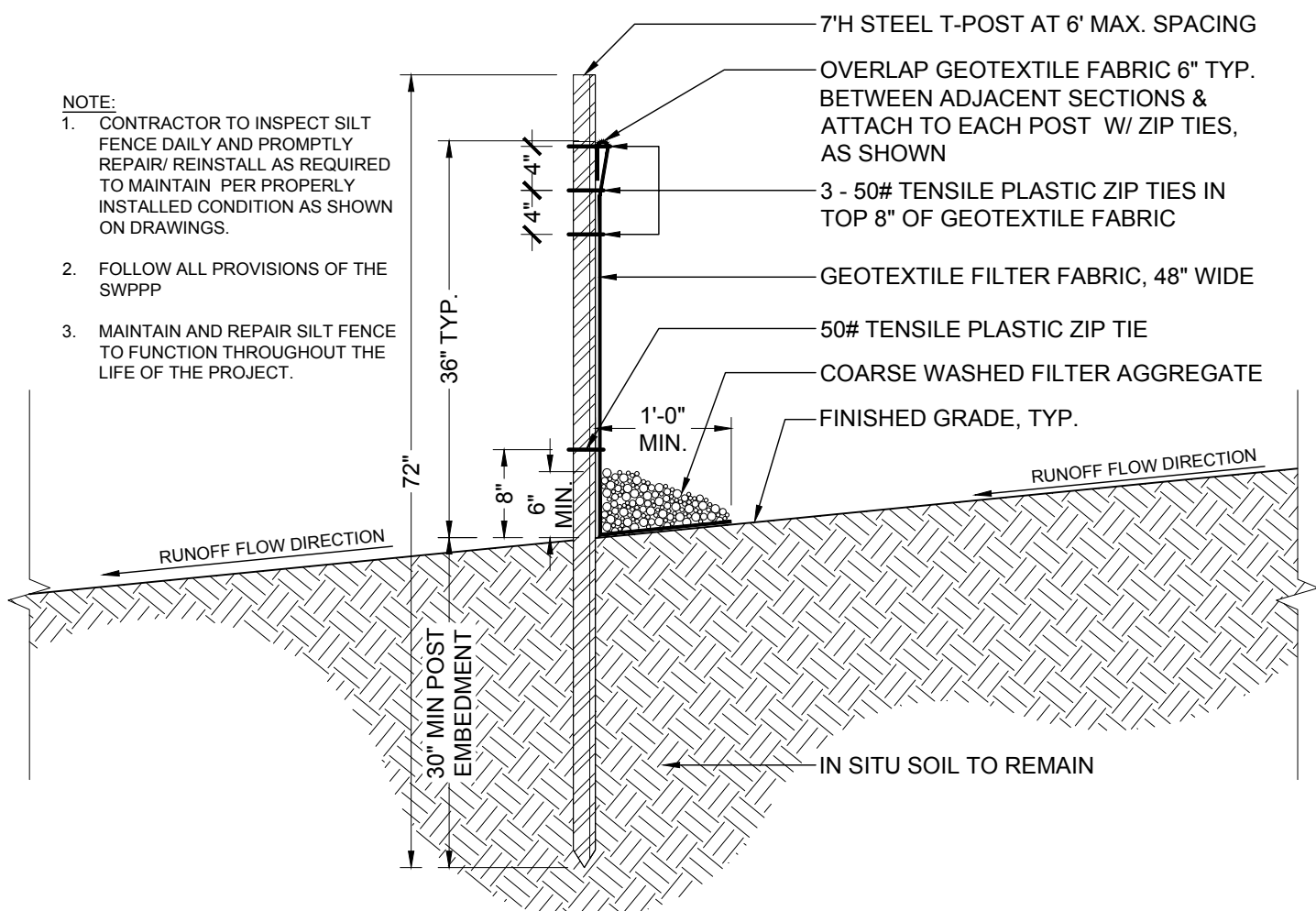


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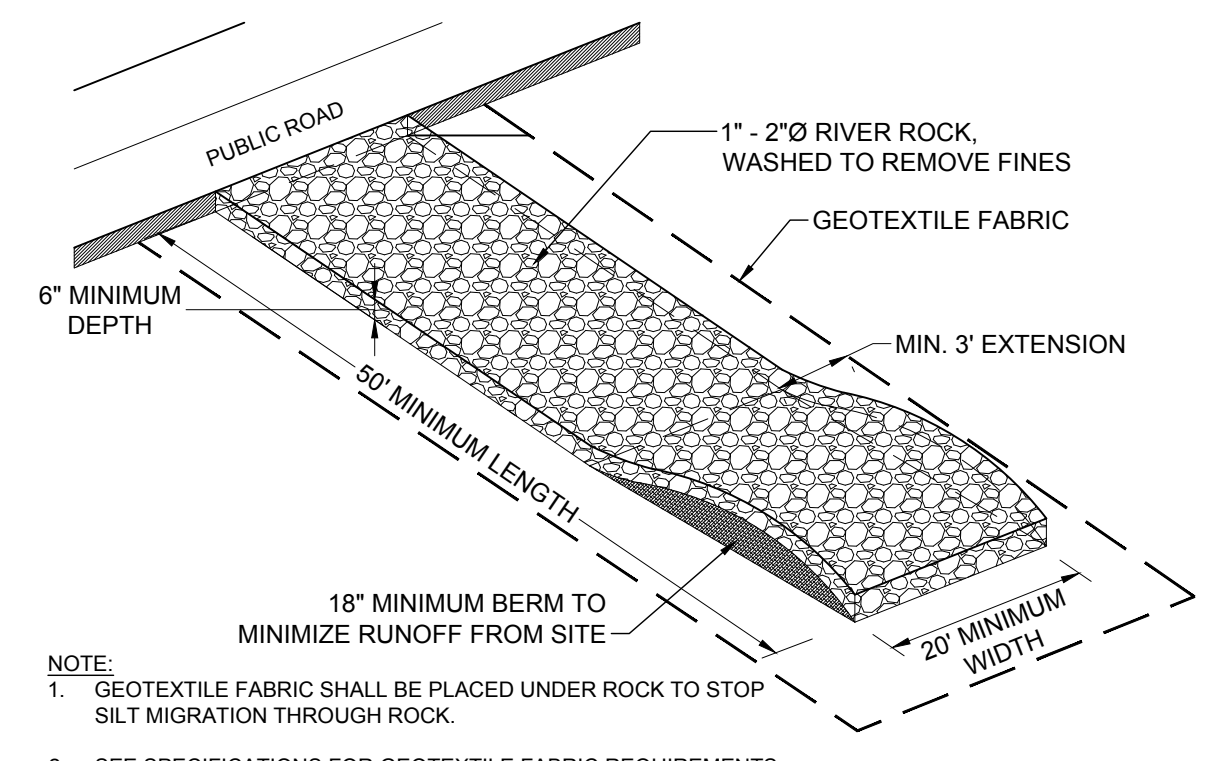
**DEMOLITION PLAN**





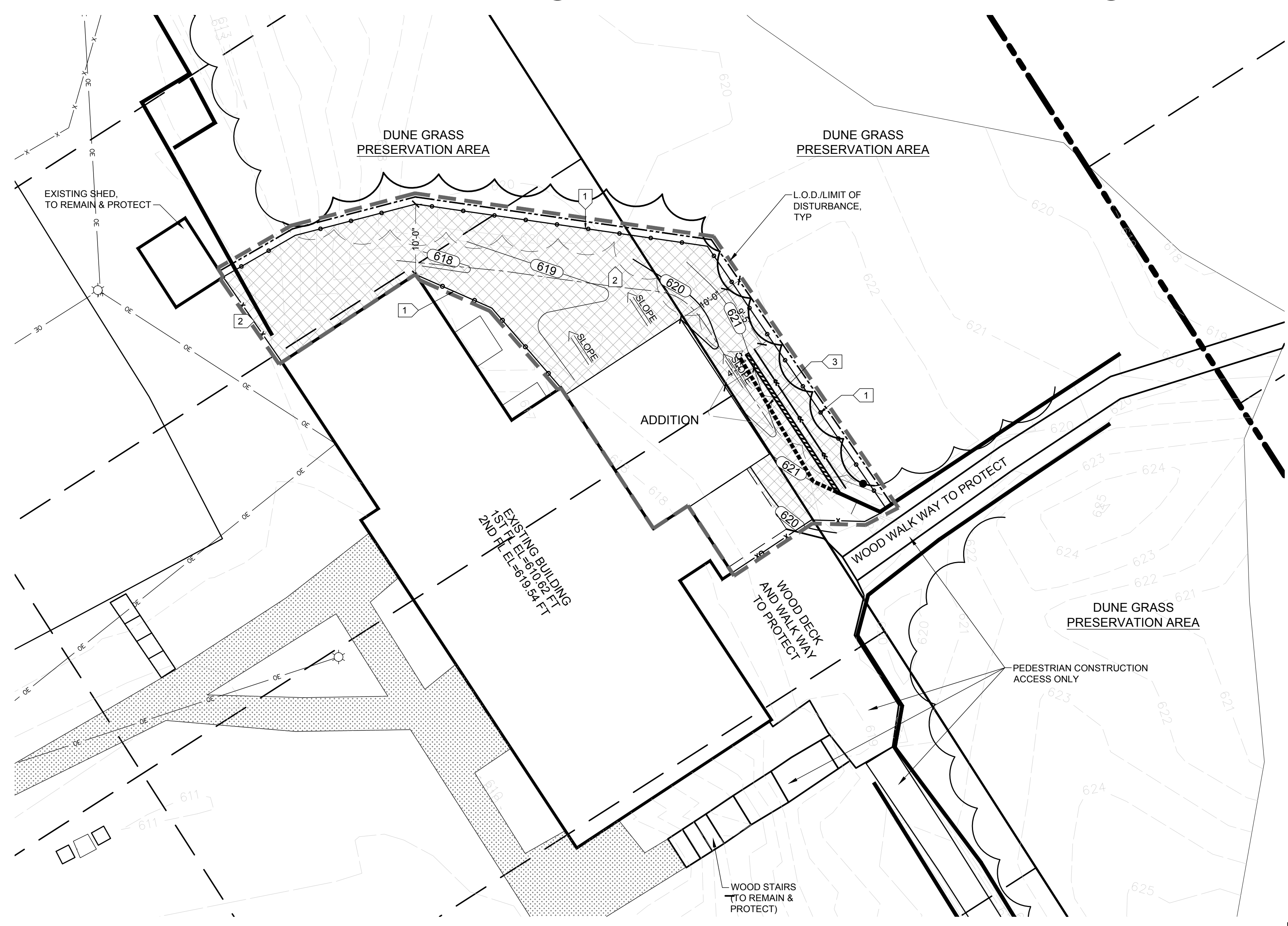
**SILT FENCE - HAND INSTALLED**

NOT TO SCALE



**ROCK CONSTRUCTION ENTRANCE**

NOT TO SCALE



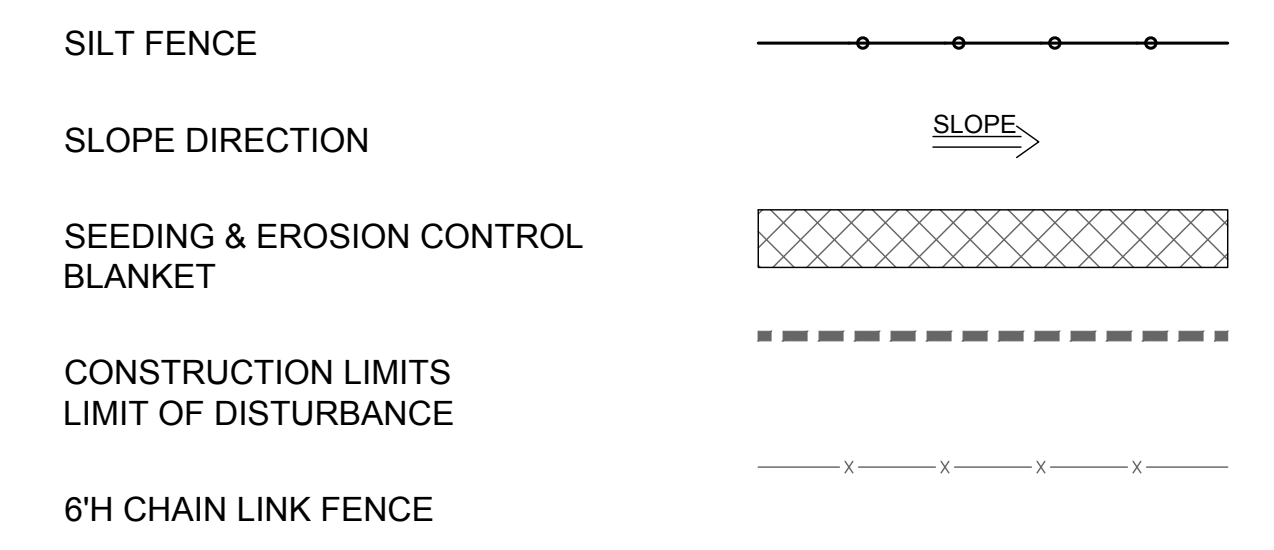
**EROSION CONTROL PLAN**

SCALE

**EROSION CONTROL NOTES:**

- EXISTING CONDITIONS SITE SURVEY PROVIDED BY ALTA SURVEY COMPANY, INC., P.O. BOX 161138, DULUTH, MN 55806. (218) 727-5211. VERIFY EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT IMMEDIATELY.
- THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES, PRIVATE & PUBLIC, BEFORE COMMENCING WORK (GOPHER STATE ONE CALL 1-800-252-1166). CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MIGHT BE CAUSED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES.
- CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE SWPPP THROUGHOUT THE LIFE OF THE PROJECT UNTIL WHICH TIME AS THE PERMIT IS CLOSED OUT.
- CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTATION OF BEST MANAGEMENT PRACTICES (BMP'S) AND COMPLIANCE WITH ALL STATE, COUNTY, AND CITY SEDIMENT CONTROL REQUIREMENTS.
- PERIMETER SEDIMENT BMP'S SHALL BE IMPLEMENTED PRIOR TO THE START OF CONSTRUCTION ACTIVITY. STORM INLET PROTECTION SHALL BE MAINTAINED ON ALL STORM DRAINAGE STRUCTURES.
- ALL EROSION CONTROL AND SEDIMENT BMP'S SHALL REMAIN IN PLACE AND BE MAINTAINED AS OPERATIONAL UNTIL PERMANENT VEGETATIVE COVER IS ESTABLISHED AND ALL PAVING IS COMPLETE.
- ALL CONSTRUCTION ENTRANCES SHALL BE SURFACED WITH CRUSHED ROCK ACROSS FULL WIDTH, FROM ENTRANCE POINT TO 50 FEET INTO CONSTRUCTION ZONE (REFER TO DETAIL 3/SW1.2), CONTRACTOR TO LOCATE.
- ALL SLOPES 3:1 OR STEEPER, NOT TO BE SODDED AND GREATER THAN 8 FEET IN HEIGHT, SHALL HAVE EROSION CONTROL FABRIC INSTALLED ON SLOPE PER MNDOT SPEC. 3885. VERIFY RESTORATION METHOD AND SEED MIXTURE. CONTRACTOR TO SUBMIT SHOP DRAWING TO ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
- SEDIMENT SHALL BE REMOVED FROM ALL SEDIMENT CONTROL DEVICES AS NECESSARY AND MUST BE REMOVED IF DESIGN CAPACITY HAS BEEN REDUCED BY 50%.
- SEDIMENT TRACKED OFF-SITE, AS A RESULT OF CONSTRUCTION TRAFFIC, SHALL BE MINIMIZED AND SWEEPED ON A DAILY BASIS.
- ALL DISTURBED AREAS SHALL BE RESTORED WITH SOD, SEED, WOOD FIBER BLANKET OR PAVED SURFACE WITHIN 7 DAYS.
- STOCKPILE AREAS TO BE ENCIRCLED WITH SILT FENCE.
- TEMPORARY OR PERMANENT SEDIMENTATION BASINS SHALL BE CONSTRUCTED AND MADE OPERATIONAL CONCURRENT WITH THE START OF SOIL DISTURBANCE THAT IS UP-GRADIENT AND CONTRIBUTES RUNOFF TO THE BASIN.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL EROSION CONTROL BMP QUANTITIES ON SITE.
- CONTRACTOR MUST AMEND EROSION CONTROL MEASURES AS NECESSARY, SUCH AS ADDITIONAL OR MODIFIED BMP'S, DESIGNED TO CORRECT PROBLEMS THAT ARE IDENTIFIED OR ARISE DURING THE CONSTRUCTION PROCESS.

**EROSION CONTROL LEGEND**

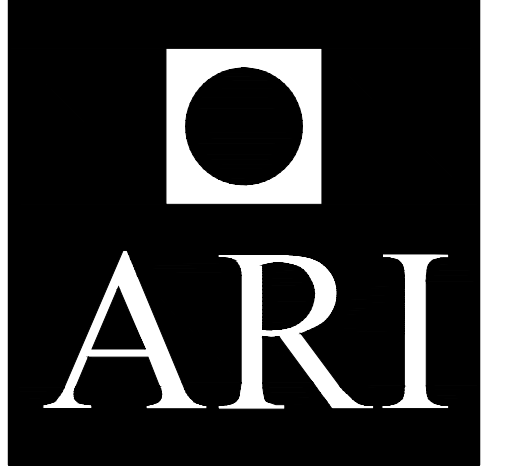


**KEYED NOTES - EROSION CONTROL PLAN**

- SILT FENCE PER DETAIL 2/SW1.2
- MNDOT EROSION CONTROL BLANKET WITH SEED MIX TYPE B ON SLOPES 3:1 OR GREATER; SEE SPECIFICATIONS
- PROVIDE TEMPORARY EROSION CONTROL IN REMOVAL AREA UNTIL RETAINING WALL INSTALLATION (NEW)

**EROSION CONTROL EST. MATERIAL QUANTITIES SCHEDULE**

DESCRIPTION	ESTIMATED QUANTITY
PERMANENT SEEDING	1,340 SF (0.03 AC)
EROSION CONTROL BLANKET	1,340 SF (0.03 AC)
SILT FENCE	1,700 LF
ROCK CONSTRUCTION ENTRANCE	1 MIN.



- ARCHITECTURE
- LANDSCAPE ARCHITECTURE
- INTERIOR DESIGN
- ENGINEERING
- TECHNOLOGY

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 126 EAST SUPERIOR STREET  
 DULUTH, MINNESOTA 55802  
 tel: 218.727.8481  
 fax: 218.722.8483

**CITY OF DULUTH  
LAFAYETTE  
COMMUNITY CENTER**



**DULUTH, MINNESOTA**

PROJECT NO.: 16-076  
 DATE: 05-MAY-17  
 DRAWN BY: AMW  
 REVISIONS:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

ANDREA WEDUL  
 LANDSCAPE ARCHITECT  
 57284  
 REG. NO.

**EROSION CONTROL PLAN/  
SWPPP**

**SW  
1.2**

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## STORM WATER POLLUTION PREVENTION PLAN (SWPPP) NARRATIVE

### PROJECT DESCRIPTION/LOCATION

LAFAYETTE COMMUNITY CENTER IMPROVEMENTS PROJECT IS LOCATED AT 3026 MINNESOTA AVE, DULUTH, MN 55802, AT APPROXIMATELY LAT 46.7522, LONG -92.0719 ON PARCEL #010-3100-01130 IN THE CITY OF DULUTH, MINNESOTA, IN SAINT LOUIS COUNTY.

THE PLANNED SCOPE OF THE PROJECT INCLUDES:

- CONSTRUCTION OF A TOILET ROOM ADDITION TO THE EXISTING BUILDING
- CONSTRUCTION OF A SMALL LANDSCAPE RETAINING WALL
- GRADING AND BITUMINOUS SURFACING
- GENERAL LANDSCAPE IMPROVEMENTS

### SPECIAL AND IMPAIRED WATERS

THESE SPECIAL AND IMPAIRED WATERS ARE LOCATED WITHIN ONE MILE (AERIAL RADIUS) OF THE PROJECT LIMITS AND RECEIVE RUNOFF FROM THE PROJECT SITE. DUE TO THE PROXIMITY OF THESE SPECIAL AND IMPAIRED WATERS. THE BMFS DESCRIBED IN APPENDIX A OF THE NPDES PERMIT WILL APPLY TO ALL AREAS OF THE SITE.

WATERBODY	IMPAIRMENT(S)
LAKE SUPERIOR	RESTRICTED DISCHARGES, MERCURY IN FISH TISSUE, PCB IN FISH TISSUE

### AREAS OF ENVIRONMENTAL SENSITIVITY (AES) AND INFESTED WATERS

IN ADDITION TO THE LIST OF SPECIAL AND IMPAIRED WATERS THE CONTRACTOR SHALL BE AWARE THAT THERE ARE THE FOLLOWING CONSIDERATIONS FOR ENVIRONMENTAL SENSITIVITY WITHIN AND NEAR THE PROJECT BOUNDARY.

- SEE PROJECT SPECIFICATION SECTION 00 31 24 ENVIRONMENTAL ASSESSMENT INFORMATION FOR US FISH & WILDLIFE SERVICE THREATENED & ENDANGERED SPECIES CONSIDERATIONS FOR CONSTRUCTION, TIMING.
- LAKE SUPERIOR SAND/GRAVEL/COBBLE SHORE BEACHGRASS DUNE & SAND BEACH NATIVE PLANT COMMUNITIES (FLORISTIC TYPES Lk432a AND Lk432c) OCCUR WITHIN THE UPSLOPE AREAS SURROUNDING THE CONSTRUCTION AREA, FOR SPECIAL PROTECTION CONSIDERATION OF AMERICAN BEACHGRASS (AMMOPHILA BREVLIGULATA) POPULATIONS WITH MN THREATENED STATUS.

### SOIL TYPES

SOIL TYPES TYPICALLY FOUND ON THIS PROJECT ARE: MU# F157C UDIPSAMMENTS - URBAN LAND COMPLEX, 1- TO 20 PERCENT SLOPES, PER THE USDA WEB SOIL SURVEY APPLICATION.

### LONG TERM MAINTENANCE AND OPERATION

CITY OF DULUTH (OWNER) WILL BE RESPONSIBLE FOR LONG TERM ONGOING MAINTENANCE AND OPERATIONS OF SITE STORMWATER DEVICES.

### PROJECT PERSONNEL AND TRAINING

THIS SWPPP WAS PREPARED BY PERSONNEL THAT ARE CURRENTLY CERTIFIED IN THE DESIGN OF CONSTRUCTION SWPPPS. COPIES OF THE CERTIFICATION(S) ARE ON FILE WITH THE A/E AND WILL BE FURNISHED UPON REQUEST.

CONTRACTOR SHALL PROVIDE A CERTIFIED EROSION CONTROL SUPERVISOR IN GOOD STANDING WHO IS KNOWLEDGEABLE AND EXPERIENCED IN THE APPLICATION OF EROSION PREVENTION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES. THE EROSION CONTROL SUPERVISOR WILL WORK WITH THE PROJECT A/E TO OVERSEE THE IMPLEMENTATION OF THE SWPPP AND THE INSTALLATION, INSPECTION, AND MAINTENANCE OF THE EROSION PREVENTION AND SEDIMENT CONTROL BMFS BEFORE, DURING AND AFTER CONSTRUCTION UNTIL THE NOTICE OF TERMINATION (N.O.T.) HAS BEEN FILED WITH THE MPCA. PROVIDE PROOF OF CERTIFICATION AT THE PRE-CONSTRUCTION MEETING. WORK WILL NOT BE ALLOWED TO COMMENCE UNTIL PROOF OF CERTIFICATION HAS BEEN PROVIDED TO THE PROJECT ENGINEER.

PROVIDE AT LEAST ONE CERTIFIED INSTALLER FOR EACH CONTRACTOR OR SUBCONTRACTOR THAT INSTALLS THE PRODUCTS LISTED IN SPECIFICATION SECTION 2573.3.A.2. PROVIDE PROOF OF CERTIFICATION AT THE PRE-CONSTRUCTION MEETING. WORK WILL NOT BE ALLOWED TO COMMENCE UNTIL PROOF OF CERTIFICATION HAS BEEN PROVIDED TO THE PROJECT ENGINEER.

### CHAIN OF RESPONSIBILITY

CITY OF DULUTH AND THE CONTRACTOR ARE CO-PERMITTEES FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) CONSTRUCTION PERMIT. THE CONTRACTOR IS RESPONSIBLE TO COMPLY WITH ALL ASPECTS OF THE NPDES CONSTRUCTION PERMIT AT ALL TIMES UNTIL THE NOTICE OF TERMINATION (N.O.T.) HAS BEEN FILED WITH THE MPCA. THE CONTRACTOR WILL DEVELOP A CHAIN OF COMMAND WITH ALL OPERATORS ON THE SITE TO ENSURE THAT THE SWPPP WILL BE IMPLEMENTED AND STAY IN EFFECT UNTIL THE CONSTRUCTION PROJECT IS COMPLETE, THE ENTIRE SITE HAS UNDERGONE FINAL STABILIZATION, AND A NOTICE OF TERMINATION (N.O.T.) HAS BEEN SUBMITTED TO THE MPCA.

### PROJECT CONTACTS

CITY OF DULUTH AND THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTATION OF THE SWPPP AND INSTALLATION, INSPECTION, AND MAINTENANCE OF THE EROSION PREVENTION AND SEDIMENT CONTROL BMFS BEFORE, DURING, AND AFTER CONSTRUCTION UNTIL THE NOTICE OF TERMINATION (N.O.T.) HAS BEEN FILED.

ORGANIZATION	CONTACT NAME	PHONE
ARCHITECTURAL RESOURCES, INC. (SWPPP DESIGNER)	ANDREA WEDUL	(218) 727-8481
CITY OF DULUTH - PROPERTY & FACILITIES MGMT.	ROBERT HURD	(218) 730-4416
MINNESOTA POLLUTION CONTROL AGENCY (MPCA)	JIM DEXTER	(218) 302-6632
MINNESOTA DEPARTMENT OF NATURAL RESOURCES	PETER LEETE	(651) 366-3634
ARMY CORP OF ENGINEERS	ANDREW CHAMBERS	(218) 720-5291

**MPCA DUTY OFFICER 24 HOUR EMERGENCY MANAGEMENT UNIT (EMU) NOTIFICATION HOTLINE: 1-800-422-0788**

### LOCATION OF SWPPP REQUIREMENTS

THE REQUIRED SWPPP ELEMENTS MAY BE LOCATED IN MANY PLACES WITHIN THE PLAN SET AS WELL AS IN THE SPECIAL PROVISIONS AND/OR IN THE MNDOT SPEC BOOK (2016 EDITION). THE NOTES AND TABLE BELOW ARE INTENDED TO BE A QUICK REFERENCE FOR THE CONTRACTOR AND PROJECT A/E TO USE IN THE FIELD. THERE MAY BE ADDITIONAL REQUIRED SWPPP ELEMENTS INCLUDED ON THE PROJECT THAT ARE NOT LISTED ON THIS SHEET.

### LOCATION OF SWPPP REQUIREMENTS IN PROJECT PLAN

DESCRIPTION	LOCATION
TEMPORARY EROSION CONTROL MEASURES	SHEETS NO. SW1.2, SW1.3
PERMANENT EROSION CONTROL MEASURES	SHEETS NO. SW1.2, SW1.3
DIRECTION OF FLOW	SHEETS NO. SW2.1
FINAL STABILIZATION	SHEETS NO. SW1.2, SW1.3
SOILS AND CONSTRUCTION NOTES	SHEETS NO. SW2.1, SW3.1, PROJECT SPECIFICATIONS
EROSION AND SEDIMENT CONTROL DETAILS	SHEETS NO. SW1.2
EROSION CONTROL TABULATION	SHEETS NO. SW1.2
TURF ESTABLISHMENT TABULATION	SHEETS NO. SW1.2
STORMWATER CALCULATIONS AND MAPS	CONTACT CITY OF DULUTH - PARKS & RECREATION
WATER RESOURCES NOTES	SHEETS NO. SW1.3

STORMWATER CALCULATIONS AND ADDITIONAL DESIGN INFORMATION CAN BE PROVIDED UPON WRITTEN REQUEST TO CITY OF DULUTH.

### SITE INSPECTION AND MAINTENANCE

INSPECT THE ENTIRE CONSTRUCTION SITE A MINIMUM OF ONCE EVERY SEVEN DAYS DURING ACTIVE CONSTRUCTION AND WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCH IN 24 HOURS. INSPECT ALL TEMPORARY AND PERMANENT WATER QUALITY MANAGEMENT, EROSION PREVENTION AND SEDIMENT CONTROL BMFS UNTIL THE SITE HAS UNDERGONE FINAL STABILIZATION AND THE NOT HAS BEEN SUBMITTED. INSPECT SURFACE WATER INCLUDING DRAINAGE DITCHES FOR SIGNS OF EROSION AND SEDIMENT DEPOSITION. INSPECT CONSTRUCTION SITE VEHICLE EXIT LOCATIONS FOR EVIDENCE OF TRACKING ONTO PAVED SURFACES. INSPECT SURROUNDING PROPERTIES FOR EVIDENCE OF OFF SITE SEDIMENT ACCUMULATION. INSPECT INFILTRATION AREAS FOR SIGN OS SEDIMENT DEPOSITION AND COMPACTION (TO ENSURE THAT EQUIPMENT IS NOT BEING DRIVEN ACROSS THE AREA).

RECORD ALL INSPECTIONS AND MAINTENANCE ACTIVITIES IN WRITING WITHIN 24 HOURS. SUBMIT INSPECTION REPORTS IN A FORMAT THAT IS ACCEPTABLE TO THE PROJECT ENGINEER. INCLUDE THE FOLLOWING IN THE RECORDS OF EACH INSPECTION AND MAINTENANCE ACTIVITY:

- DATE AND TIME OF INSPECTIONS
- NAME OF PERSON CONDUCTING INSPECTIONS
- FINDINGS OF INSPECTIONS, INCLUDING RECOMMENDATIONS FOR CORRECTIVE ACTIONS
- CORRECTIVE ACTIONS TAKEN, INCLUDING DATES, TIMES, AND PARTY COMPLETING MAINTENANCE ACTIVITIES
- DATE AND AMOUNT OF ALL RAINFALL EVENTS GREATER THAN 0.5 INCH IN 24 HOURS
- DOCUMENTS AND CHANGES MADE TO THE SWPPP

REPLACE, REPAIR OR SUPPLEMENT ALL NONFUNCTIONAL BMFS BY THE END OF THE NEXT BUSINESS DAY FOLLOWING DISCOVERY UNLESS LISTED DIFFERENTLY BELOW:

- REPAIR, REPLACE, OR SUPPLEMENT PERIMETER CONTROL DEVICES WHEN IT BECOMES NONFUNCTIONAL OR SEDIMENT REACHES  $\frac{1}{2}$  THE HEIGHT OF THE DEVICE. COMPLETE REPAIRS BY THE END OF THE NEXT BUSINESS DAY FOLLOWING DISCOVERY.
- REPAIR OR REPLACE INLET PROTECTION DEVICES WHEN THEY BECOME NONFUNCTIONAL OR SEDIMENT REACHES  $\frac{1}{2}$  THE HEIGHT AND/OR DEPTH OF THE DEVICE.
- DRAIN AND REMOVE SEDIMENT FROM TEMPORARY AND PERMANENT SEDIMENT BASINS ONCE THE SEDIMENT HAS REACHED  $\frac{1}{2}$  THE STORAGE VOLUME. COMPLETE WORK WITHIN 72 HOURS OF DISCOVERY.
- REMOVE ALL DELTAS AND SEDIMENT DEPOSITED IN SURFACE WATERS INCLUDING DRAINAGE WAYS, CATCH BASINS, AND OTHER DRAINAGE SYSTEMS. RESTABILIZE ANY AREAS THAT ARE DISTURBED BY SEDIMENT REMOVAL OPERATIONS. SEDIMENT REMOVAL AND STABILIZATION MUST BE COMPLETED WITHIN 7 DAYS OF DISCOVERY. PREPARE AND SUBMIT A SITE MANAGEMENT PLAN FOR WORKING IN SURFACE WATERS. CONTACT ALL APPROPRIATE AUTHORITIES PRIOR TO WORKING IN SURFACE WATERS.
- REMOVE TRACKED SEDIMENT FROM PAVED SURFACES BOTH ON AND OFF SITE WITHIN 24 HOURS OF DISCOVERY. STREET SWEEPING MAY HAVE TO OCCUR MORE OFTEN TO MINIMIZE OFF SITE IMPACTS. LIGHTLY WET THE PAVEMENT PRIOR TO SWEEPING.
- MAINTAIN ALL BMFS UNTIL WORK HAS BEEN COMPLETED, SITE HAS GONE UNDER FINAL STABILIZATION, AND THE NOTICE OF TERMINATION (NOT) HAS BEEN SUBMITTED TO THE MPCA.

### ENVIRONMENTAL REVIEW

THERE ARE NO STORMWATER MITIGATION MEASURES REQUIRED AS A RESULT OF AN ENVIRONMENTAL, ARCHEOLOGICAL OR AGENCY REVIEW.

THIS PROJECT IS NOT LOCATED IN A WELLHEAD PROTECTION AREA.

THIS PROJECT IS NOT LOCATED IN A DRINKING WATER - GROUNDWATER - SUPPLY MANAGEMENT AREA (DWSMA). THIS PROJECT IS NOT LOCATED IN A DRINKING WATER - SURFACE WATER - SUPPLY MANAGEMENT AREA (DWSMA).

### LAND FEATURE CHANGES

TOTAL DISTURBED AREA	0.050 ACRES (2,155 SF)
TOTAL EXISTING IMPERVIOUS SURFACE AREA	0.463 ACRES (20,177 SF)
TOTAL PROPOSED IMPERVIOUS SURFACE AREA	0.466 ACRES (20,301 SF)
TOTAL PROPOSED NET CHANGE IN IMPERVIOUS SURFACE AREA	+0.003 ACRES (124 SF)

### STABILIZATION TIME FRAMES

AREA	TIME FRAME	NOTES
LAST 200 LINEAL FEET OF DRAINAGE DITCH OR SWALE	WITHIN 24 HOURS OF CONNECTION TO SURFACE WATER OR PROPERTY EDGE	1, 2, 3
REMAINING PORTIONS OF DRAINAGE DITCH OR SWALE	7 DAYS	1, 3
PIPE AND CULVERT OUTLETS	24 HOURS	
STOCKPILES	7 DAYS	1

- INITIATE STABILIZATION IMMEDIATELY WHEN CONSTRUCTION HAS TEMPORARILY OR PERMANENTLY CEASED ON ANY PORTION OF THE SITE. COMPLETE STABILIZATION WITHIN THE TIME FRAME LISTED. IN MANY INSTANCES THIS WILL REQUIRE STABILIZATION TO OCCUR MORE THAN ONCE DURING THE COURSE OF THE PROJECT. TEMPORARY SOIL STOCKPILES WITHOUT SIGNIFICANT CLAY OR SILT AND STOCKPILED AND CONSTRUCTED ROAD BASE ARE EXEMPT FROM THE STABILIZATION REQUIREMENT.
- STABILIZE WETTED PERIMETER OF DITCH (I.E. WHERE THE DITCH GETS WET).
- APPLICATION OF MULCH, HYDROMULCH, TACKIFIER AND POLYACRYLAMIDE ARE NOT ACCEPTABLE STABILIZATION METHODS IN THESE AREAS.
- STABILIZE ALL AREAS OF THE SITE PRIOR TO THE ONSET OF WINTER. ANY WORK STILL BEING PERFORMED WILL BE SNOW MULCHED, SEEDED, AND BLANKETED WITHIN THE TIME FRAMES IN THE NPDES PERMIT.
- TOPSOIL BERMS MUST BE STABILIZED IN ORDER TO BE CONSIDERED PERIMETER CONTROL BMFS. USE RAPID STABILIZATION METHOD 2, 3, OR 4 AS DIRECTED BY THE ENGINEER. THE SEED MIX USED IN THE RAPID STABILIZATION MAY BE SUBSTITUTED AS FOLLOWS:
  - SINGLE YEAR CONSTRUCTION BETWEEN MAY 1 - AUGUST 1, SEED WITH SEED MIXTURE 21-111
  - SINGLE YEAR CONSTRUCTION BETWEEN AUGUST 1 AND OCTOBER 31, SEED WITH SEED MIXTURE 21-112
  - MULTI YEAR CONSTRUCTION 22-111
- KEEP DITCHES AND EXPOSED SOILS IN AN EVEN ROUGH GRADED CONDITION IN ORDER TO BE ABLE TO APPLY EROSION CONTROL MULCHES, HYDROMULCHES AND BLANKETS.

### GENERAL SWPPP NOTES FOR CONSTRUCTION ACTIVITY

- AMEND THE SWPPP AND DOCUMENT ANY AND ALL CHANGES TO THE SWPPP AND ASSOCIATED PLAN SHEETS IN A TIMELY MANNER. STORE THE SWPPP AND ALL AMENDMENTS ON SITE AT ALL TIMES.
- PREPARE AND SUBMIT A SITE MANAGEMENT PLAN FOR THE A/E'S ACCEPTANCE FOR CONCRETE MANAGEMENT, CONCRETE SLURRY APPLICATION AREAS, WORK IN AND NEAR AREAS OF ENVIRONMENTAL SENSITIVITY, AREAS IDENTIFIED IN THE PLANS AS "SITE MANAGEMENT PLAN AREA", ANY WORK THAT WILL REQUIRE DEWATERING, AND AS REQUESTED BY THE A/E. SUBMIT ALL SITE MANAGEMENT PLANS TO THE A/E IN WRITING. ALLOW A MINIMUM OF 7 DAYS FOR OWNER TO REVIEW AND ACCEPT SITE MANAGEMENT PLAN SUBMITTALS. WORK WILL NOT BE ALLOWED TO COMMENCE IF A SITE MANAGEMENT PLAN IS REQUIRED UNTIL ACCEPTANCE HAS BEEN GRANTED BY THE A/E. THERE WILL BE NO EXTRA TIME ADDED TO THE CONTRACT DUE TO THE TIMELY SUBMITTAL.
- IT IS THE DESIGNER'S INTENT THAT THE CONTRACTOR BUILD PONDS AND INSTALL EROSION CONTROL BMFS BEFORE PUTTING THEM INTO ACTIVE SERVICE TO THE MAXIMUM EXTENT PRACTICABLE.
- BURNING OF ANY MATERIAL IS NOT ALLOWED WITHIN PROJECT BOUNDARY.
- DO NOT DISTURB AREAS OUTSIDE OF THE CONSTRUCTION LIMITS. DELINEATE AREAS NOT TO BE DISTURBED PRIOR TO STARTING GROUND-DISTURBANCE ACTIVITIES. IF IT BECOMES NECESSARY TO DISTURB AREAS OUTSIDE OF THE CONSTRUCTION LIMITS, OBTAIN WRITTEN PERMISSION FROM THE PROJECT A/E PRIOR TO PROCEEDING WITH WORK. PRESERVE ALL NATURAL BUFFERS SHOWN ON THE PLANS.
- ROUTE STORMWATER AROUND UNSTABILIZED AREAS OF THE SITE WHENEVER FEASIBLE. PROVIDE EROSION CONTROL AND VELOCITY DISSIPATION DEVICES AS NEEDED TO KEEP CHANNELS FROM ERODING AND TO PREVENT NUISANCE CONDITIONS AT THE OUTLET.
- DIRECT DISCHARGES FROM BMFS TO VEGETATED AREAS WHENEVER FEASIBLE. PROVIDE VELOCITY DISSIPATION DEVICES AS NEEDED TO PREVENT EROSION.
- THE EROSION PREVENTION AND SEDIMENT CONTROL BMFS SHALL BE PLACED AS NECESSARY TO MINIMIZE EROSION FROM DISTURBED SURFACES AND TO CAPTURE SEDIMENT ON SITE. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO COMMENCEMENT OF ANY REMOVAL WORK AND/OR GROUND DISTURBING ACTIVITIES COMMENCE.
- ESTABLISH SEDIMENT CONTROL DEVICES ON ALL DOWN-GRADIENT PERIMETERS AND UP-GRADIENT OF ANY BUFFER ZONES BEFORE ANY UP-GRADIENT LAND DISTURBING ACTIVITIES BEGIN. MAINTAIN SEDIMENT CONTROL DEVICES UNTIL CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
- LOCATE PERIMETER CONTROL ON THE CONTOUR TO CAPTURE OVERLAND, LOW-VELOCITY SHEET FLOWS DOWN-GRADIENT OF ALL EXPOSED SOILS AND PRIOR TO DISCHARGING TO SURFACE WATERS. PLACE FENCING J-HOOKS AT A MAXIMUM OF 100 FOOT INTERVALS.
- PROVIDE PERIMETER CONTROL AROUND ALL STOCKPILES. PLACE BMP A MINIMUM 5 FEET FROM THE TOE OF SLOPE WHERE FEASIBLE. DO NOT PLACE STOCKPILES IN NATURAL BUFFER AREAS, SURFACE WATERS, OR STORMWATER CONVEYANCES.
- FLOATING SILT CURTAIN IS ALLOWED AS PERIMETER CONTROL FOR IN WATER WORK ONLY. INSTALL THE FLOATING SILT CURTAIN AS CLOSE TO SHORE AS POSSIBLE. PLACE PERIMETER CONTROL BMP ON LAND IMMEDIATELY AFTER THE IN WATER WORK IS COMPLETED.
- DITCH CHECKS WILL BE PLACED AS INDICATED ON THE PLANS DURING ALL PHASES OF CONSTRUCTION
- PROJECT STORM SEWER INLETS AT ALL TIMES WITH THE APPROPRIATE INLET PROTECTION FOR EACH SPECIFIC PHASE OF CONSTRUCTION. PROVIDE INLET PROTECTION DEVICES WITH EMERGENCY OVERFLOW CAPABILITIES. SILT FENCE PLACED IN THE INLET GRATE IS NOT AN ACCEPTABLE INLET PROTECTION BMP FOR GRADING OPERATIONS. SILT FENCE PLACED IN THE GRATE IS ONLY ALLOWED FOR SHORT INTERVALS DURING MILLING OR PAVING OPERATIONS. INLET PROTECTION DEVICES MAY NEED TO BE PLACED MULTIPLE TIMES IN THE SAME LOCATION OVER THE LIFE OF THE CONTRACT. INLET PROTECTION DEVICES WILL BE PAID FOR ONCE PER INLET REGARDLESS OF THE NUMBER OF TIMES THE BMP IS PLACED. KEEP ALL STORM SEWER INLET PROTECTION DEVICES IN GOOD FUNCTIONAL CONDITION AT ALL TIMES. REPLACE INLET PROTECTION DEVICE WITH A SUITABLE ALTERNATIVE IF THE PROJECT A/E DEEMS AN INLET PROTECTION DEVICE TO BE NON-FUNCTIONAL, IN POOR CONDITION, INEFFECTIVE, OR NOT APPROPRIATE FOR THE CURRENT CONSTRUCTION ACTIVITIES. THERE WILL BE NO ADDITIONAL COST TO OWNER FOR REPLACEMENT OF INLET PROTECTION DEVICES.
- PLACE CONSTRUCTION EXITS AS NECESSARY AND PER PLANS TO PREVENT TRACKING OF SEDIMENT ONTO PAVED SURFACES BOTH ON AND OFF THE PROJECT SITE. PROVIDE CONSTRUCTION EXITS OF SUFFICIENT SIZE TO PREVENT TRACK OUT. MAINTAIN CONSTRUCTION EXITS WHEN EVIDENCE OF TRACKING IS DISCOVERED. REGULAR STREET SWEEPING IS NOT AN ACCEPTABLE ALTERNATIVE TO PROPER CONSTRUCTION EXIT INSTALLATION AND MAINTENANCE. CONSTRUCTION EXITS ARE INCIDENTAL.

- DISCHARGE TURBID OR SEDIMENT LADEN WATER TO TEMPORARY SEDIMENT BASINS WHENEVER FEASIBLE. IN THE EVENT THAT IT IS NOT FEASIBLE TO DISCHARGE THE SEDIMENT LADEN WATER TO A TEMPORARY SEDIMENT BASIN, THE WATER MUST BE TREATED SO THAT IT DOES NOT CAUSE A NUISANCE CONDITION IN THE RECEIVING WATERS OR TO DOWNSTREAM LANDOWNERS. CLEAN OUT ALL PERMANENT STORMWATER BASINS REGARDLESS OF WHETHER USED AS TEMPORARY SEDIMENT BASINS OR TEMPORARY SEDIMENT TRAPS TO THE DESIGN CAPACITY AFTER ALL UPGRADIENT LAND DISTURBING ACTIVITY IS COMPLETED.
- PROVIDE SCOUR PROTECTION AT ANY OUTFALL OF DEWATERING ACTIVITIES.
- PROVIDE STABILIZATION IN ANY TRENCHES CUT FOR DEWATERING OR SITE DRAINING PURPOSES.

### POLLUTION PREVENTION

- PROVIDE A SPILL KIT AT EACH WORK LOCATION ON THE SITE.
- STORE ALL BUILDING MATERIALS THAT HAVE THE POTENTIAL TO LEACH POLLUTANTS, PESTICIDES, HERBICIDES, INSECTICIDES, FERTILIZERS, TREATMENT CHEMICALS, AND LANDSCAPE MATERIALS UNDER COVER AND WITH SECONDARY CONTAINMENT.
- PROVIDE A SECURE STORAGE AREA WITH RESTRICTED ACCESS FOR ALL HAZARDOUS MATERIALS AND TOXIC WASTE. RETURN ALL HAZARDOUS MATERIALS AND TOXIC WASTE TO THE DESIGNATED STORAGE AREA AT THE END OF THE BUSINESS DAY UNLESS INFEASIBLE. STORE ALL HAZARDOUS MATERIALS AND TOXIC WASTE (INCLUDING BUT NOT LIMITED TO FUEL, GASOLINE, HYDRAULIC FLUIDS, PAINT, PETROLEUM BASED PRODUCTS, WOOD PRESERVATIVES, ADDITIVES, CURING COMPOUNDS, AND ACIDS) IN SEALED CONTAINERS WITH SECONDARY CONTAINMENT. CLEAN UP SPILLS IMMEDIATELY.
- STORE, COLLECT AND DISPOSE OF ALL SOLID WASTE.
- POSITION ALL PORTABLE TOILETS SO THAT THEY ARE SECURE AND CANNOT BE TIPPED OR KNOCKED OVER. PROPERLY DISPOSE OF ALL SANITARY WASTE.
- FUEL AND MAINTAIN VEHICLES IN A DESIGNATED CONTAINED AREA WHENEVER FEASIBLE. USE DRIP PANS OR ABSORBENT MATERIALS TO PREVENT SPILLS OR LEAKED CHEMICALS FROM DISCHARGING TO SURFACE WATER OR STORMWATER CONVEYANCES. PROVIDE A SPILL KIT AT EACH LOCATION THAT VEHICLES AND EQUIPMENT ARE FUELED OR MAINTAINED AT.
- LIMIT VEHICLE AND EQUIPMENT WASHING TO A DEFINED AREA OF THE SITE. CONTAIN RUNOFF FROM THE WASHING AREA TO A TEMPORARY SEDIMENT BASIN OR OTHER EFFECTIVE CONTROL. PROPERLY DISPOSE OF ALL WASTE GENERATED BY VEHICLE AND EQUIPMENT WASHING. ENGINE DEGREASING IS NOT ALLOWED ON THE SITE.
- PROVIDE EFFECTIVE CONTAINMENT FOR ALL LIQUID AND SOLID WASTES GENERATED BY WASHOUT OF CONCRETE, STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS. LIQUID AND SOLID WASHOUT SOILS MUST NOT CONTACT THE GROUND. DESIGN THE CONTAINMENT SO THAT IT DOES NOT RESULT IN RUNOFF FROM THE WASHOUT OPERATIONS OR CONTAINMENT AREA.
- CREATE AND FOLLOW A WRITTEN DISPOSAL PLAN FOR ALL WASTE MATERIALS. INCLUDE IN THE PLAN HOW THE MATERIAL WILL BE DISPOSED OF AND THE LOCATION OF THE DISPOSAL SITE. SUBMIT PLAN TO THE ENGINEER.
- USE METHODS AND OPERATIONAL PROCEDURES THAT PREVENT DISCHARGE OR PLACEMENT OF BITUMINOUS GRINDINGS, CUTTINGS, MILLINGS, AND OTHER BITUMINOUS WASTES FROM AREAS OF EXISTING OR FUTURE VEGETATED SOILS AND FROM ALL WATER CONVEYANCE SYSTEMS, INCLUDING INLETS, DITCHES AND CURB FLOW LINES.
- USE METHODS AND OPERATIONAL PROCEDURES THAT PREVENT CONCRETE DUST, PARTICLES, CONCRETE WASH OUT, AND OTHER CONCRETE WASTES FROM LEAVING MNDOT RIGHT OF WAY, DEPOSITING IN EXISTING OR FUTURE VEGETATED AREAS, AND FROM ENTERING STORMWATER CONVEYANCE SYSTEMS, INCLUDING INLETS, DITCHES AND CURB FLOW LINES. USE METHODS AND OPERATIONAL PROCEDURES THAT PREVENT SAW CUT SLURRY AND PLANING WASTE FROM LEAVING MNDOT RIGHT OF WAY AND FROM ENTERING STORMWATER CONVEYANCE SYSTEMS INCLUDING DITCHES AND CULVERTS.

### WATER RESOURCES NOTES

THESE NOTES ALONG WITH THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) NARRATIVE ARE INTENDED TO GIVE INFORMATION ON CRITICAL DRAINAGE FEATURES, NATURAL RESOURCES AND CONTRACTOR OPERATIONS THAT MAY IMPACT DRAINAGE AND NATURAL RESOURCES.

- THE SIZE AND ELEVATION OF CULVERTS, STORM SEWER PIPES, CATCH BASINS, PONDS, INFILTRATION/FILTRATION BASINS, PERMEABLE DITCH BLOCKS AND OVERFLOW DEVICES HAVE BEEN SPECIFICALLY DESIGNED TO CONFORM TO MNDOT DESIGN STANDARDS, MINNESOTA POLLUTION CONTROL AGENCY (MPCA) AND WATERSHED DISTRICT PERMIT REQUIREMENTS. THE DESIGN COMPUTATIONS ARE ON FILE WITH OWNER. CHANGING THESE ITEMS OR THE DIRECTION OF FLOW FROM WHAT IS SHOWN ON THE PLANS MAY CAUSE PROBLEMS OFF THE PROJECT AND COULD MEAN THE PROJECT IS OUT OF COMPLIANCE WITH APPROVED DRAINAGE PERMITS. ANY CHANGES TO THE SIZE, ELEVATION OR DIRECTION OF FLOW OF THE DRAINAGE SYSTEM MUST BE APPROVED BY THE METRO WATER RESOURCES DESIGNER.
- SUBSOIL ALL DISTURBED GREEN SPACES EXCEPT AS LISTED IN MNDOT SPECIFICATION 2574.3A.2 AND PER PROJECT SPECIFICATIONS.
- PERFORM POST INSTALLATION MANDREL TESTING OF ALL PLASTIC PIPE.
- ANY SUBSURFACE DRAINAGE TILES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED, REPLACED OR REROUTED, AND CONNECTED TO THE EXISTING TILE OR DRAINAGE SYSTEM TO ENSURE THAT EXISTING UPLAND DRAINAGE IS PERPETUATED. THIS SHOULD BE DONE TO THE APPROVAL AND SATISFACTION OF THE ENGINEER.
- THE FOLLOWING WATER RELATED PERMITS APPLY TO THIS PROJECT:

AGENCY	TYPE OF PERMIT
MINNESOTA POLLUTION CONTROL AGENCY (MPCA)	NPDES CONSTRUCTION PERMIT
DEPARTMENT OF NATURAL RESOURCES (DNR)	JOINT STATE/FED WATER/WETLAND
ARMY CORP OF ENGINEERS	JOINT STATE/FED WATER/WETLAND
CITY OF DULUTH	SHORELAND/EROSION CONTROL

REVIEW ALL PERMITS FOR ANY SPECIAL CONDITIONS THAT WILL EFFECT CONSTRUCTION OF THE PROJECT.

TEMPORARY DEWATERING ACTIVITIES MAY BE REQUIRED FOR GENERAL CONSTRUCTION AND UTILITY WORK. THEREFORE IT IS POSSIBLE THAT A PERMIT FOR THE TEMPORARY APPROPRIATION OF WATERS OF THE STATE, NON-IRRIGATION, FROM MNDNR WILL BE REQUIRED FOR THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THIS PERMIT PRIOR TO COMMENCING DEWATERING ACTIVITIES. ALL TEMPORARY DEWATERING SHALL BE DISCHARGED TO AN APPROVED LOCATION FOR TREATMENT PRIOR TO DISCHARGE TO THE RECEIVING WATER. SUBMIT A SITE MANAGEMENT PLAN TO THE ENGINEER FOR APPROVAL PRIOR TO COMMENCING WORK.

### FILTRATION CONSTRUCTION NOTES

- DO NOT STOCKPILE MATERIALS OR PARK EQUIPMENT OR VEHICLES IN A CONSTRUCTED FILTRATION AREA. STAKE OFF OR OTHERWISE MARK OFF FILTRATION AREAS TO PREVENT HEAVY CONSTRUCTION VEHICLES AND EQUIPMENT FROM DRIVING THROUGH.
- DO NOT PLACE FILTER MATERIAL IN FILTRATION BASINS UNTIL ALL UPGRADIENT LAND DISTURBANCE ACTIVITY HAS BEEN COMPLETED AND THE DRAINAGE AREA HAS BEEN STABILIZED. PROVIDE RIGOROUS EROSION PREVENTION AND SEDIMENT CONTROL BMFS IF THE FILTRATION AREA MUST BE COMPLETED PRIOR TO COMPLETION OF GROUND DISTURBING ACTIVITIES.
- INSTALL SEDIMENT CONTROL BMFS AT THE TOE OF THE ADJACENT SLOPE IMMEDIATELY AFTER PLACEMENT OF AMENDED TOPSOIL.
- SUBMIT A SITE MANAGEMENT PLAN TO THE ENGINEER FOR THE CONSTRUCTION OF FILTRATION AREAS.
- DO NOT DRAIN TURBID OR SEDIMENT LADEN WATER TO THE FILTRATION AREA AFTER THE FILTER MATERIAL HAS BEEN INSTALLED.
- THE CONTRACTOR MAY NOT DRIVE ANY EQUIPMENT ON FINISHED FILTRATION AREAS OR ADJACENT SIDE SLOPES. RESTORE DISTURBED FILTRATION AREAS AND ADJACENT SIDE SLOPES TO PRE DISTURBANCE CONDITIONS, WITHIN 24 HOURS. ANY RUTS OR DAMAGED TURF THAT COULD CREATE SEDIMENT DISCHARGE TO FILTRATION AREAS MUST BE REPAIRED WITHIN 24 HOURS.
- EXCAVATE ANY SEDIMENT THAT WASHES INTO FILTRATION AREAS. REMOVE AND REPLACE ANY AMENDED TOPSOIL THAT HAS SEDIMENT DEPOSITS VISIBLE AT THE SURFACE.
- REPORT ANY SIGNS OF HIGH WATER TABLE OR COMPACTION OF THE IN PLACE SOILS TO THE ENGINEER.



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**CITY OF DULUTH  
LAFAYETTE  
COMMUNITY CENTER**



**DULUTH, MINNESOTA**

PROJECT NO.: 16-076

DATE: 05-MAY-17

DRAWN BY: AMW/AJB

REVISIONS:

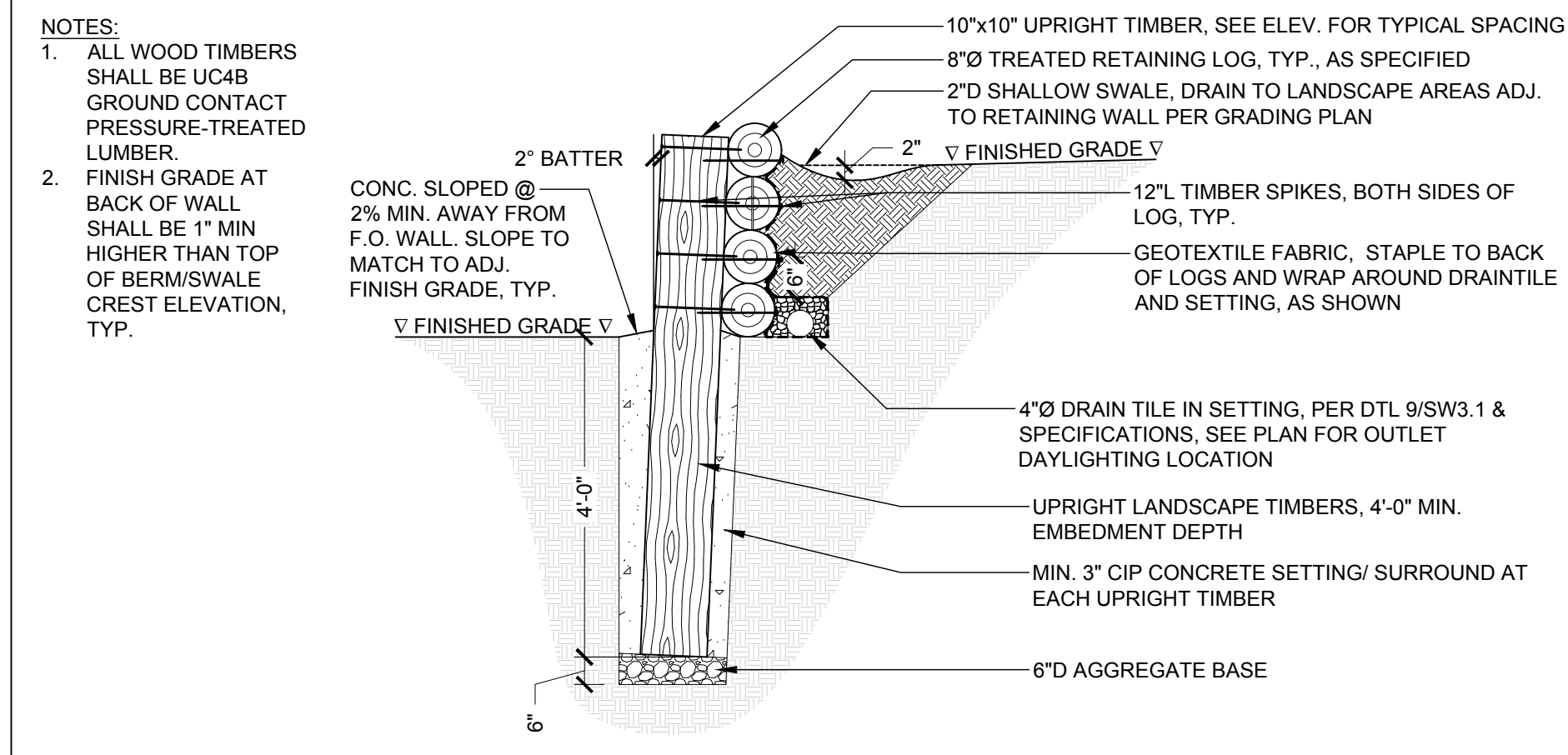
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*Andrea Wedul*  
ANDREA WEDUL  
LANDSCAPE ARCHITECT  
57284  
REG. NO.

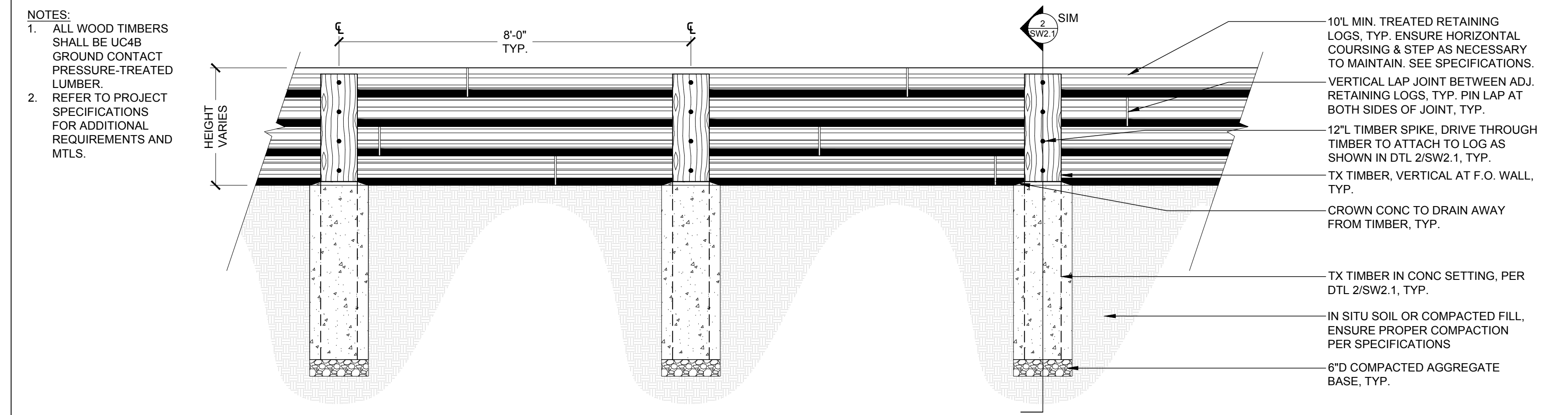
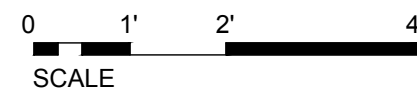
**SWPPP  
NARRATIVE**

**SW  
1.3**

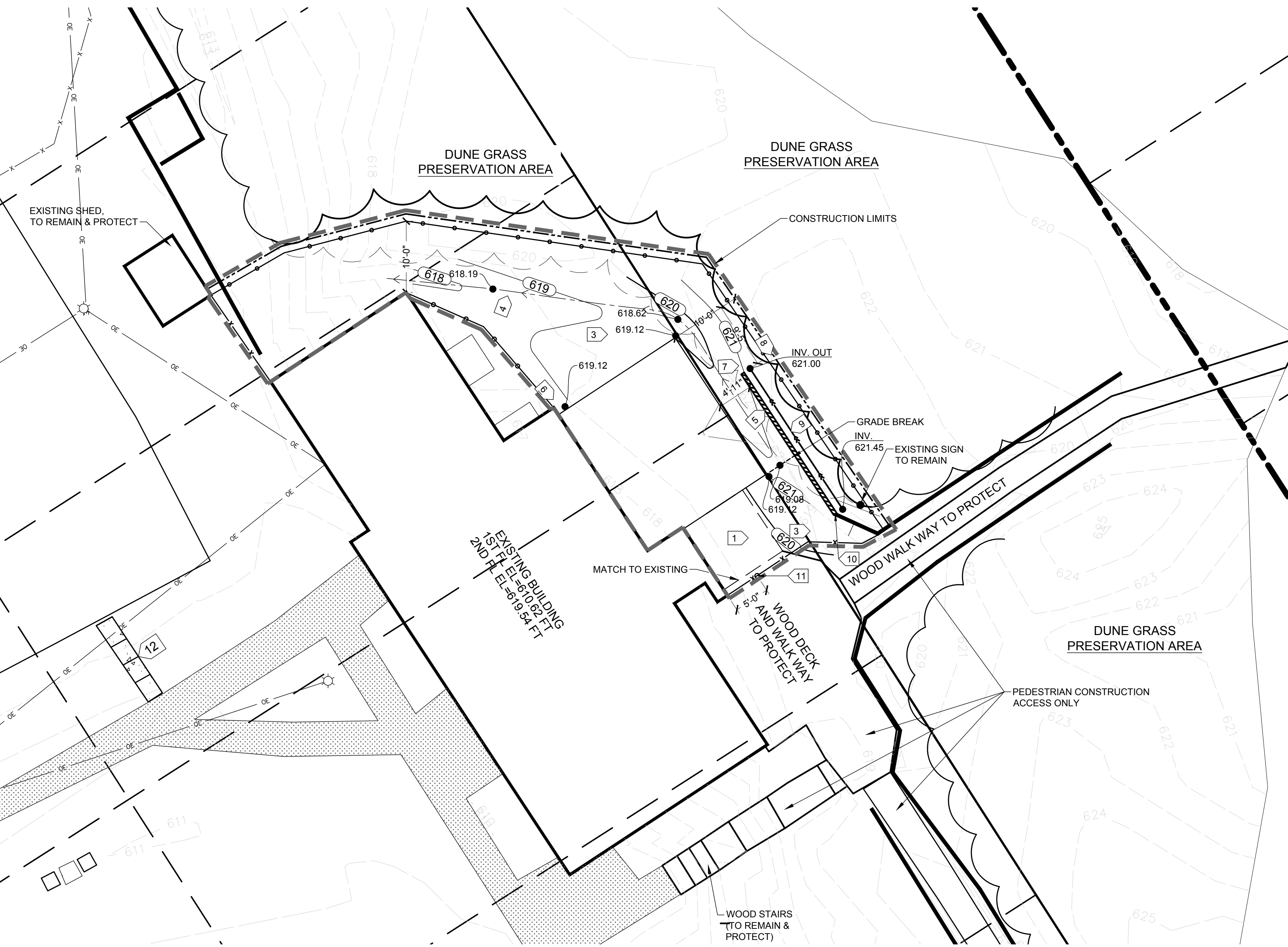




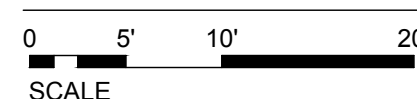
**TIMBER RETAINING WALL SECTION**



**TIMBER RETAINING WALL ELEVATION**



**SITE & GRADING PLAN**



**SITE CONSTRUCTION NOTES:**

- EXISTING CONDITIONS SITE SURVEY PROVIDED BY ALTA SURVEY COMPANY, INC., P.O. BOX 161138, DULUTH, MN 55806, (218) 727-5211. VERIFY EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT IMMEDIATELY.
- THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES, PRIVATE & PUBLIC, BEFORE COMMENCING WORK (GOPHER STATE ONE CALL 1-800-252-1166). CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MIGHT BE CAUSED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES.
- ALL GRADES AND ELEVATIONS SHOWN ARE FINISHED GRADES AND ELEVATIONS.
- EACH CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTATION OF BEST MANAGEMENT PRACTICES (BMP'S) AND COMPLIANCE WITH ALL STATE OF MINNESOTA AND LOCAL SEDIMENT CONTROL REQUIREMENTS.
- PERIMETER SEDIMENT BMP'S SHALL BE IMPLEMENTED PRIOR TO THE START OF CONSTRUCTION ACTIVITY. STORM INLET PROTECTION SHALL BE MAINTAINED ON ALL STORM DRAINAGE STRUCTURES.
- ALL EROSION CONTROL AND SEDIMENT BMP'S SHALL REMAIN IN PLACE AND BE MAINTAINED AS OPERATIONAL UNTIL PERMANENT VEGETATIVE COVER IS ESTABLISHED AND ALL PAVING IS COMPLETE.
- ALL HORIZONTAL AND VERTICAL CONTROL AND LAYOUT TO BE PROVIDED AND MAINTAINED BY THE CONTRACTOR UNDER THIS CONTRACT.
- ALL EXISTING TREES TO REMAIN SHALL BE PROTECTED WITH 4' HIGH ORANGE CONSTRUCTION FENCING ERECTED AT THE DRIP EDGE OF THE TREES PRIOR TO THE START OF ANY SITE WORK. NO CONSTRUCTION ACTIVITIES SHALL TAKE PLACE WITHIN THE TREE PROTECTION ZONE, WITHOUT PRIOR APPROVAL OF THE LANDSCAPE ARCHITECT.
- REFER TO STRUCTURAL SHEET S2.0 FOR CONCRETE STOOP DETAILS.
- PROPOSED SPOT ELEVATIONS TAKE PRECEDENCE OVER PROPOSED CONTOURS.

**KEYED NOTES - SITE PLAN**

- |   |                                                                                                         |    |                                                                                                  |
|---|---------------------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------|
| 1 | MODIFIED WOOD DECK, SEE ARCHITECTURAL PLANS                                                             | 7  | DAYLIGHT RET. WALL DRAIN TILE                                                                    |
| 2 | NOT USED                                                                                                | 8  | RESTORE DISTURBED AREAS BEHIND WALL WITH SEED MIX B, SEE PROJ. SPEC & RESTORATION DETAIL 3/SW2.1 |
| 3 | RESTORE ALL DISTURBED AREAS WITH MNDOT TURF SEED MIX 260 INSTALLED PER MNDOT SPECIFICATION REQUIREMENTS | 9  | DRAIN TILE BEHIND WALL, (SLOPE AT 1.5% TYP. FROM HIGH POINT TO OUTLET (CONT.)) - (APPROX. 24 LF) |
| 4 | MAINTAIN POSITIVE DRAINAGE AWAY FROM BUILDING IN DRY SWALE                                              | 10 | DOVETAIL EXISTING RETAINING WALL COURSING WITH NEW WALL TO JOINT.                                |
| 5 | LOG RETAINING WALL (APPROX. 24 LF) PER DETAILS 2/SW2.1 & 3/SW2.1                                        | 11 | FORMED CONC. BOLLARD, PER DETAIL 4/SW3.1                                                         |
| 6 | PRECAST 12"W X 24"L CONCRETE SPLASH BLOCK, SEE SPECIFICATIONS                                           | 12 | REPLACE CONC. WALK REMOVED IN DEMOLITION PER DETAIL 7/SW3.1                                      |

**SITE PLAN & GRADING LEGEND**

	EXISTING	PROPOSED
CONTOURS	— 620 —	— (1430) —
CONCRETE WALK	□	▣
OVERHEAD ELECTRIC	— ⚡ —	— ⚡ —
6'H CHAIN LINK FENCE	— x —	— x —
DRY SWALE CENTERLINE	— < —	— < —
RETAINING WALL	—	▨
LIGHT POLE	☼	☼
CONSTRUCTION LIMITS	---	---



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**CITY OF DULUTH  
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**DULUTH, MINNESOTA**

PROJECT NO.: 16-076

DATE: 05-MAY-17

DRAWN BY: AMW

REVISIONS:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

ANDREA WEDUL  
 LANDSCAPE ARCHITECT  
 REG. NO. 57284

**SITE &  
 GRADING  
 PLAN**

**SW  
 2.1**

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PLANT SCHEDULE:

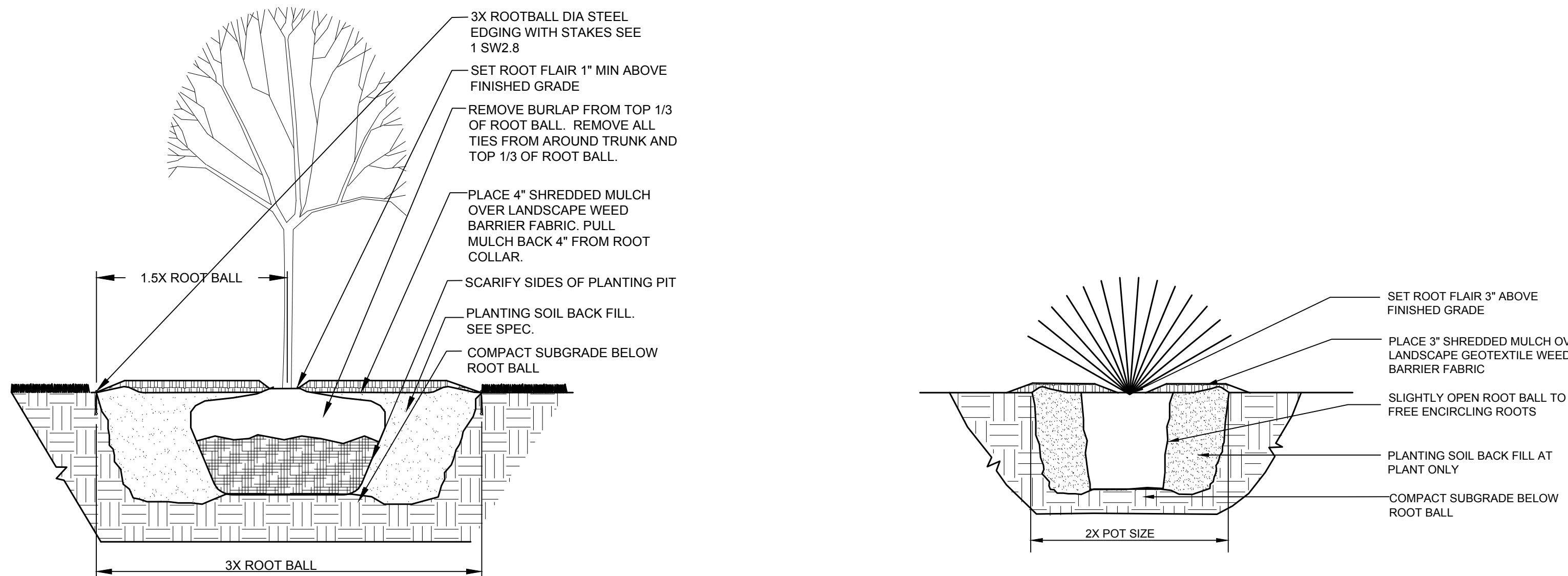
ABBR	QTY	UNIT	SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	CONT/B&B	SIZE
PC	8	EA	PRUNUS X CISTENA	PURPLE LEAF SANDCHERRY	SHRUB, DECIDUOUS	CONT	#5
PA	3	EA	PICEA ABIES	HILLSIDE UPRIGHT SPRUCE	TREE, EVERGREEN	CONT	#20

PLANTING NOTES:

- THE DULUTH, MN, SITE LIES ENTIRELY WITHIN THE AREA DESIGNATED BY THE US DEPT. OF AGRICULTURE AS HARDINESS ZONE 4B. ONLY PLANTING STOCK APPROPRIATE FOR THIS CLIMATE SHALL BE ACCEPTED OR REVIEWED FOR "AS EQUAL" DESIGNATION.
- LANDSCAPE CONTRACTOR SHALL LAY OUT PLANT MATERIAL PER PLAN TO GIVE BEST APPEARANCE OR RELATION TO ADJACENT PLANTS, STRUCTURES, OR VIEWS. CONTRACTOR SHALL OBTAIN APPROVAL OF FINAL PLANT LAYOUT FROM LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
- PLANT LOCATIONS ARE DIAGRAMMATIC AND MAY BE ADJUSTED IN THE FIELD AT THE LANDSCAPE ARCHITECT'S REQUEST PRIOR TO INSTALLATION.
- PLANT OR SHRUB AREAS IDENTIFIED AS "PLANTING BEDS" ARE TO RECEIVE MULCH OVER LANDSCAPE FABRIC, AS NOTED & SPECIFIED.
- ALL NEWLY PLANTED MATERIAL SHALL BE WATERED THOROUGHLY WITHIN 2 HOURS OF PLANTING.
- THIRTY DAYS AFTER PLANTING, CONTRACTOR SHALL RE-STAKE AND STRAIGHTEN TREES AS NECESSARY.
- CONTRACTOR SHALL LOOSEN ANY COMPACTED SUBGRADES PRIOR TO PLACING TOPSOIL TO A MINIMUM DEPTH OF 8". PROOF ROLL SUBGRADES TO PREVENT SETTLING TO PROJECT SPECIFICATIONS OR 85% SPD MAX..
- LANDSCAPE CONTRACTOR SHALL IMPORT CLEAN TOPSOIL FREE OF WEEDS, RHIZOMES, ROCKS, STICKS AND OTHER DELETERIOUS MATERIAL. CONTRACTOR SHALL BRING TO FINISH GRADE WITH 6" OF TOPSOIL IN ALL LAWNS AREAS, AND 12" OF TOPSOIL IN ALL PLANTING BEDS.
- LANDSCAPE CONTRACTOR SHALL REMOVE SOD, CONTAMINATED SOILS, MISCELLANEOUS WASTE MATERIALS FROM AREAS TO BE PLANTED AND SEEDED. CONTRACTOR SHALL LOOSEN COMPACTED SUBSOILS BY TILLING AND IMPORTING NEW TOPSOIL AS REQUIRED TO RESTORE GRADES AND MAINTAIN POSITIVE DRAINAGE AWAY FROM THE BUILDING. VERIFY FINAL LIMITS OF AREAS WITH LANDSCAPE ARCHITECT PRIOR TO COMMENCING OPERATIONS.
- CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND WATERING ALL PLANT STOCK IN NURSERY CONDITION UNTIL PLANTED.
- ALL PLANT MATERIAL SUBSTITUTION MUST BE APPROVED IN WRITING BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION OR SHALL BE REMOVED AND REPLACED WITH SPECIFIED AT COST TO CONTRACTOR.
- ALL PLANT MATERIALS TO BE INSTALLED PER PLANTING DETAILS AND PROJECT SPECIFICATIONS.
- LANDSCAPE ARCHITECT RETAINS THE RIGHT OF REFUSAL FOR ALL SUB-STANDARD STOCK. SUBSTANDARD STOCK (PER PROJECT SPECIFICATION) SHALL BE REMOVED AND REPLACED AT NO ADDITIONAL COST TO OWNER.
- ALL OTHER DISTURBED AREAS TO RECEIVE 6"D TOPSOIL & SEED, AS SPECIFIED.

SITE PLAN & GRADING LEGEND

	EXISTING	PROPOSED
CONTOURS	— 620 —	— 1430 —
CONCRETE WALK		
SEED DISTURBED AREAS WITH SEED MIX A, PER PROJECT SPEC		
SEED DISTURBED AREAS WITH SEED MIX B, PER PROJECT SPEC		
OVERHEAD ELECTRIC	— o —	
6'H CHAIN LINK FENCE	— x —	
DRY SWALE CENTERLINE	— < —	
RETAINING WALL (SEE PLAN FOR RAILING & HANDRAIL LOCATIONS)		
LIGHT POLE	⊛	
CONSTRUCTION LIMITS		— - - -
LANDSCAPE PLANTING BED		



EVERGREEN & DECIDUOUS TREE PLANTING DETAIL

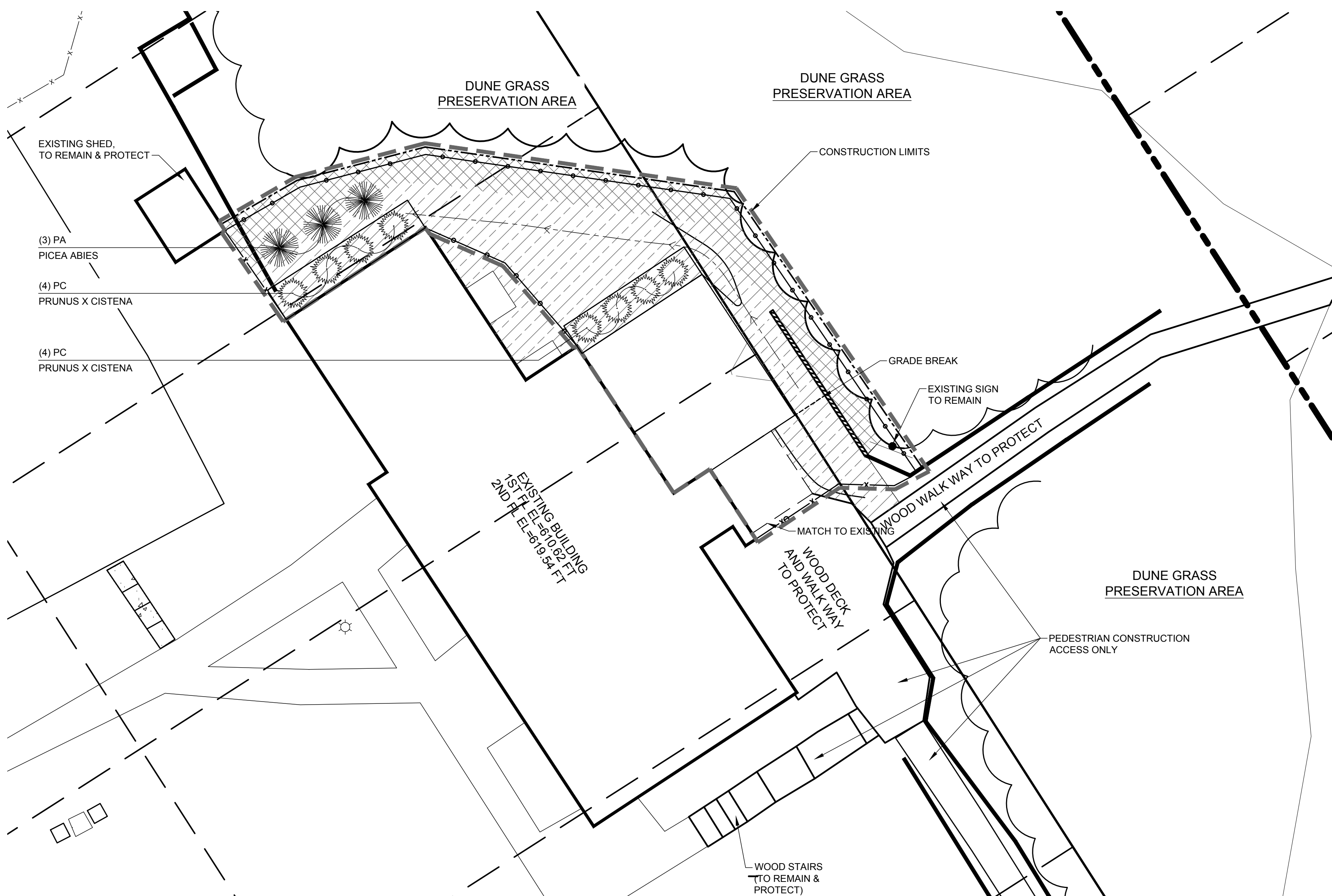
NOT TO SCALE

2  
SW2.2

SHRUB & PERENNIAL PLANTING DETAIL

NOT TO SCALE

3  
SW2.2

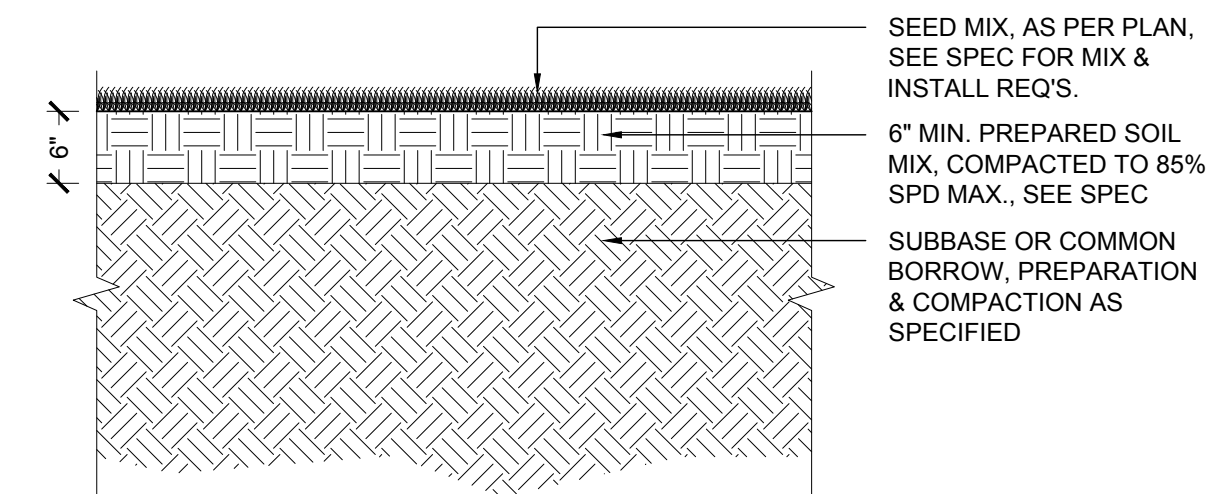


LANDSCAPE PLAN

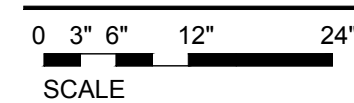
0 5' 10' 20'  
SCALE

1  
SW2.2  
NORTH

- NOTES:
1. REFER TO PROJECT SPECIFICATION FOR SOIL MIXTURE, OTHER REQS.
  2. SEEDING TYPE AND AREAS SHALL BE AS DESIGNATED ON THE PLAN DRAWINGS.

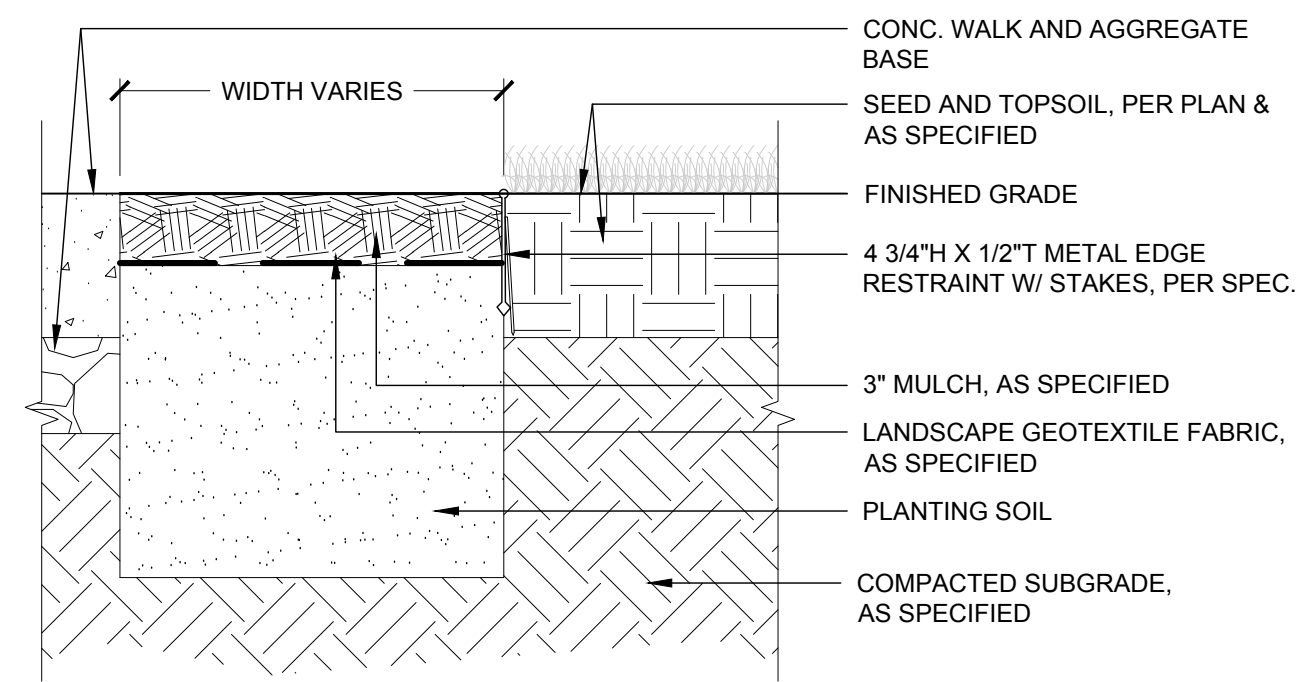


SEEDING DETAIL

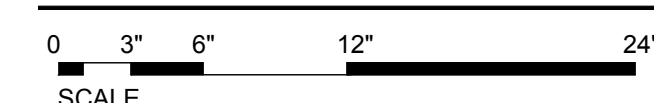


1  
SW3.1

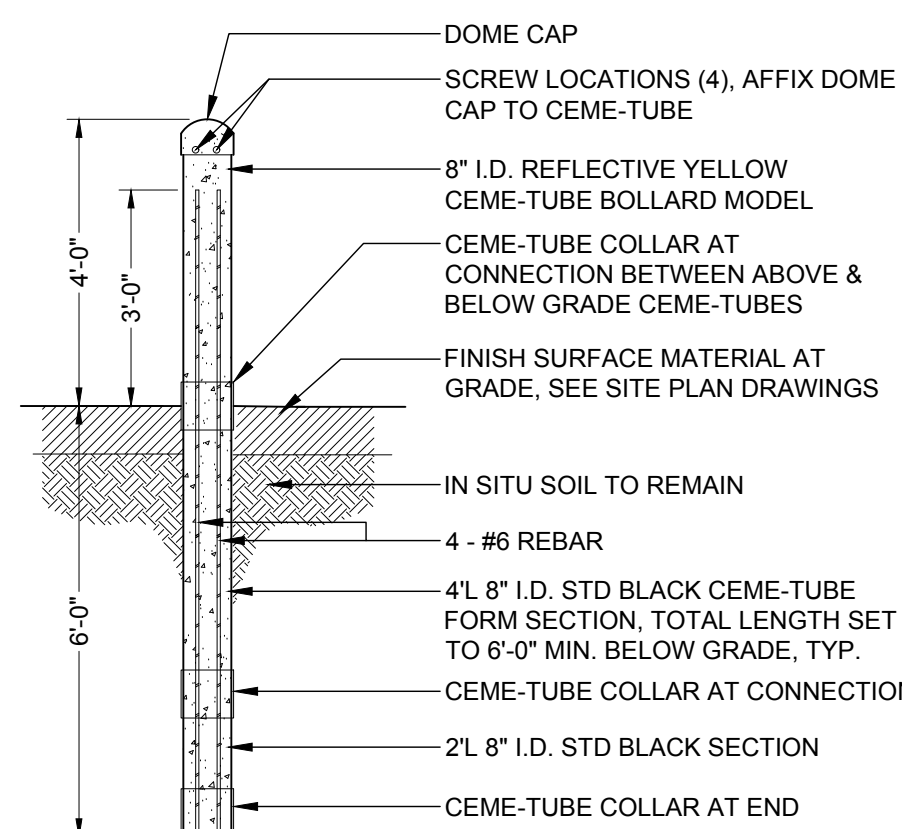
- NOTES:
1. LANDSCAPE EDGE RESTRAINT NOT REQUIRED AT CONCRETE WALKS OR CURBS



WOOD MULCH PLANTING  
BED & EDGING DETAIL



2  
SW3.1

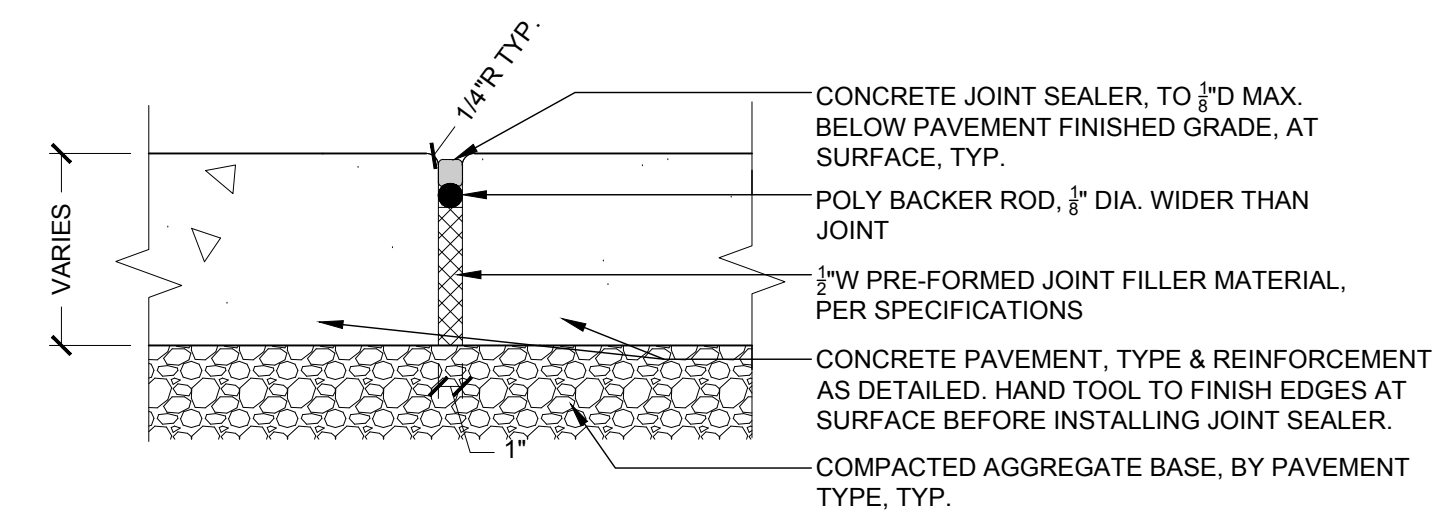


FORMED CONCRETE BOLLARD

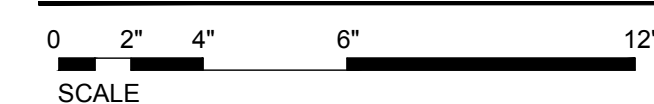


4  
SW3.1

- NOTES:
1. ENSURE JOINT IS CLEAN AND DRY PRIOR TO INSTALLING JOINT MATERIAL AND SEALANTS.
  2. FOLLOW ALL MANUFACTURERS' INSTALLATION INSTRUCTIONS
  3. ENSURE SEALANT IS CONCAVE AT SURFACE AND TIGHT TO BACKER ROD AND CONCRETE WITH NO AIR POCKETS.

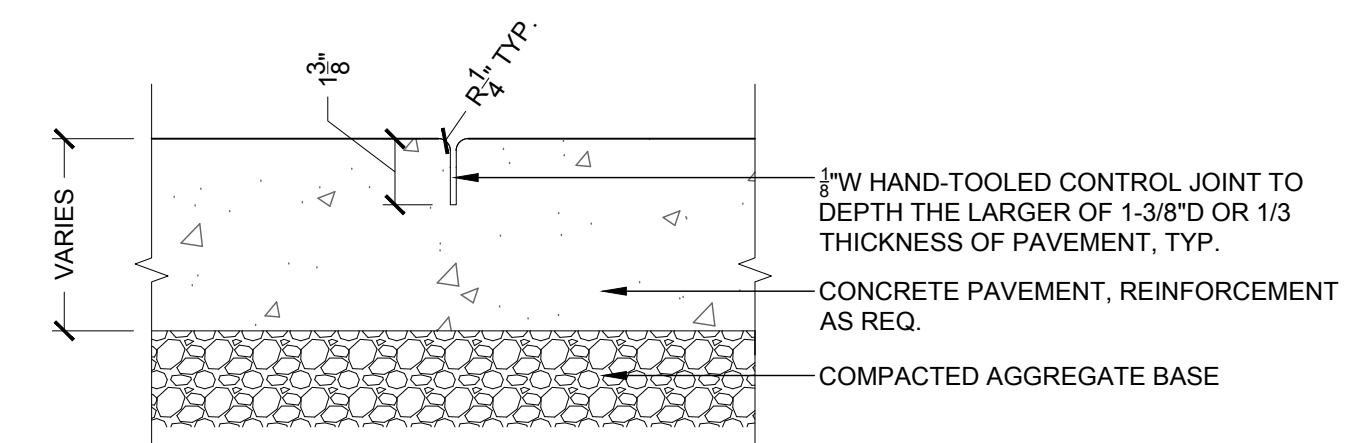


EXPANSION JOINT DETAIL

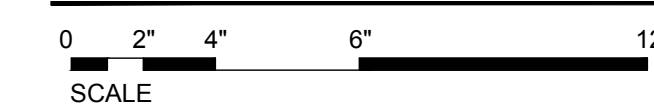


5  
SW3.1

- NOTES:
1. CLEAN AND INSPECT ALL JOINTS AFTER INSTALLATION TO ENSURE THERE IS NO EXPOSED AGGREGATE AT SURFACE OR OBSTRUCTING JOINT.
  2. ALL JOINT MATERIALS AND INSTALLATION SHALL COMPLY WITH CURRENT MNDOT STANDARD SPECIFICATIONS.

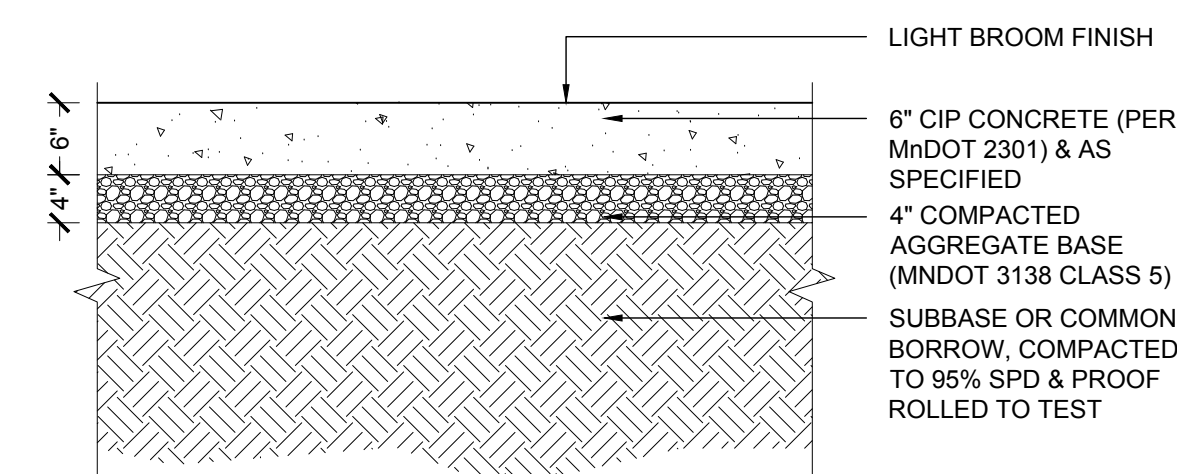


CONTROL JOINT DETAIL

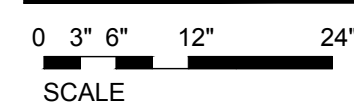


6  
SW3.1

- NOTES:
1. COMPLY WITH ALL MNDOT STANDARDS IN INSTALLATION.
  2. ENSURE BASE IS PROPERLY COMPACTED AND TO CORRECT MOISTURE CONTENT PER PROJECT STANDARDS BEFORE INSTALLING CONCRETE.
  3. INSTALL EXPANSION AND CONTROL JOINTS PER PROJECT DETAILS, TYP.

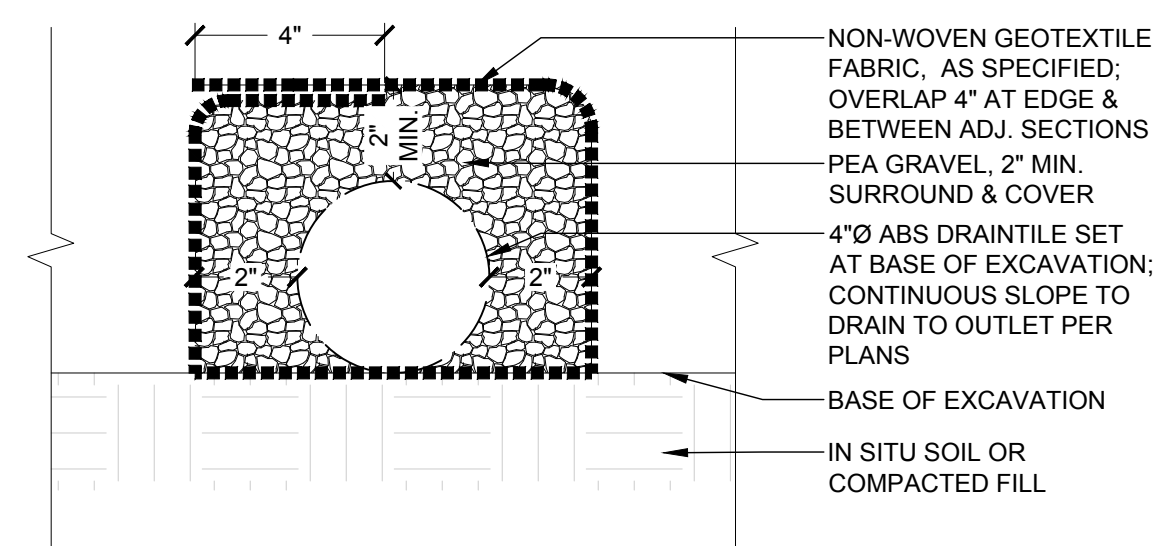


PEDESTRIAN CONCRETE PAVING

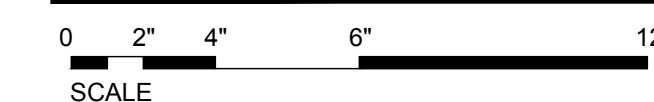


7  
SW3.1

- NOTES:
1. REFER TO PROJECT SPECIFICATION FOR MATERIALS
  2. COMPACTION PER MATERIAL AS SPECIFIED AND PER GEOTECHNICAL ENG. REPORT



DRAINTILE DETAIL



9  
SW3.1



- ARCHITECTURE
- LANDSCAPE ARCHITECTURE
- INTERIOR DESIGN
- ENGINEERING
- TECHNOLOGY

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tel: 218.727.8481  
fax: 218.722.8483

**CITY OF DULUTH  
LAFAYETTE  
COMMUNITY CENTER**



**DULUTH, MINNESOTA**  
PROJECT NO.: 16-076  
DATE: 05-MAY-17  
DRAWN BY: BL / KJS  
REVISIONS:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*[Signature]*  
RYAN ESPAME 49444  
ARCHITECT REG. NO.

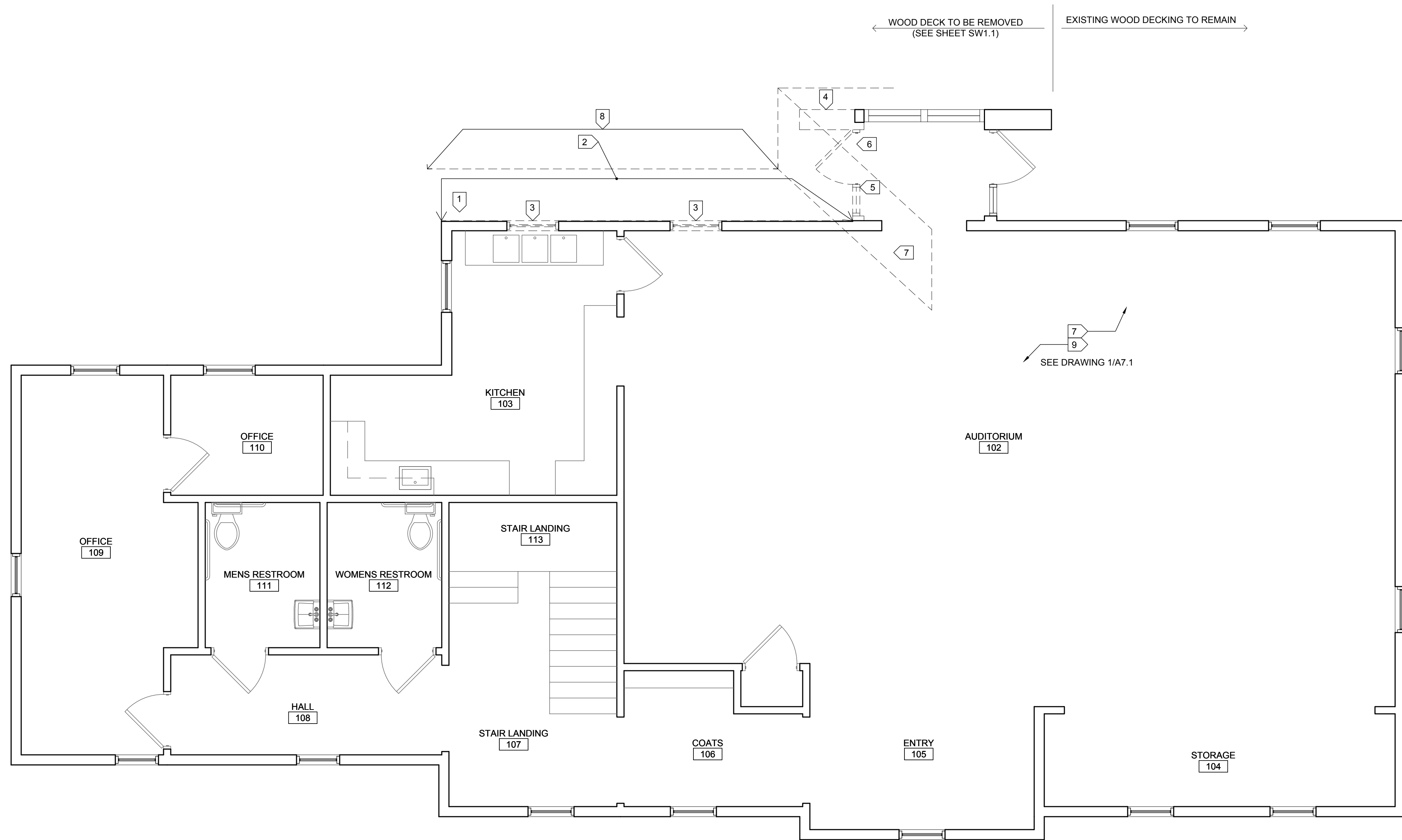
**FIRST FLOOR  
DEMOLITION  
PLAN**

**A  
0.1**

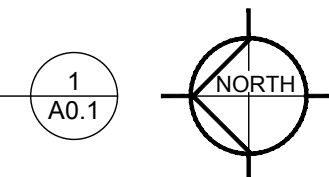
KEYED DEMOLITION NOTES	
ITEM #	DESCRIPTION
1	REMOVE EXISTING GUTTER AND DOWNSPOUT. SALVAGE FOR REINSTALLATION.
2	REMOVE EXISTING WOOD SIDING AND UNDERLAYMENT.
3	REMOVE EXISTING WINDOW.
4	REMOVE EXISTING EXTERIOR WALL TO ACCOMMODATE NEW CONSTRUCTION. EXISTING FRAMING AT WINDOW JAMB TO REMAIN.
5	REMOVE EXISTING DOOR AND FRAME ASSEMBLY.
6	REMOVE EXISTING QUARRY TILE AS NEEDED TO ACCOMMODATE CONSTRUCTION OF NEW WALL.
7	REMOVE EXISTING ROOFING AS NEEDED TO ACCOMMODATE CONSTRUCTION OF NEW ROOF. EXISTING SHEATHING TO REMAIN. SEE 1/A7.1 FOR EXTENTS.
8	REMOVE EXISTING ROOF OVERHANG AS NEEDED TO ACCOMMODATE CONSTRUCTION OF NEW ROOF. SEE 1/A7.1 FOR EXTENTS.
9	REMOVE EXISTING ROOF VENTS. SALVAGE FOR REINSTALLATION.

**GENERAL NOTES:**

1. DEMOLITION DRAWINGS ARE A REASONABLE REPRESENTATION OF THE EXISTING CONDITIONS. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO FAMILIARIZE THEMSELVES W/ THE EXISTING CONDITIONS. NO COST ADDS WILL BE ALLOWED FOR ITEMS NOT FULLY DESCRIBED.
2. TURN OVER UNUSED SALVAGED MATERIALS TO THE OWNER.
3. IF CONTRACTOR ENCOUNTERS HAZARDOUS MATERIALS OR MATERIALS THE CONTRACTOR SUSPECTS MAY CONTAIN HAZARDOUS MATERIALS (ASBESTOS, LEAD ETC.) STOP WORK IMMEDIATELY AND CONTACT THE ARCHITECT. ALL ASBESTOS TESTING AND REMEDIATION BY THE OWNER.



**FIRST FLOOR DEMOLITION PLAN**



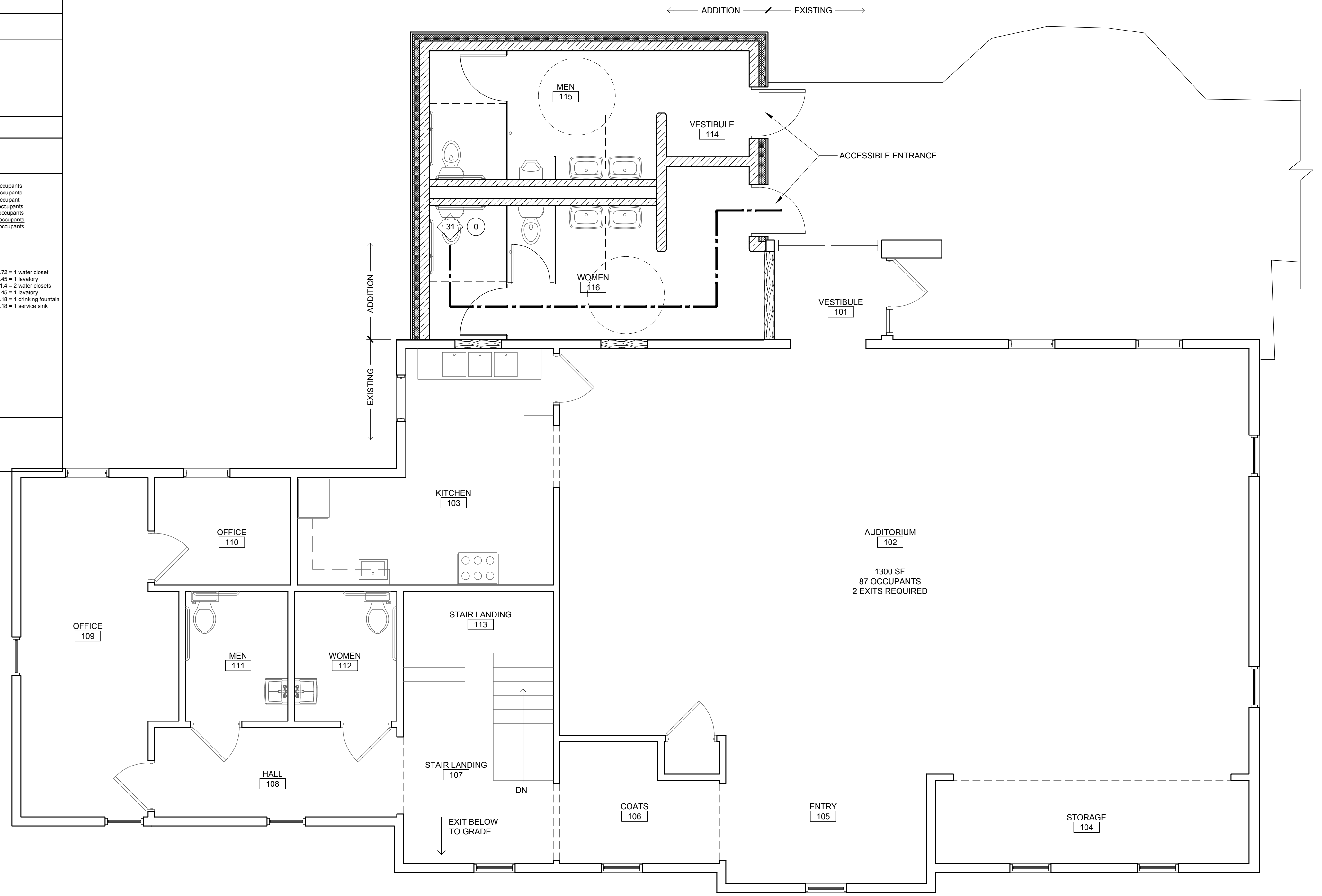
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# CODE SUMMARY

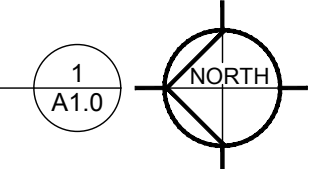
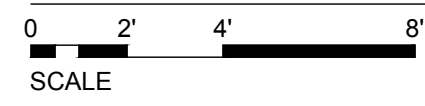
**PROJECT SUMMARY:**  
COMMUNITY CENTER ADDITION INCLUDES DEMOLITION OF PART OF THE EXISTING ROOF, TWO EXISTING WINDOWS AND EXISTING ENTRANCE SYSTEM. IT WILL INCLUDE A 1 STORY ADDITION WITH ACCESSIBLE TOILET ROOMS TO BE USED BY THE PUBLIC WITH ACCESS FROM THE PUBLIC BEACH. THERE WILL BE NO ACCESS FROM EXISTING BUILDING.

Topics	Requirements	IBC 2012 Reference	Remarks
Occupancy Classification Chapter 3	N/A	Section 509	
Incidental Use Areas Occupancy Occupancy Separation	A-3 (Assembly) N/A	Section 303 Table 508.4	
Special Requirements Chapter 4	N/A		
Area / Height Requirements Chapter 5	1 story = 40 feet (A-3) Tabular 6,000 SF	Table 503	1 story = 20 feet Existing Basement 2,600 SF Existing First Floor 2,600 SF Addition 458 SF Total 5,658 SF
Construction Type Chapter 6	V-B	Table 601 / 602	
Rated Construction Chapter 7			
Fire Walls	N/A	706	N/A
Fire Barriers	N/A	707	N/A
Shaft Enclosures	N/A	713	N/A
Fire Partitions	N/A	708	N/A
Smoke Barriers	N/A	709	N/A
Opening Protection	N/A	716	N/A
Mech. Openings	N/A	717	N/A
Interior Finishes Chapter 8	Interior rooms to have class C	Table 803.9	
Fire Protection Chapter 9			
Sprinkler System	Not Required	903	N/A
Fire Alarm & Detection Systems	Not Required	907	N/A
Means of Egress Chapter 10		Table 1004.1.2	
Means of Egress		1003	Occupant Load: 2358 SF / 15 = 157 occupants
Exit Access		1014	Multipurpose 120 SF / 300 = 1 occupant
Exits		1020	Kitchen 329 SF / 50 = 7 occupants
Exit Discharge		1027	Mechanical 407 SF / 300 = 2 occupants
Mechanical Room Egress		1015	Office 284 SF / 100 = 2 occupants
			Toilets 11 = 11 occupants
			Total 180 occupants
			Required Plumbing: 180 / 2 = 90 Male: 90 / 125 = 72 = 1 water closet 90 / 200 = 45 = 1 lavatory Female: 90 / 65 = 14 = 2 water closets 90 / 200 = 45 = 1 lavatory General: 90 / 500 = 18 = 1 drinking fountain 90 / 500 = 18 = 1 service sink
EFFECTIVE CODES	-2015 MINNESOTA BUILDING CODE -2012 INTERNATIONAL BUILDING CODE -2014 NATIONAL ELECTRICAL CODE, CHAPTER 1315, EFFECTIVE JULY 1, 2014 -2015 MINNESOTA ENERGY CODE -2015 MINNESOTA ACCESSIBILITY CODE -2015 MINNESOTA MECHANICAL & FUEL GAS CODE -2015 MINNESOTA STATE PLUMBING CODE -2015 MINNESOTA CONSERVATION CODE FOR EXISTING BUILDINGS  -2015 MINNESOTA STATE FIRE CODE -2006 INTERNATIONAL FIRE CODE ADOPTED WITH STATE AMENDMENTS, CHAPTER 7511, EFFECTIVE JULY 10, 2007 -2015 DULUTH UNIFORM DEVELOPMENT CHAPTER (UDC)		
CODE NARRATIVE:	1. Special inspections - see sheet S1.0 for requirements. 2. Removal of exit from Vestibule 101 does not reduce first floor exits below 2 required. 3. Energy Code compliance: ANSI / ASHRAE / IESNA 90.1		

LEGEND	
ITEM	DESCRIPTION
	PATH OF TRAVEL
	COMMON PATH TRAVEL DISTANCE
	TRAVEL DISTANCE (SHORTEST PATH)



FIRST FLOOR LIFE SAFETY PLAN



- ARCHITECTURE
- LANDSCAPE ARCHITECTURE
- INTERIOR DESIGN
- ENGINEERING
- TECHNOLOGY

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## CITY OF DULUTH LAFAYETTE COMMUNITY CENTER



### DULUTH, MINNESOTA

PROJECT NO.: 16-076  
 DATE: 05-MAY-17  
 DRAWN BY: BL / KJS  
 REVISIONS:

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 KRYAN ESPAME ARCHITECT 49444 REG. NO.

## FIRST FLOOR LIFE SAFETY PLAN / CODE SUMMARY

A  
1.0

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DULUTH, MINNESOTA

PROJECT NO.: 16-076

DATE: 05-MAY-17

DRAWN BY: BL /KJS

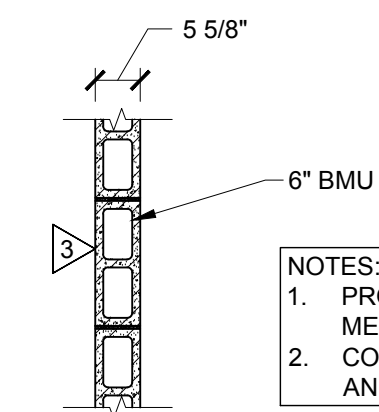
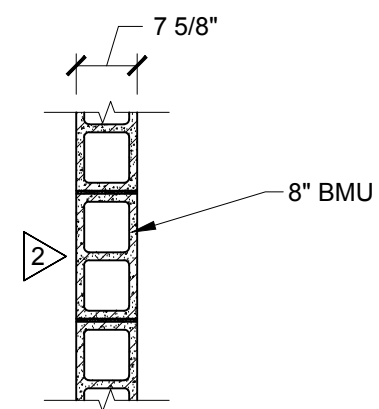
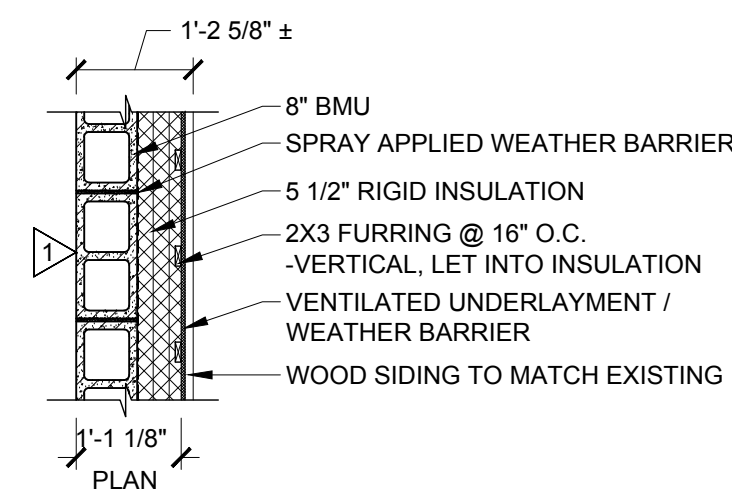
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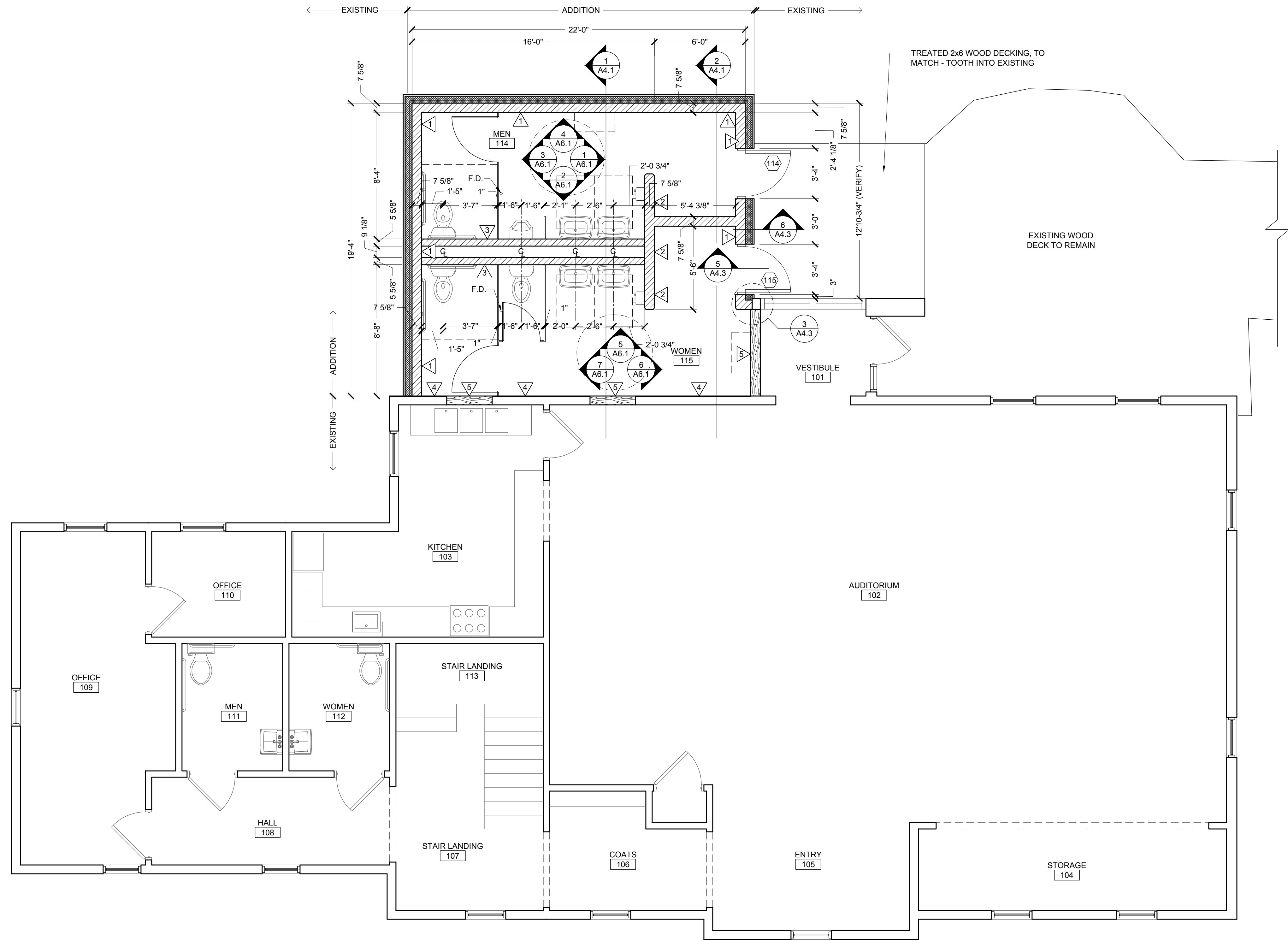
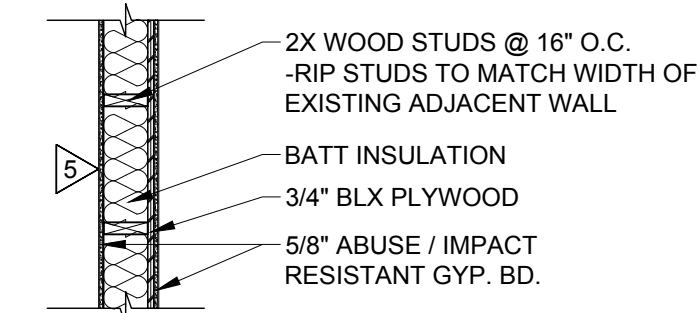
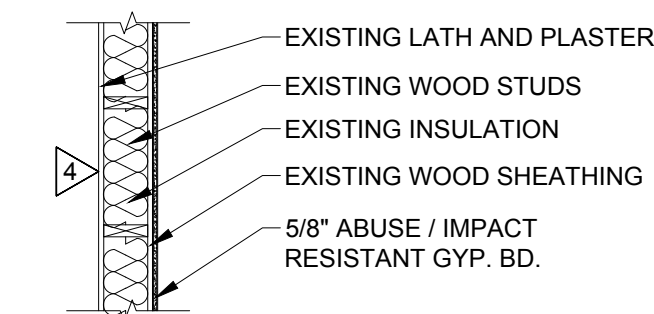
*[Signature]*  
KRYSTIAN ESPAME  
ARCHITECT 49444  
REG. NO.

FIRST FLOOR  
REMODEL  
PLAN / WALL  
TYPES

A  
1.1



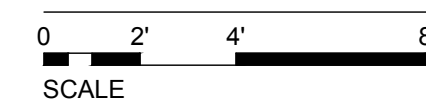
NOTES:  
1. PROVIDE 4" BMU AS REQUIRED FOR MECHANICAL CARRIERS.  
2. COORDINATE MECHANICAL VENTS AND ACCESS PANEL LOCATIONS.



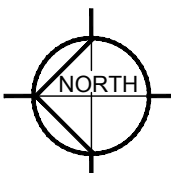
WALL TYPES

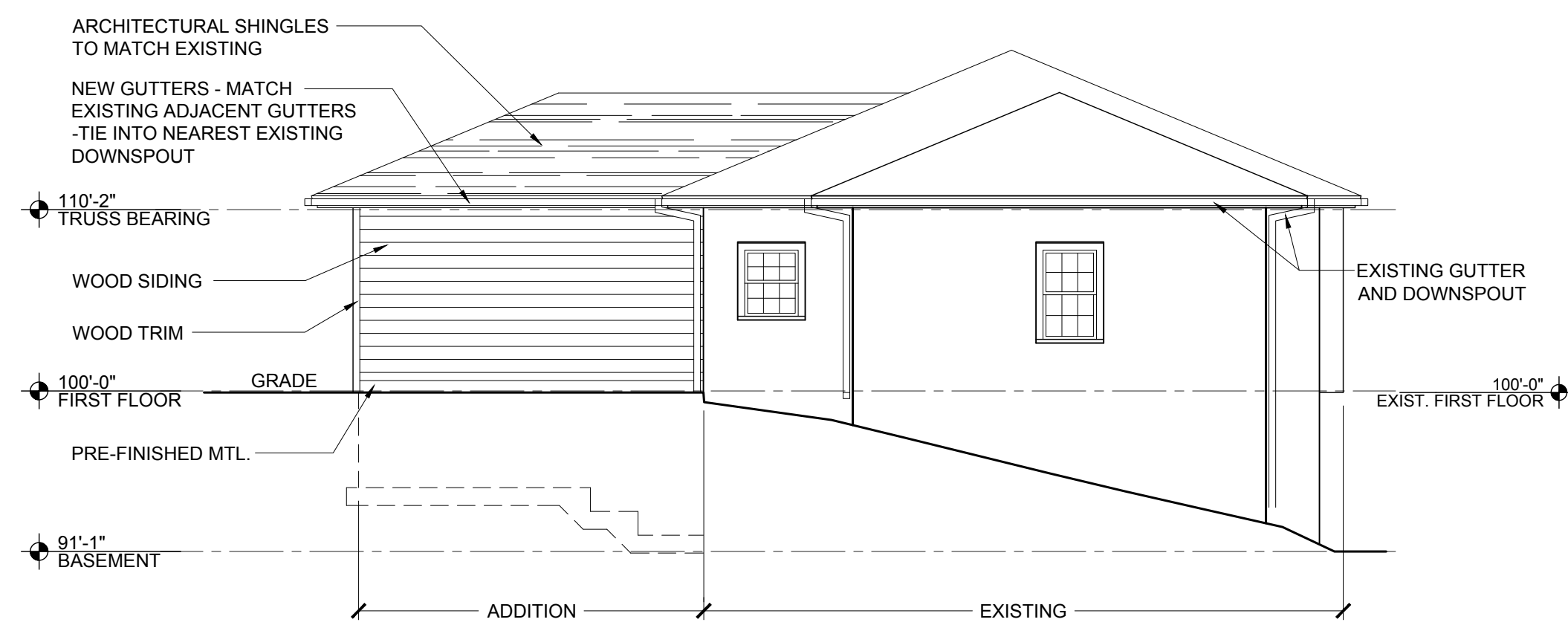
2  
A1.1

FIRST FLOOR REMODEL PLAN



1  
A1.1

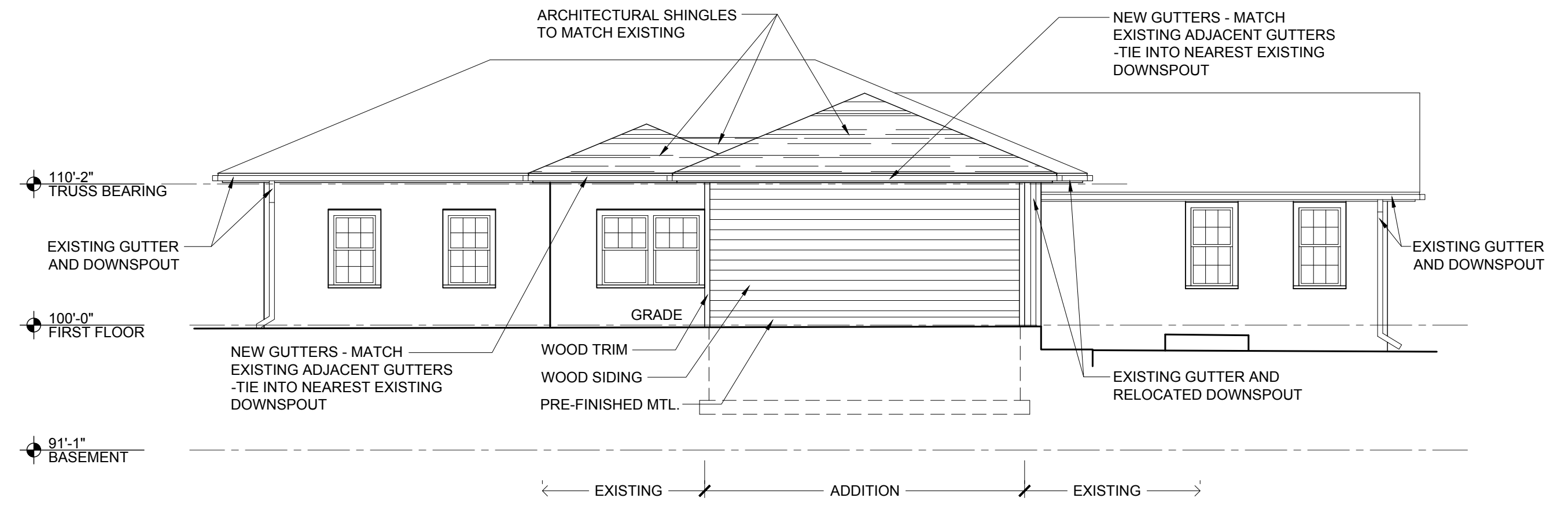




NORTH EXTERIOR ELEVATION

0 1' 2' 4' 8' 16'  
SCALE

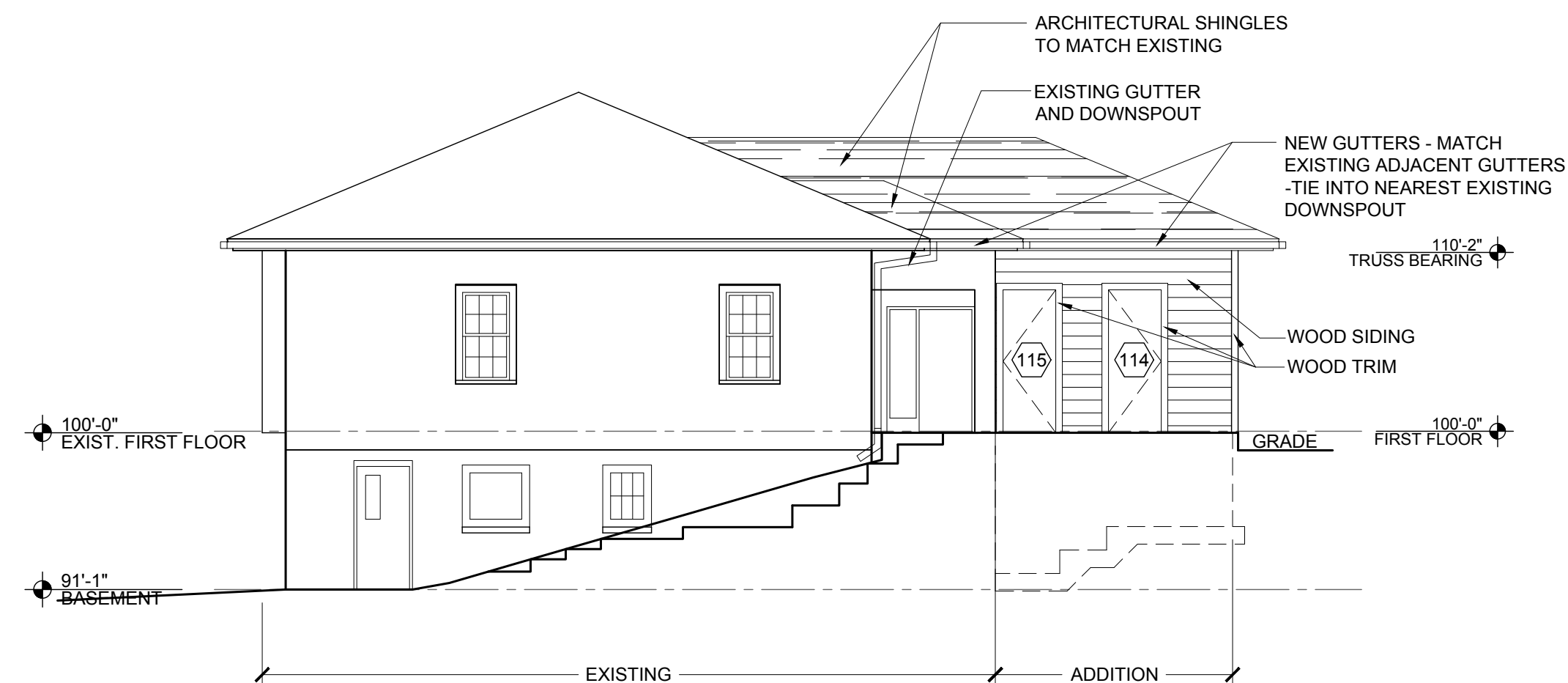
1  
A2.1



EAST EXTERIOR ELEVATION

0 1' 2' 4' 8' 16'  
SCALE

2  
A2.1



SOUTH EXTERIOR ELEVATION

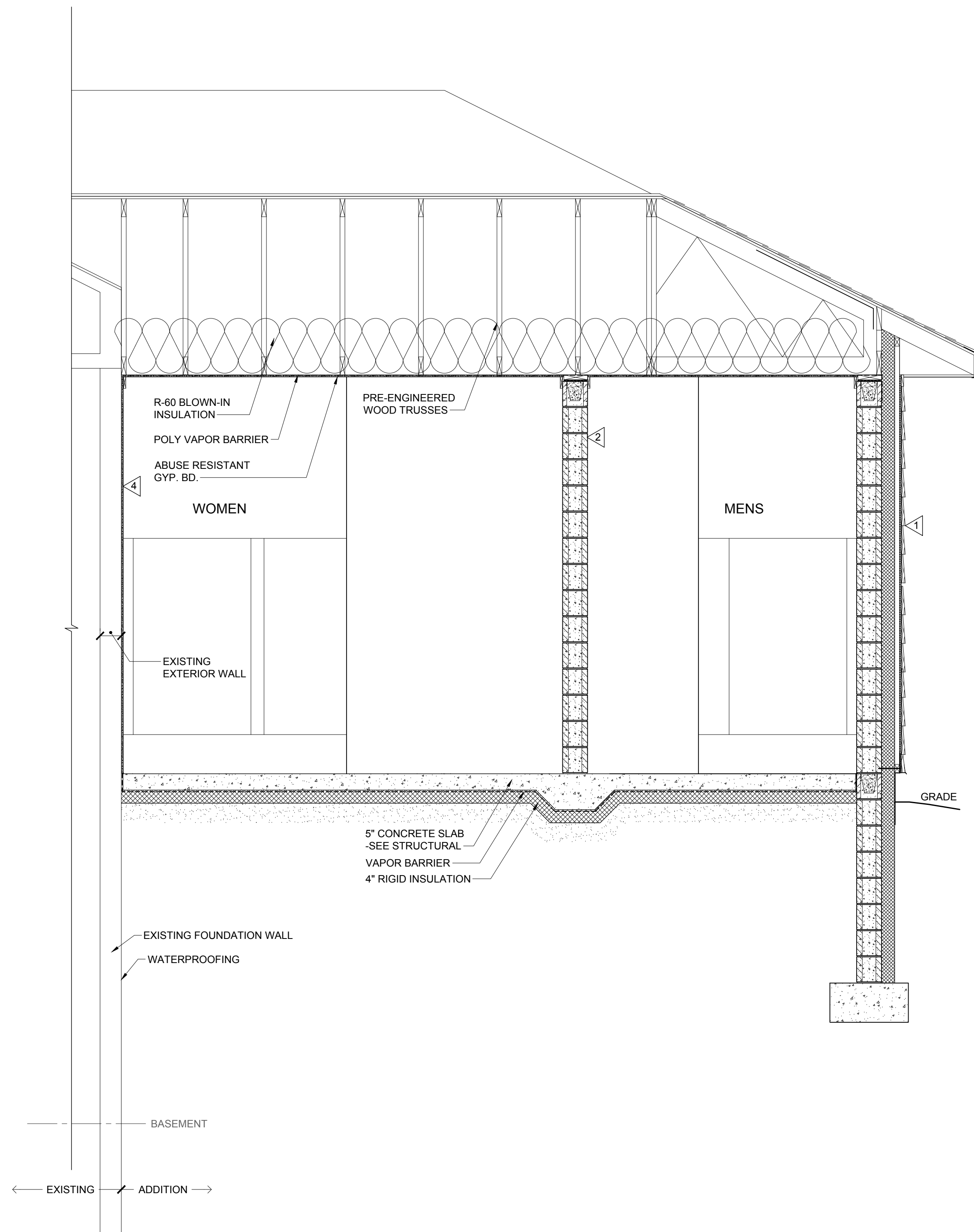
0 1' 2' 4' 8' 16'  
SCALE

3  
A2.1



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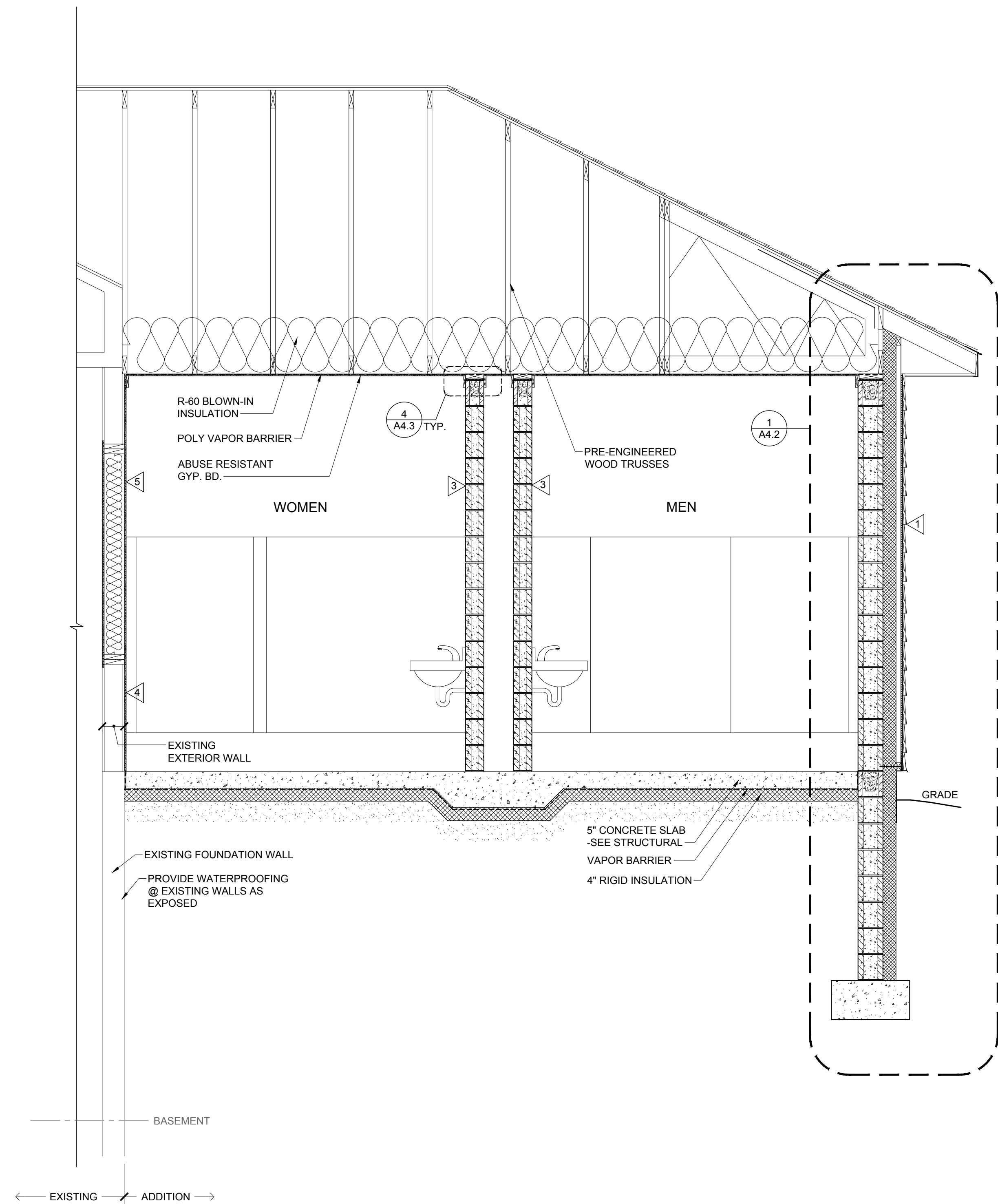
*KYAN ESPAME*  
ARCHITECT 49444  
REG. NO.



**BUILDING SECTION**

0 1' 2' 4'  
SCALE

2  
A4.1



**BUILDING SECTION**

0 1' 2' 4'  
SCALE

1  
A4.1



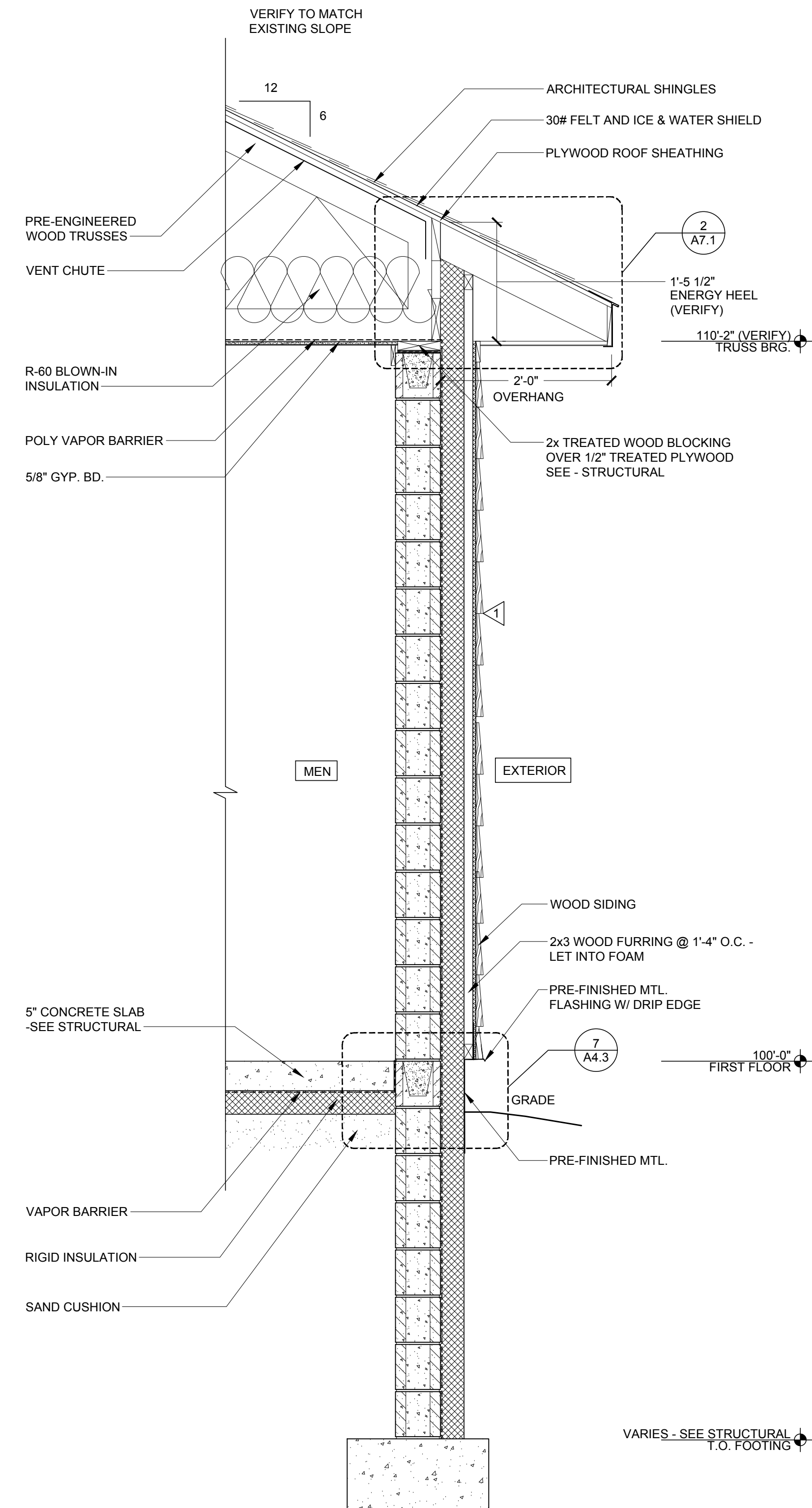


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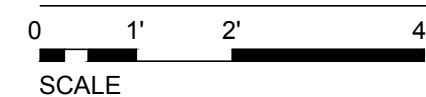
*[Signature]*  
RYAN ESPAME  
ARCHITECT 49444  
REG. NO.

**SECTIONS**

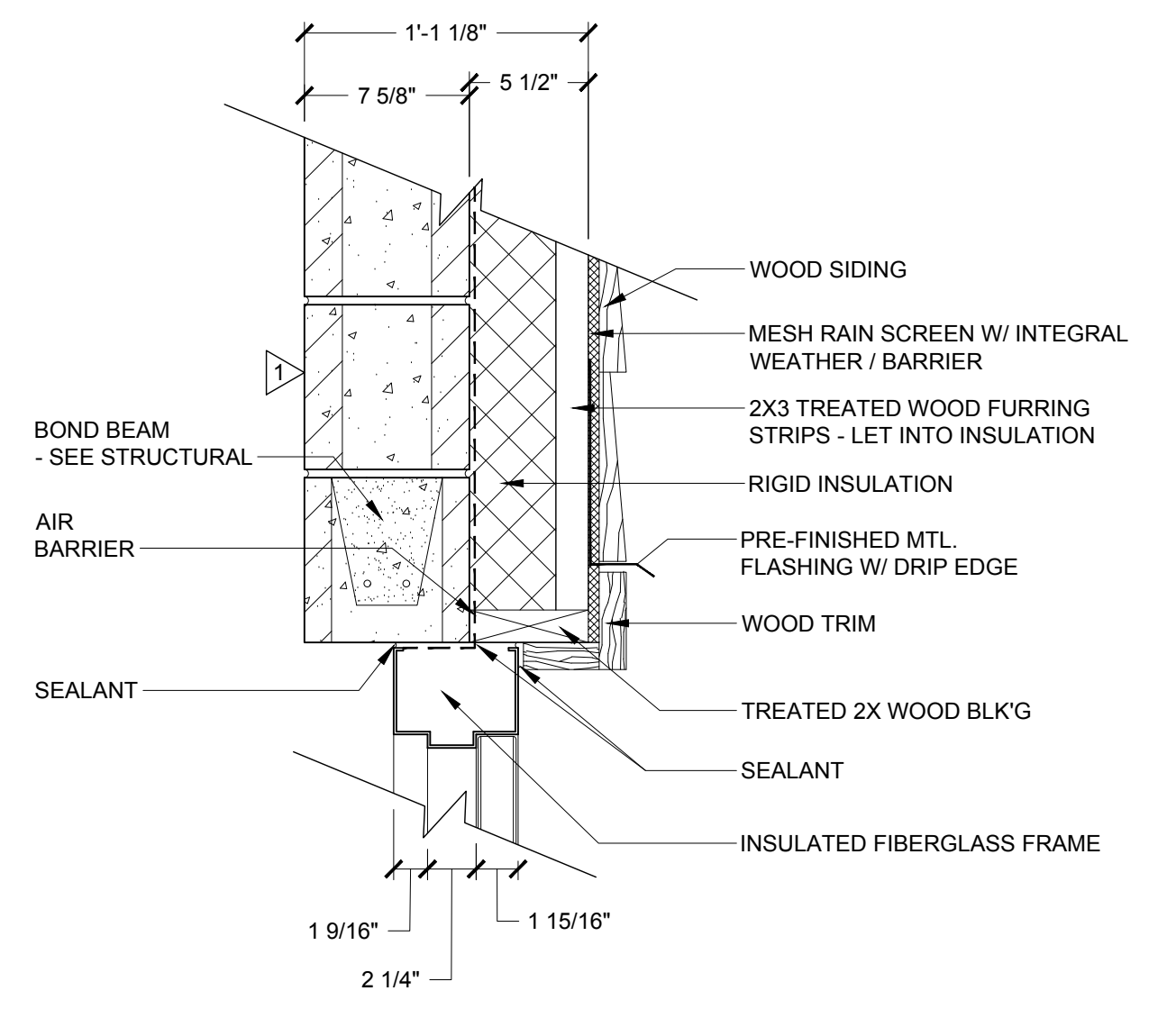
**A  
4.2**



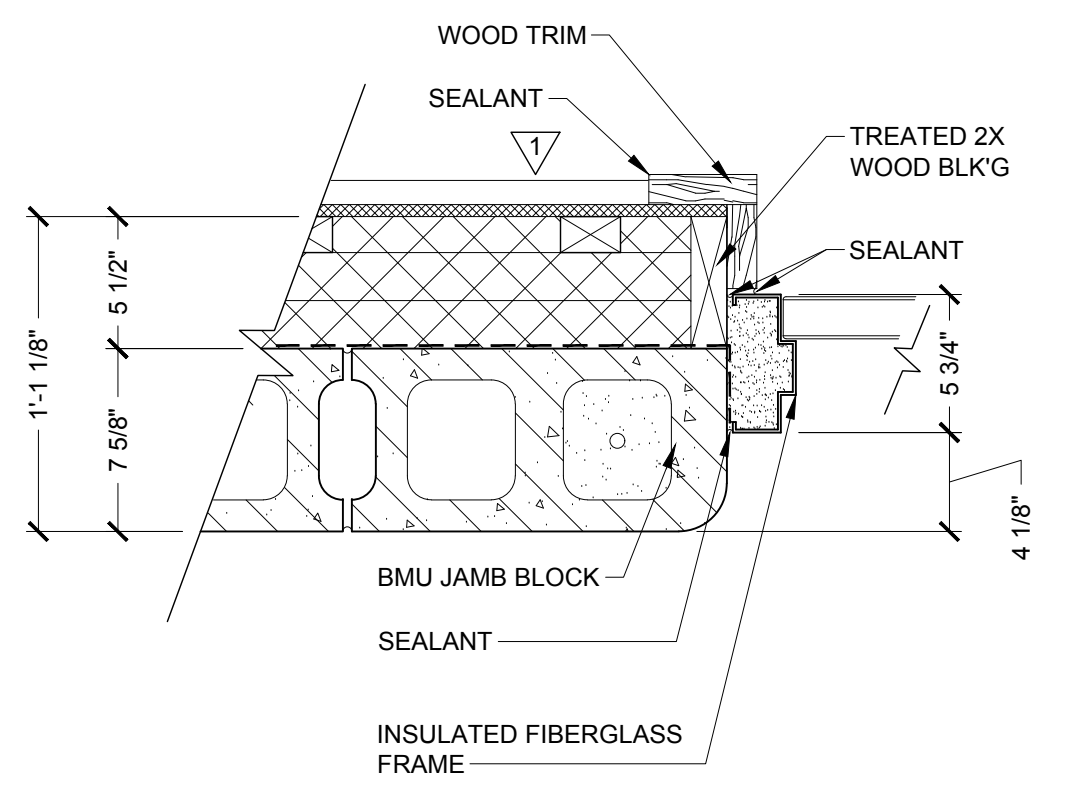
**WALL SECTION**



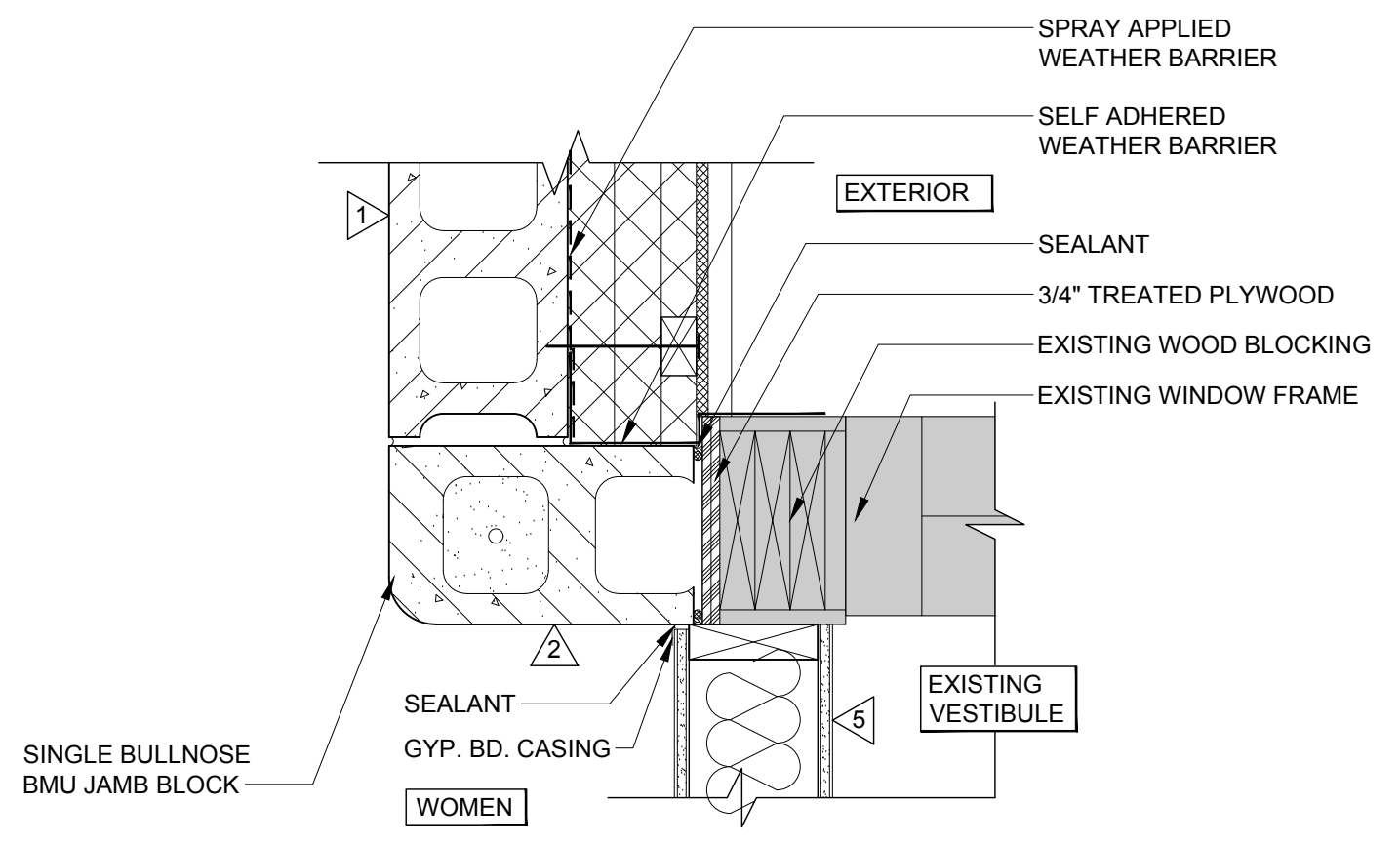
1  
A4.2



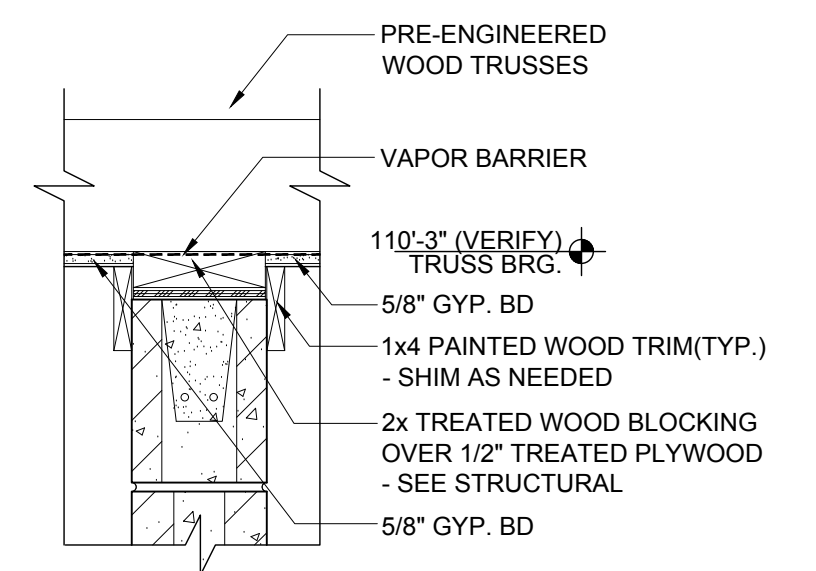
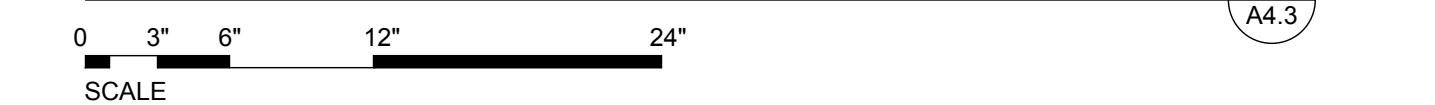
HEAD DETAIL



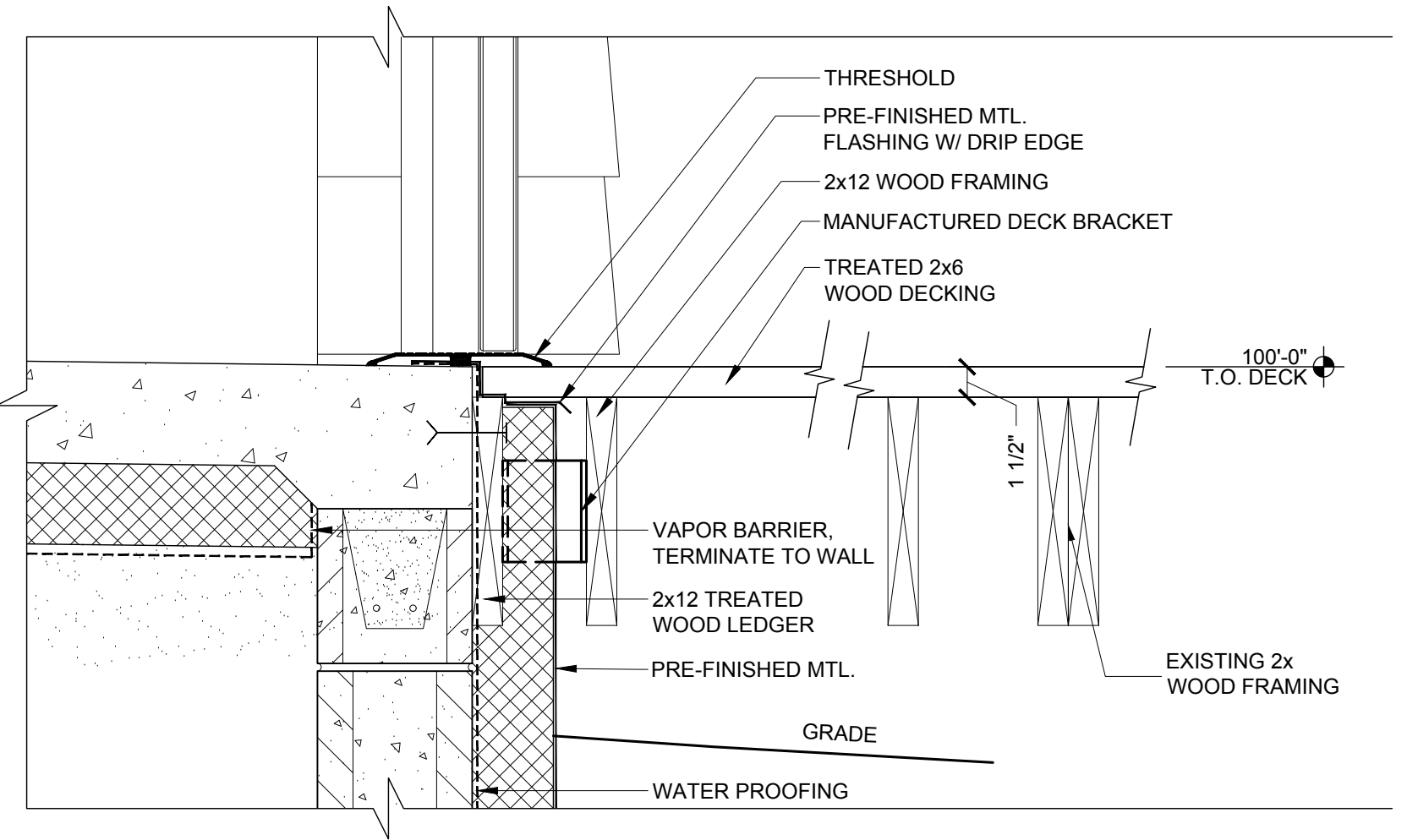
JAMB DETAIL



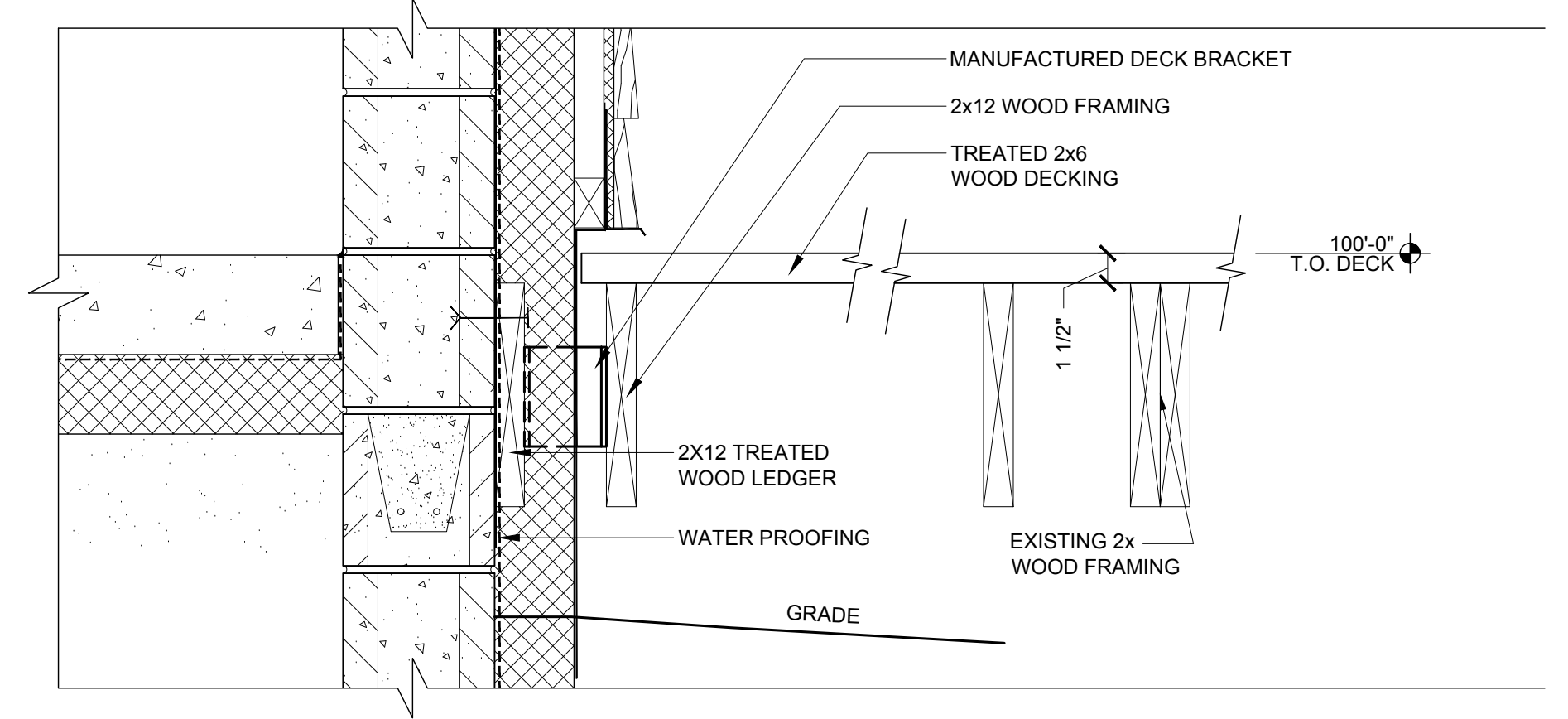
DETAIL @ CORNER



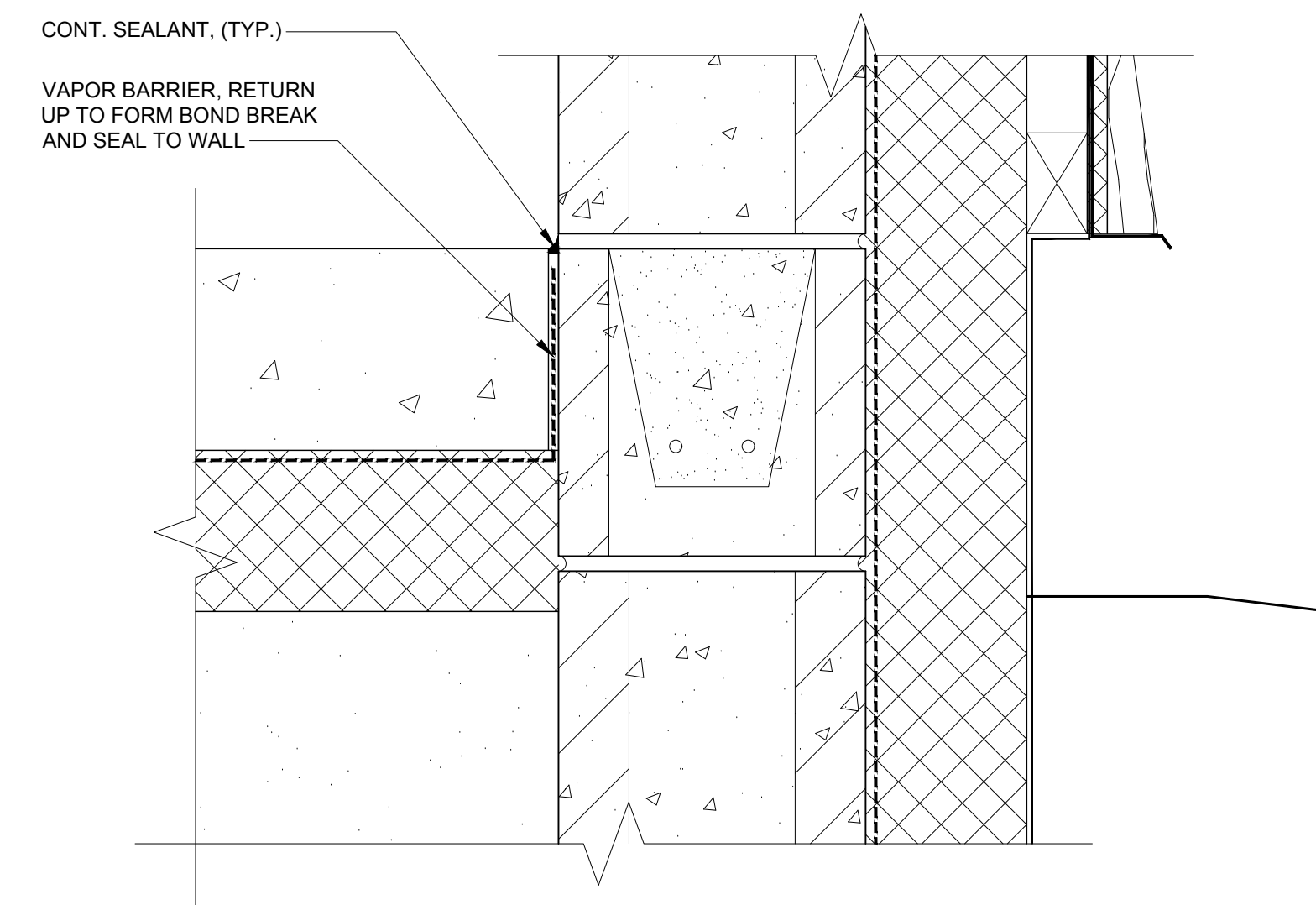
DETAIL @ TOP OF WALL



DETAIL AT DECK

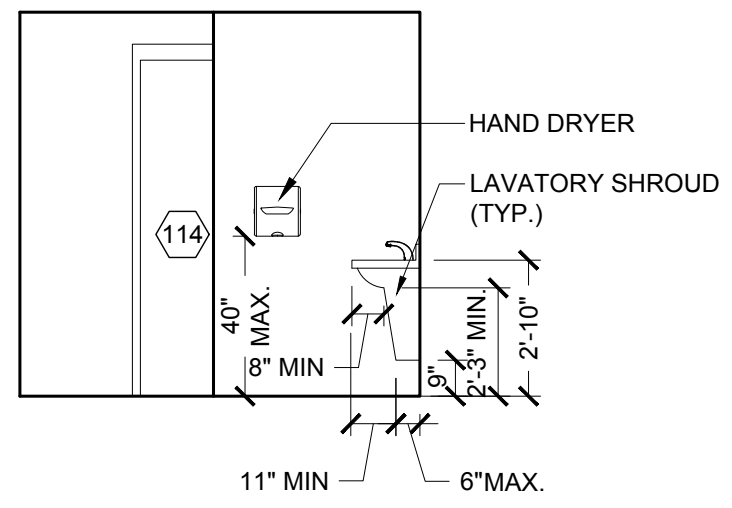


DETAIL AT DECK

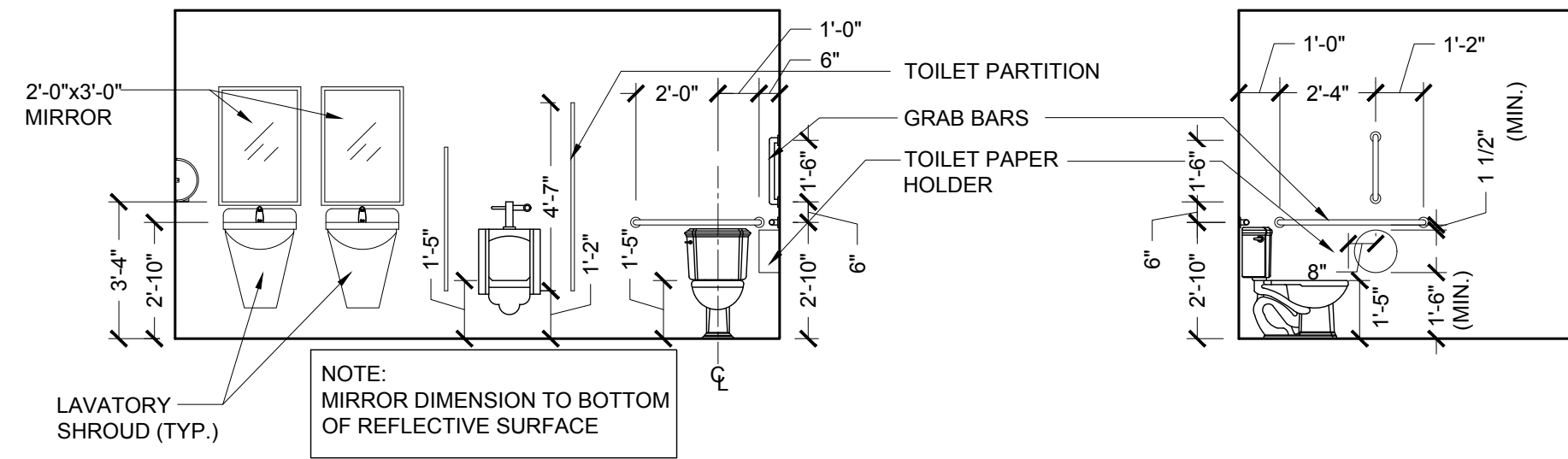
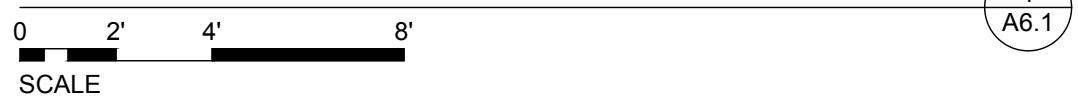


BASE OF WALL DETAIL

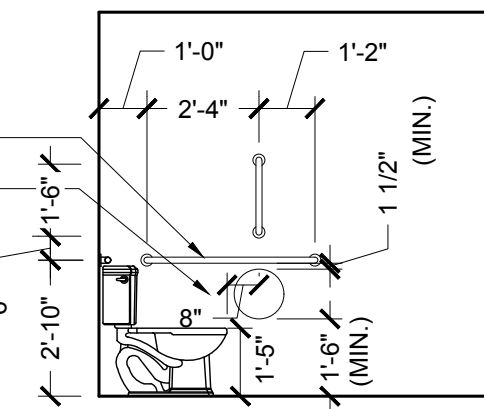
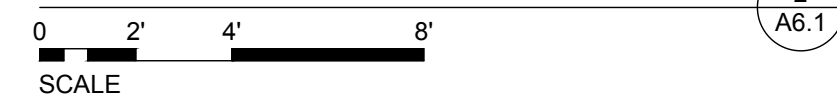




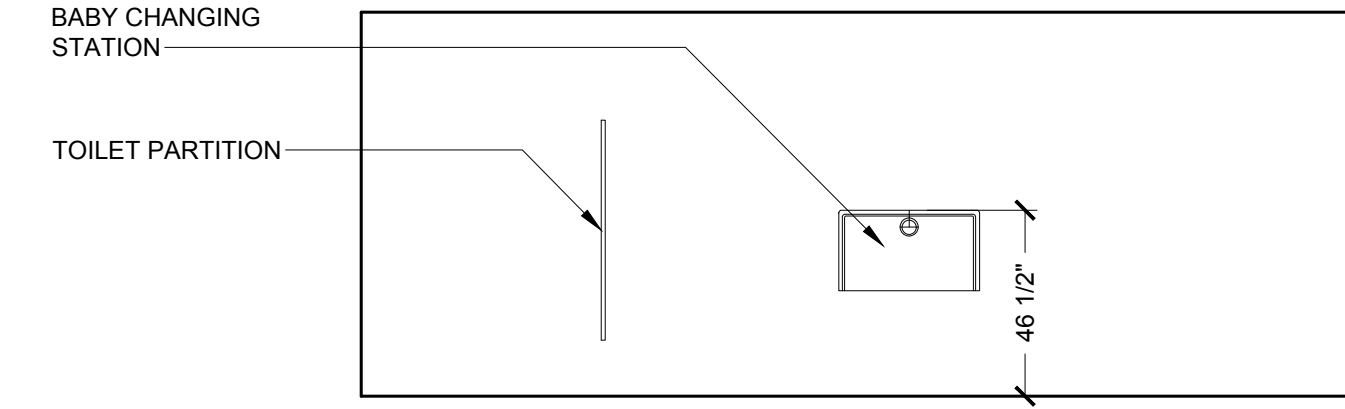
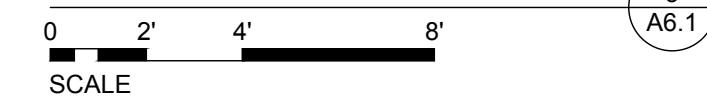
**MEN 114**



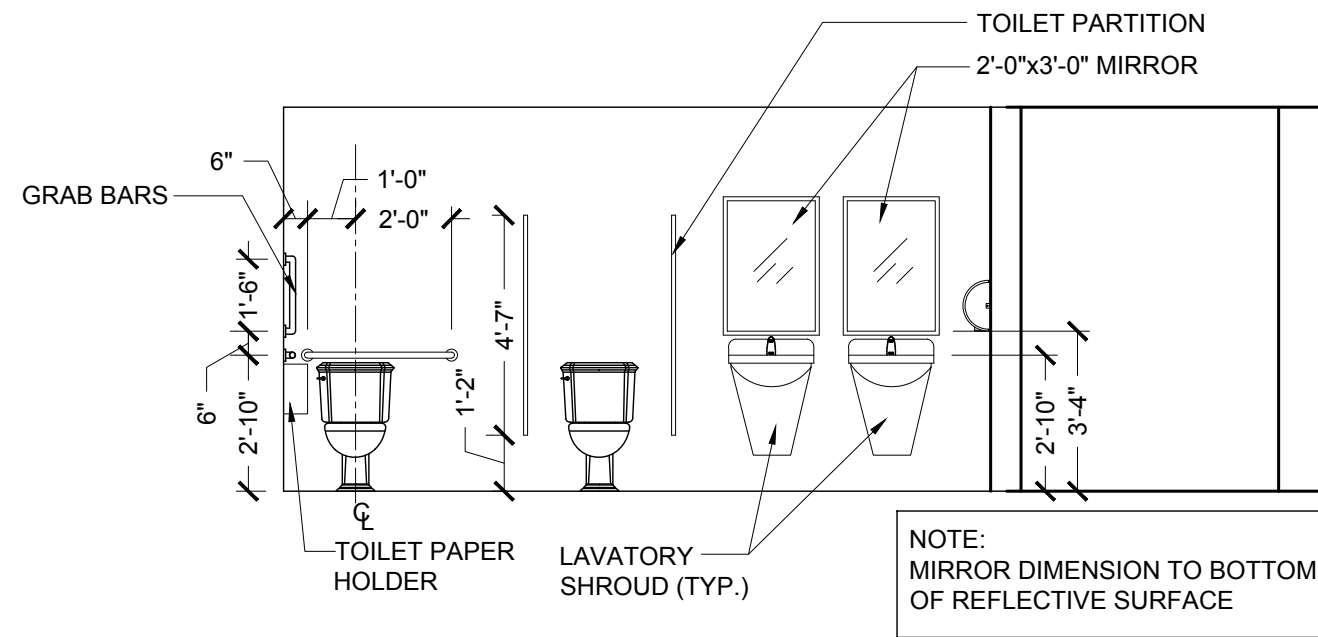
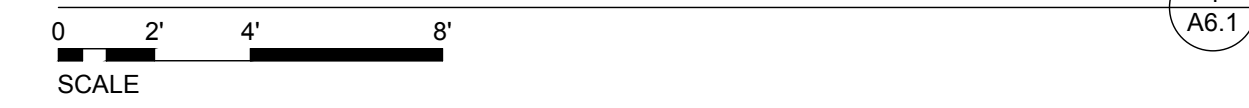
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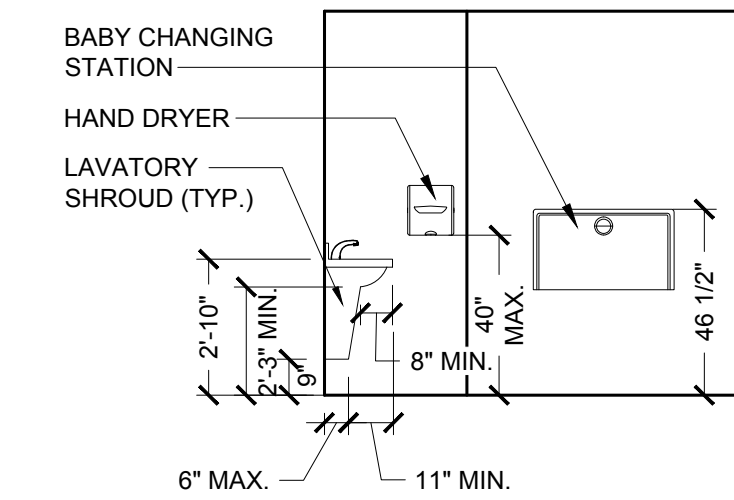
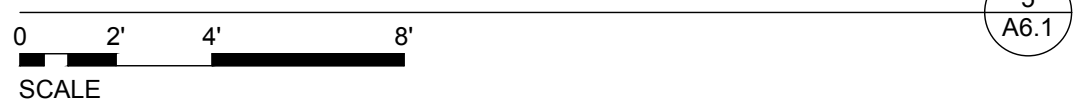
**MEN 114**



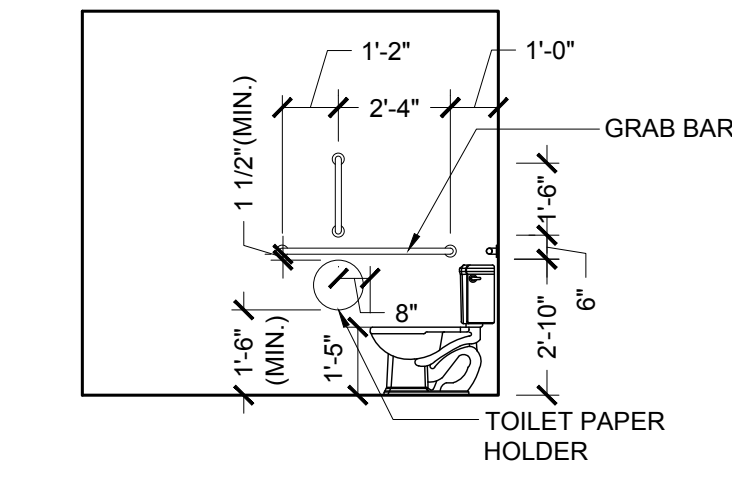
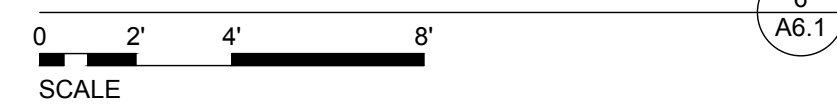
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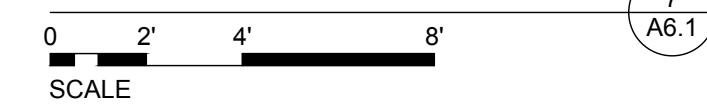
**WOMEN 115**



**WOMEN 115**



**WOMEN 115**



**DOOR SCHEDULE**

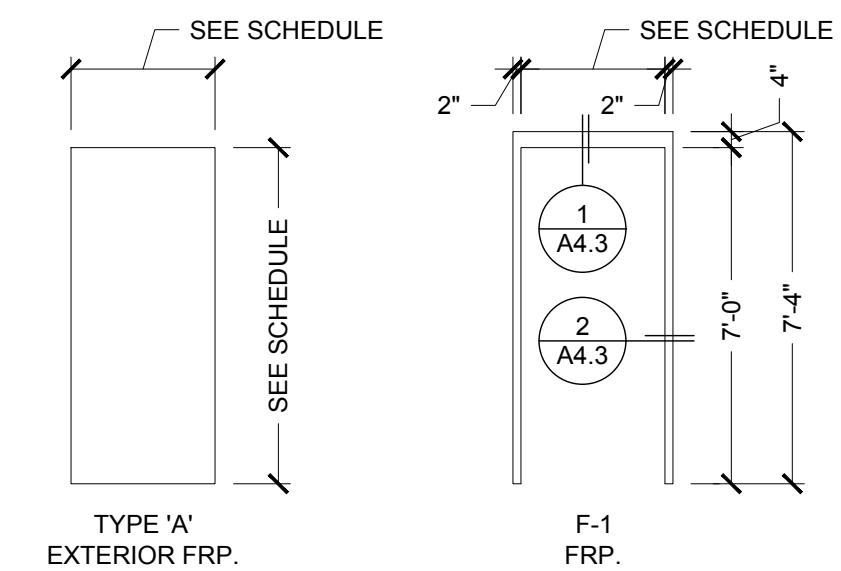
DOOR NUMBER	SIZE	DOOR TYPE	FRAME MATL	FRAME TYPE	REMARKS	HARDWARE	COMMENTS
115	3'-0"x7'-0"x1 3/4"	A	FRP	F-1	NOT RATED	1	
116	3'-0"x7'-0"x1 3/4"	A	FRP	F-1	NOT RATED	1	

**ROOM FINISH SCHEDULE**

RM#	NAME	FLOOR	BASE	NORTH WALL	FIN.	EAST WALL	FIN.	SOUTH WALL	FIN.	WEST WALL	FIN.	CEILING MAT.	FIN.	HT.	REMARKS	
101	VESTIBULE	EXIST	WD	GYP BD	PT	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	PT		1, 2, 4	
102	AUDITORIUM	EXIST	EXIST	EXIST	EXIST	EX / GYP BD	PT	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	3	
103	KITCHEN	EXIST	EXIST	EXIST	EXIST	EX / GYP BD	PT	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	3	
104	STORAGE	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
105	ENTRY	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
106	COATS	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
107	STAIR LANDING	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
108	HALL	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
109	OFFICE	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
110	OFFICE	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
111	MEN	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
112	WOMEN	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
113	STAIR LANDING	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	NO WORK	
114	MEN	SEALED CONC.	---	BMU	SEALER	BMU	SEALER	BMU	SEALER	BMU	SEALER	BMU	SEALER	GYP BD	PT	10'-1 3/8" ---
115	WOMEN	SEALED CONC.	---	BMU	SEALER	BMU	SEALER	BMU	SEALER	BMU	SEALER	GYP BD	PT	10'-1 3/8" ---		

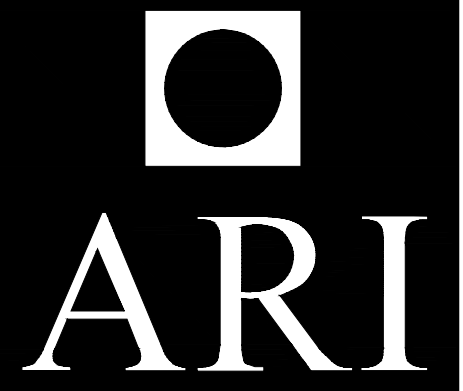
**REMARKS**

1. MATCH EXISTING WOOD BASE.
2. PATCH EXISTING PLASTER CEILING AS NEEDED TO ACCOMMODATE NEW CONSTRUCTION.
3. PAINT EAST WALL ONLY - TO MATCH EXISTING. - EXTEND TO NEAREST JOINT, CORNER OR TRANSITION.
4. PAINT NORTH WALL ONLY - TO MATCH EXISTING.



**DOOR / FRAME TYPES**





- ARCHITECTURE
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CITY OF DULUTH  
LAFAYETTE  
COMMUNITY CENTER



DULUTH, MINNESOTA

PROJECT NO.: 16-076

DATE: 05-MAY-17

DRAWN BY: BL / KJS

REVISIONS:

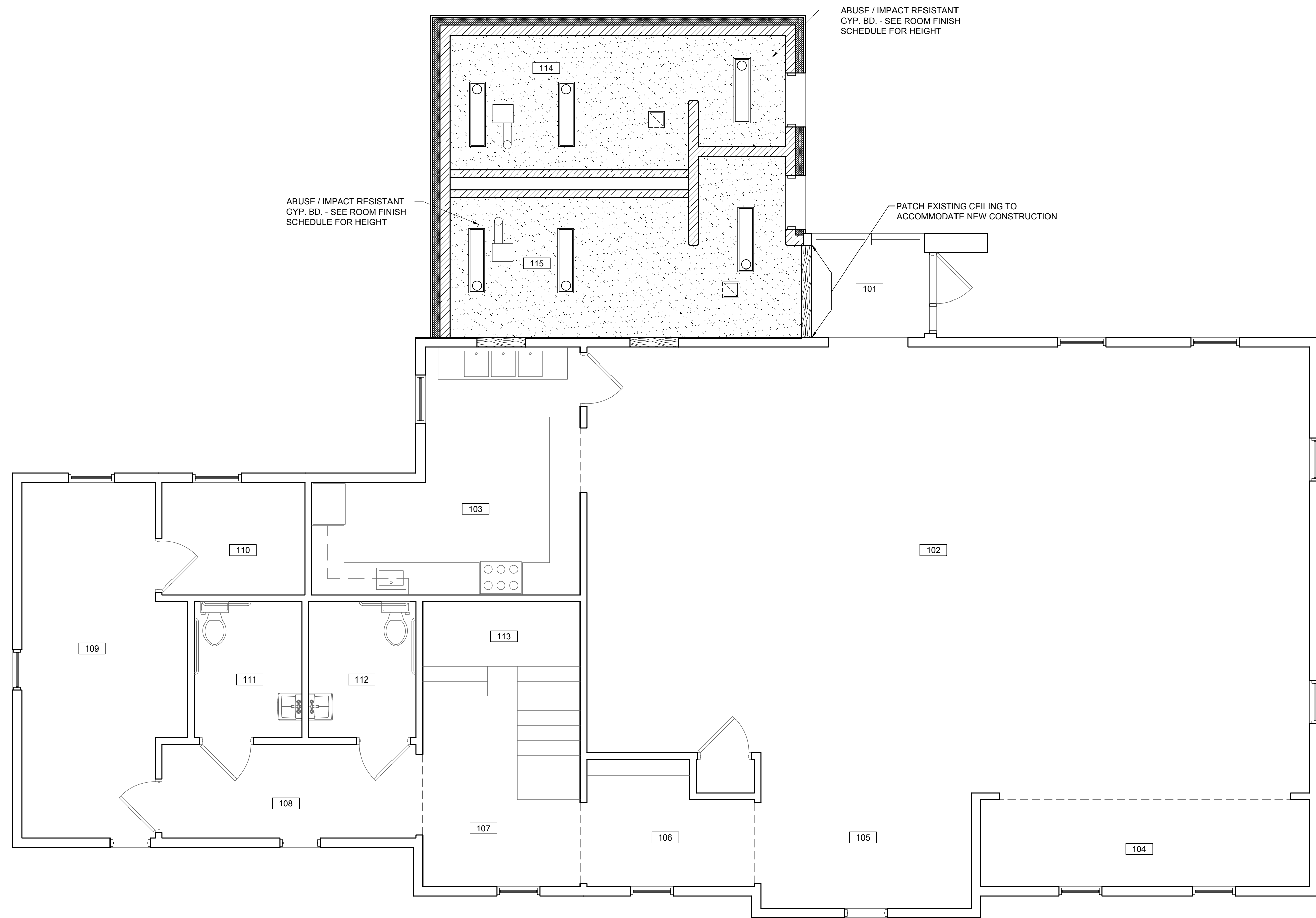
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*[Signature]*  
KRYAN ESPAME  
ARCHITECT 49444  
REG. NO.

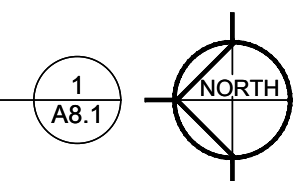
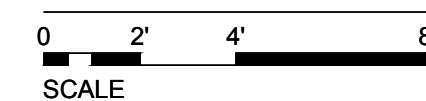
REFLECTED  
CEILING PLAN

A  
8.1

LEGEND	
ITEM	DESCRIPTION
	NEW LIGHT FIXTURE - SEE SHEET E1.1.
	EXHAUST FAN - SEE SHEET E1.1.
	MECHANICAL GRILLE - SEE SHEET M2.1.



REFLECTED CEILING PLAN



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# CITY OF DULUTH LAFAYETTE COMMUNITY CENTER

## DULUTH, MN

PROJECT NO. 17-080

DATE 05-MAY-2017

DRAWN GDB

REVISIONS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Mark R. Udd  
MARK R. UDD  
ENGINEER 40443  
REG. NO.

## STRUCTURAL NOTES/ ABBREVIATIONS/ SHEET INDEX

### GENERAL

ALL TYPICAL DETAILS AND NOTES SHOWN ON DRAWINGS SHALL APPLY UNLESS NOTED OTHERWISE. TYPICAL DETAILS MAY NOT NECESSARILY BE INDICATED ON THE PLANS BUT SHALL STILL APPLY AS SHOWN OR DESCRIBED IN THE DETAILS. WHERE TYPICAL DETAILS ARE NOTED ON THE DRAWINGS, THE SPECIFIED TYPICAL DETAIL SHALL BE USED. WHERE NO DETAIL IS NOTED, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CHOOSE THE APPROPRIATE TYPICAL DETAIL FROM THOSE PROVIDED. THE CONTRACTOR SHALL SUBMIT ALL PROPOSED ALTERNATE TYPICAL DETAILS TO THOSE PROVIDED WITH RELATED CALCULATIONS TO THE ENGINEER FOR APPROVAL PRIOR TO SHOP DRAWING PRODUCTION AND FIELD USE.

### BUILDING CODE

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE BUILDING CODE. THE PUBLICATIONS LISTED BELOW ARE THE GOVERNING CODES AND STANDARDS AND ARE REFERENCED BY THEIR BASIC DESIGNATION. IN THE CASE OF CONFLICTING REQUIREMENTS, THE BUILDING CODE SHALL GOVERN.

### APPLICABLE CODES AND STANDARDS

BUILDING CODE	INTERNATIONAL BUILDING CODE (IBC), 2012 EDITION, INCLUDING THE STATE OF MINNESOTA BUILDING CODE AMENDMENTS.
ACI 318	AMERICAN CONCRETE INSTITUTE, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" 2011 EDITION
ACI 530	AMERICAN CONCRETE INSTITUTE, "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES", 2011 EDITION
ASCE 7	AMERICAN SOCIETY OF CIVIL ENGINEERS, "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES", 2010 EDITION
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM INTERNATIONAL)
ICC	INTERNATIONAL CODE COUNCIL, INTERNATIONAL CODE COUNCIL - EVALUATION SERVICES (ICC-ES)

### STRUCTURAL DESIGN DATA

#### LOAD COMBINATIONS

LOAD COMBINATIONS ARE IN ACCORDANCE WITH SECTION 1605 OF THE BUILDING CODE.

#### SNOW LOADS

SNOW LOADINGS AND SNOW DRIFT LOADING SHALL BE IN ACCORDANCE WITH THE BUILDING CODE (SECTION 1609).

GROUND SNOW LOAD:	$P_g = 60$ PSF
IMPORTANCE FACTOR:	$I_s = 1.0$
SNOW EXPOSURE FACTOR:	$C_e = 1.0$
THERMAL FACTOR:	$T = 1.0$
FLAT-ROOF SNOW LOAD:	$P_f = 42$ PSF

#### WIND LOADS

WIND PRESSURE SHALL BE IN ACCORDANCE WITH THE BUILDING CODE (SECTION 1609).

BASIC WIND SPEED:	$V = 90$ MPH (3-SECOND GUST)
EXPOSURE:	D
IMPORTANCE FACTOR:	$I_w = 1.0$
ENCLOSURE CLASSIFICATION:	ENCLOSED
INT. PRESSURE COEFFICIENT:	$G_{CPI} = 0.18$

#### LOAD PATH FOR LATERAL FORCES

LATERAL FORCES ARE CARRIED BY THE ROOF DIAPHRAGM TO THE SHEAR WALLS, BRACED FRAMES, MOMENT FRAMES, ETC., MOMENTS, SHEARS, AND ROTATIONAL FORCES ARE DELIVERED TO THE FOUNDATION BY THE SHEAR WALLS, BRACED FRAMES, MOMENT FRAMES, ETC. IN PROPORTION TO THEIR ABILITY TO RESIST LATERAL DEFORMATION.

### CONCRETE

- MIXING, BATCHING, TRANSPORTING, PLACING, AND CURING OF ALL CONCRETE, AND SELECTION OF CONCRETE MATERIALS, SHALL CONFORM TO ACI 301, "SPECIFICATION FOR STRUCTURAL CONCRETE FOR BUILDINGS"; EXCEPT WHERE NOTED, PROPORTIONS OF AGGREGATE TO CEMENTITIOUS PASTE SHALL BE SUCH AS TO PRODUCE A DENSE, WORKABLE MIX THAT CAN BE PLACED WITHOUT SEGREGATION OR EXCESS FREE SURFACE WATER.
- ALL CONCRETE USED IN HORIZONTAL SURFACES EXPOSED TO THE WEATHER SHALL CONTAIN AN ACCEPTABLE ADMIXTURE TO PRODUCE AIR-ENTRAINED CONCRETE WITH TOTAL AIR CONTENT, AS NOTED IN THE CONCRETE MIX SPECIFICATION TABLE. TOLERANCE FOR AIR CONTENT SHALL BE +/- 1 PERCENT. AIR CONTENT SHALL BE MEASURED AT THE DISCHARGE OF THE TRUCK, IF CONCRETE IS PUMPED, AIR CONTENT SHALL BE MEASURED AT THE DISCHARGE END OF THE PUMP LINE. TESTS FOR AIR CONTENT SHALL MEET ASTM C172 REQUIREMENTS.
- MIX DESIGNS LISTED BELOW SHALL BE SUBMITTED TO THE ARCHITECT AND APPROVED PRIOR TO USE. SUBMITTALS SHALL INCLUDE TEST DATA THAT CONFIRMS THE STRENGTH OF EACH MIX PER ACI 318 CHAPTER 5. SELECTION OF CONCRETE MIX PROPORTIONS SHALL BE IN ACCORDANCE WITH ACI 301. MIX PROPORTIONS SHALL MEET OR EXCEED THE REQUIREMENTS LISTED BELOW FOR THE LOCATIONS NOTED. THE MORE STRINGENT OF THE REQUIREMENTS LISTED SHALL GOVERN.
- MAXIMUM SIZE OF AGGREGATE SHALL BE AS LISTED BELOW. MAXIMUM FLY ASH AS A PERCENTAGE OF TOTAL WEIGHT OF CEMENTITIOUS MATERIAL SHALL BE 30 PERCENT. FLY ASH SHALL BE CLASS C OR F, MEETING ASTM C618 REQUIREMENTS. WATER/CEMENT RATIO SHALL BE BASED ON TOTAL CEMENTITIOUS MATERIAL, INCLUDING FLY ASH AND OTHER POZZOLANIC MATERIALS.
- THE CONTRACTOR SHALL DETERMINE SLUMP. EACH CONCRETE MIX SUBMITTED SHALL HAVE THE SLUMP SPECIFIED. SLUMP SHALL BE MEASURED AT THE DISCHARGE OF THE TRUCK. IF CONCRETE IS PUMPED, SLUMP SHALL BE MEASURED AT THE DISCHARGE END OF THE PUMP LINE. SLUMPS SHALL BE WITHIN +/- 1 INCH AND +/- 2 INCHES OF THE SPECIFIED SLUMP.
- THE USE OF SUPER PLASTICIZERS AND WATER REDUCERS IS ALLOWED, BUT NOT REQUIRED. ALL ADMIXTURES SHALL BE CHLORIDE FREE UNLESS OTHERWISE APPROVED BY THE ENGINEER.

#### CONCRETE MIX DESIGN TABLE

LOCATION	f' (PSI)	TEST AGE (DAYS)	MAX W/C RATIO	AIR CONTENT (%)	MAX AGGREGATE SIZE
MISCELLANEOUS CONCRETE, CURBS, SIDEWALKS	3,000	28	0.50	6.0	1"
EXTERIOR SLABS ON GRADE	4,000	28	0.45	6.0	1"
INTERIOR SLABS ON GRADE	4,000	28	0.50	-	1"
FOOTINGS	4,000	28	0.44	-	1"
CONCRETE ON STEEL DECK	4,000	28	0.44	-	3/4"

### FIBER REINFORCED CONCRETE

- FIBER REINFORCED CONCRETE MAY BE USED FOR INTERIOR SLABS ON GRADE, AT THE CONTRACTOR'S OPTION, AND SHALL BE A SPECIAL MIX DESIGN PRODUCING A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AND SHALL CONFORM TO ACI REPORT 544-R.
- EITHER POLYPROPYLENE OR NYLON FIBERS MAY BE USED. POLYPROPYLENE FIBERS SHALL BE MANUFACTURED BY THE FIBERMESH COMPANY, NYCON COMPANY, OR APPROVED EQUAL AND SHALL COMPLY WITH ASTM C116. TYPE III NYLON FIBERS SHALL BE MANUFACTURED BY THE NYCON COMPANY OR APPROVED EQUAL. DOSAGE PER MANUFACTURER'S RECOMMENDATIONS.
- FIBER REINFORCED CONCRETE OF THE SAME THICKNESS MAY BE USED IN LIEU OF REINFORCED SLABS ON GRADE; HOWEVER, STILL PROVIDE IN THE FIBER REINFORCED SLABS ON GRADE ANY ADDITIONAL REINFORCING BARS SHOWN ON PLANS AND TYPICAL DETAILS.

### REINFORCING STEEL

- ALL REINFORCING SHALL BE NEW BILLET STOCK ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE. BARS SHALL BE SECURELY TIED IN PLACE WITH #16 DOUBLE-ANNEALED IRON WIRE. BARS SHALL BE SUPPORTED ON ACCEPTABLE CHAIRS. REINFORCING STEEL SHALL BE DETAILED IN ACCORDANCE WITH THE ACI MANUAL OF STANDARD PRACTICE FOR DETAILING OF REINFORCED CONCRETE STRUCTURES. CONTRACTOR SHALL COORDINATE REINFORCING STEEL PLACEMENT DETAILS AND PROVIDE TEMPLATES FOR PLACING STEEL IN CONGESTED AREAS AS NECESSARY. SHOP DRAWINGS (INCLUDING PLACING PLANS AND ELEVATIONS) SHALL BE SUBMITTED TO, AND REVIEWED BY, THE ARCHITECT/ENGINEER BEFORE STARTING FABRICATION.
- NO REINFORCING BARS SHALL BE SPLICED BY WELDING. AT THE CONTRACTOR'S OPTION, MECHANICAL BUTT SPLICES USING AN EXOTHERMIC WELDING PROCESS AND HIGH STRENGTH SLEEVES OR MECHANICAL CONNECTION SPlicing MAY BE USED, PROVIDED THAT THE MECHANICAL SPLICES SHALL HAVE A CURRENT ICC-ES REPORT DEMONSTRATING THAT THE PRODUCT CAN ACHIEVE A MINIMUM TENSILE STRENGTH OF 125 PERCENT OF THE SPECIFIED YIELD STRENGTH OF THE BAR. SPLICE DEVICES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. REINFORCING BARS SHALL BE LAP SPLICED FOR TENSION (LSB) UNLESS NOTED OTHERWISE ON THE DRAWINGS. #14 AND #16 BARS SHALL BE SPLICED USING MECHANICAL COUPLINGS TO SPLICED BARS REGARDLESS OF SIZE. ACCEPTABLE COUPLINGS ARE LENTON REINFORCING STEEL COUPLERS (ICC-ES ESR-3987). #14 AND #16 BARS SHALL NOT BE LAP SPLICED.
- WELDING OR TACK WELDING OF REINFORCING BARS TO OTHER BARS OR TO PLATES, ANCHORS, ETC., IS PROHIBITED, EXCEPT WHERE SPECIFICALLY APPROVED BY THE ENGINEER. WHERE WELDING IS APPROVED, IT SHALL BE DONE BY AWS CERTIFIED WELDERS USING E9018 OR APPROVED ELECTRODES. WELDING PROCEDURES SHALL CONFORM TO THE REQUIREMENTS OF AWS D1.4.
- MINIMUM CAST-IN-PLACE CONCRETE COVER OVER REINFORCING STEEL, UNLESS NOTED OTHERWISE, SHALL BE AS FOLLOWS:
  - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: ALL SIZES: 3 INCHES
  - CONCRETE EXPOSED TO EARTH OR WEATHER: #5 BAR OR SMALLER: 1 1/2 INCHES #6 BAR OR LARGER: 2 INCHES

### CONSTRUCTION JOINTS

- ALL CONSTRUCTION JOINTS IN SLABS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW BEFORE STARTING CONSTRUCTION.
  - ALL CONSTRUCTION, CONTROL, AND ISOLATION JOINTS FOR SLABS ON GRADE SHALL BE IN ACCORDANCE WITH THE TYPICAL SLAB ON GRADE DETAILS.
  - THE CONTRACTOR SHALL SUBMIT THE PROPOSED LOCATIONS OF CONSTRUCTION JOINTS TO THE ENGINEER FOR ACCEPTANCE BEFORE STARTING CONSTRUCTION.
- ### ANCHOR RODS
- ANCHOR RODS SHALL BE ASTM F1554 GRADE 36 WITH CLASS 1A THREADS, UNLESS NOTED OTHERWISE.
  - FURNISH ANCHOR RODS PREFABRICATED WITH MATCHING DOUBLE HEAVY HEX NUTS JAMMED AT THE END EMBEDDED IN CONCRETE. FURNISH HARDENED PLATE WASHERS, LOCK WASHERS, AND MATCHING HEAVY HEX NUTS FOR SECURING THE BASE PLATE TO THE ANCHOR RODS.
  - A RIGID STEEL TEMPLATE SHALL BE USED TO LOCATE ANCHOR RODS WHILE PLACING CONCRETE.
  - ANCHOR RODS SHALL HAVE SUFFICIENT LENGTH TO PROVIDE THE MINIMUM EMBEDMENT SHOWN ON THE DRAWINGS, MEASURED FROM THE FACE OF THE CONCRETE TO THE NEAR FACE OF THE DOUBLE NUT, AND THE CONDITION OF THE STRUCTURE TO RECEIVE THE BASE PLATE WITH FULL THREAD PROJECTION FOR NUT INSTALLATION.
  - ANCHOR ROD INSTALLATION SHALL BE COORDINATED WITH REINFORCING AND FORMWORK.
  - LEVELING NUTS SHALL NOT BE USED EXCEPT AFTER EVALUATION BY THE CONTRACTOR'S ERECTION ENGINEER.
  - AFTER BASE INSTALLATION, ANCHOR ROD NUTS SHALL BE INSTALLED TO A SNUG-TIGHT CONDITION.
  - NO HEATING OR BENDING OF THE ANCHOR RODS IS PERMITTED.
  - Holes in the base material shall NOT BE ENLARGED BY BURNING.

### PREFABRICATED CONNECTOR PLATE WOOD ROOF TRUSSES

- THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF PREFABRICATED CONNECTOR PLATE WOOD ROOF TRUSSES. THESE MEMBERS SHALL BE DESIGNED BY THE MANUFACTURER IN ACCORDANCE WITH THE "DESIGN SPECIFICATION FOR METAL PLATE CONNECTED WOOD TRUSSES", LATEST EDITION, BY THE TRUSS PLATE INSTITUTE. FOR THE SPANS AND CONDITIONS SHOWN ON THE PLANS. THE FOLLOWING TRUSS LOADING IS TYPICAL UNLESS NOTED OTHERWISE ON PLANS AND/OR LOAD MAPS.
 

TOP CHORD LIVE LOAD (SNOW)	42 PSF
TOP CHORD DEAD LOAD	10 PSF
BOTTOM CHORD DEAD LOAD	5 PSF
TOTAL LOAD	57 PSF
- ROOF TRUSSES SUPPORTING SNOW LOADS SHALL BE DESIGNED TO RESIST THE STRUCTURAL FORCES SET FORTH IN ACSE 7, SECTION 7.
- ROOF TRUSS DEFLECTION SHALL MEET THE MINIMUM IBC REQUIREMENTS UNLESS A MORE STRINGENT CRITERIA IS NOTED ON THE PLANS.
- WOOD TRUSSES SHALL UTILIZE APPROVED CONNECTOR PLATES (GANGNAIL OR APPROVED EQUAL).
- SUBMIT SHOP DRAWINGS AND DESIGN CALCULATIONS COMPLETE WITH STRESS DIAGRAMS FOR REVIEW A MINIMUM OF TWO WEEKS PRIOR TO FABRICATION. SUBMITTED DOCUMENTS SHALL BEAR THE STAMP AND SIGNATURE OF AN ENGINEER LICENSED TO PERFORM THE WORK IN THE JURISDICTION WHERE THE PROJECT IS LOCATED. PROVIDE FOR SHAPES, BEARING POINTS, GIRDER TRUSSES, INTERSECTIONS, HIPS, VALLEYS, ETC. SHOWN ON THE DRAWINGS. EXACT COMPOSITION OF SPECIAL HIP, VALLEY, AND INTERSECTION AREAS (USE OF GIRDER TRUSSES, JACK TRUSSES, STEP-DOWN TRUSSES, ETC) SHALL BE DETERMINED BY THE CONTRACTOR UNLESS SPECIFICALLY INDICATED ON THE PLANS.
- PROVIDE FOR ALL TRUSS-TO-TRUSS AND TRUSS-TO-GIRDER TRUSS CONNECTION DETAILS AND REQUIRED CONNECTION MATERIALS. PROVIDE FOR ALL TEMPORARY AND PERMANENT TRUSS BRACING AND BRIDGING.

### PLYWOOD

- PLYWOOD SHEATHING SHALL BE GRADE C-D EXTERIOR GLUE OR STRUCTURAL II, EXTERIOR GLUE SHALL BE IN CONFORMANCE WITH THE BUILDING CODE, UNITED STATES VOLUNTARY PRODUCT STANDARDS PS-1 AND PS-2.
- ORIENTED STRAND BOARD OF EQUIVALENT THICKNESS, EXPOSURE RATING, AND PANEL INDEX MAY BE USED IN LIEU OF PLYWOOD.

### ROOF SHEATHING

- PROVIDE 5/8-INCH CDX PLYWOOD, INDEX 32/16, UNLOCKED, Laid UP WITH FACE GRAIN PERPENDICULAR TO FRAMING BELOW. STAGGER PANEL END JOINTS, PROVIDE APPROVED EDGE CLIPS AT 24 INCHES ON CENTER AT UNLOCKED ROOF SHEATHING EDGES. PROVIDE 1/8-INCH GAP BETWEEN ALL ADJUTING PANEL EDGES. PROVIDE THE FOLLOWING MINIMUM NAILING UNLESS NOTED OTHERWISE ON PLANS:
 

8d AT 6 INCHES ON CENTER	ALL SUPPORTED PANEL EDGES, DIAPHRAGM BOUNDARIES AND OVER EXTERIOR WALLS AND SHEAR WALLS
8d AT 12 INCHES ON CENTER	FIELD NAILING

### TREATED WOOD

- ALL WOOD PLATES, LEDGERS AND BLOCKING IN DIRECT CONTACT WITH CONCRETE OR MASONRY SHALL BE PRESSURE-TREATED WITH AN AMERICAN WOOD PRESERVERS ASSOCIATION (AWPA) APPROVED PRESERVATIVE. ALTERNATIVELY PER IBC SECTION 2004.11, FOR SOME EXCEPTIONS, IMPERVIOUS MOISTURE BARRIERS MAY BE PROVIDED BETWEEN UNTREATED MEMBERS AND CONCRETE OR MASONRY.
- ALL METAL FASTENERS IN CONTACT WITH TREATED WOOD SHALL BE GALVANIZED OR STAINLESS STEEL. WHEN USING GALVANIZED FASTENERS, THE CONTRACTOR SHALL COORDINATE THE GALVANIZATION PROCESS WITH THE CHEMICAL COMPOSITION OF THE WOOD TREATMENT.

### TIMBER CONNECTORS

- TIMBER CONNECTORS CALLED OUT BY LETTERS AND NUMBERS SHALL BE BY SIMPSON STRONG-TIE COMPANY, INC. AS SPECIFIED IN THE LATEST EDITION OF THEIR CATALOG. EQUIVALENT DEVICES BY OTHER MANUFACTURERS MAY BE SUBSTITUTED, PROVIDED THEY HAVE CURRENT ICC-ES EVALUATION REPORTS DEMONSTRATING THAT THE PRODUCTS HAVE EQUAL OR GREATER LOAD CAPACITIES. PROVIDE NUMBER AND SIZE OF FASTENERS AS SPECIFIED BY MANUFACTURER.
- CONNECTORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED SPECIFICATIONS. WHERE CONNECTOR STRAPS CONNECT TWO MEMBERS, PLACE ONE-HALF OF THE NAILS OR BOLTS IN EACH MEMBER.
- ALL BOLTS IN WOOD MEMBERS SHALL CONFORM TO ASTM A307. PROVIDE WASHERS UNDER THE HEADS AND NUTS OF ALL BOLTS AND LAG SCREWS BEARING ON WOOD.
- ALL NAILS SHALL BE COMMON, UNLESS NOTED OTHERWISE.
- ALL SHIMS SHALL BE SEASONED AND DRIED AND THE SAME GRADE (MINIMUM) AS MEMBERS CONNECTED.
- ALL SINGLE JOISTS, DOUBLE JOISTS AND TRIPLE JOISTS SHALL BE CONNECTED TO FLUSH BEAMS WITH "U" SERIES JOIST HANGERS, UNLESS NOTED OTHERWISE.

### WOOD FRAMING DETAILS

- THE FOLLOWING APPLY UNLESS OTHERWISE SHOWN ON THE PLANS.
- AT JOIST AREAS: PROVIDE CROSS-BRIDGING AT 8'-0" ON CENTER MAXIMUM. PROVIDE SOLID BLOCKING OR CONTINUOUS RIM AT ALL BEARING JOISTS. PROVIDE SOLID BLOCKING UNDER ALL BEARING WALLS ABOVE.
  - PROVIDE DOUBLE JOIST UNDER ALL PARALLEL PARTITIONS THAT EXTEND OVER MORE THAN HALF THE JOIST LENGTH. PROVIDE DOUBLE JOISTS EACH SIDE OF ALL OPENINGS IN FLOORS AND ROOFS UNLESS NOTED OTHERWISE. PROVIDE DOUBLE JOIST UNDER ALL OPENINGS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
  - PROVIDE TWO 2x10 HEADERS OVER AND DOUBLE STUDS EACH SIDE OF ALL OPENINGS IN STUD BEARING WALLS UNLESS NOTED OTHERWISE.
  - PROVIDE SOLID BLOCKING AT FLOORS FOR WOOD COLUMNS AND MULTIPLE STUD POSTS TO PASS THROUGH.
  - PROVIDE CONTINUOUS SOLID BLOCKING AT MID-HEIGHT OF ALL STUD WALLS OVER 10'-0" IN HEIGHT.
  - ALL STUD WALLS UNLESS NOTED OTHERWISE SHALL BE 2x4 AT 16 INCHES ON CENTER AT INTERIOR WALLS AND 2x6 AT 16 INCHES ON CENTER AT EXTERIOR WALLS.
  - USE FULL-LENGTH STUDS (BALLOON FRAME) ON EXTERIOR WALLS AT STAIRWAYS AND AT VAULTED CEILINGS.
  - PLYWOOD WALL SHEATHINGS SHALL HAVE SOLID BLOCKING AT ALL LATHES. PROVIDE THE FOLLOWING MINIMUM NAILING UNLESS NOTED OTHERWISE ON PLANS:
 

8d AT 6 INCHES ON CENTER	AT SHEET EDGES
8d AT 12 INCHES ON CENTER	AT INTERMEDIATE BEARING POINTS
  - ALL WOOD STUD WALLS SHALL HAVE LOWER WOOD PLATE ATTACHED TO WOOD FRAMING WITH 16d NAILS AT 6 INCHES ON CENTER STAGGERED OR BOLTED TO CONCRETE WITH 5/8-INCH-DIAMETER ANCHOR BOLTS AT 6'-0" ON CENTER UNLESS NOTED OTHERWISE ON THE PLANS. ALL ANCHOR BOLTS SHALL HAVE 2x2x3/16-INCH PLATE WASHERS AND A MINIMUM EMBEDMENT OF 7 INCHES IN CONCRETE.

### MASONRY

- MASONRY CONSTRUCTION SHALL MEET THE REQUIREMENTS OF THE BUILDING CODE.
- ALL HOLLOW CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C90, NORMAL WEIGHT, TYPE 1, MOISTURE CONTROLLED. MINIMUM REQUIRED BLOCK COMPRESSIVE STRENGTH IS 1,900 PSI.
- GROUT SHALL CONFORM TO ASTM C476, FINE GROUT. MAXIMUM SIZE OF AGGREGATE SHALL BE 3/8 INCH. FLY ASH AS A PERCENTAGE OF TOTAL WEIGHT OF CEMENTITIOUS MATERIAL SHALL NOT EXCEED 40 PERCENT PER ASTM C595. FLY ASH SHALL BE CLASS C OR F, MEETING ASTM C618 REQUIREMENTS. SLUMP SHALL BE 9 TO 11 INCHES. WATER-REDUCING ADMIXTURES MAY BE USED. MINIMUM GROUT COMPRESSIVE STRENGTH BASED ON 28-DAY TESTS SHALL BE 2,000 PSI AND GREATER THAN OR EQUAL TO THE SPECIFIED MINIMUM DESIGN STRENGTH.
- ALL UNITS SHALL BE LAID IN RUNNING BOND USING TYPE S MORTAR WITH HEAD JOINTS.
- REQUIRED MORTAR PROPORTIONS BY VOLUME:
 

TYPE	PORTLAND CEMENT	HYDRATED LIME	AGGREGATE MEASURED IN A DAMP, MOISTURE CONDITION
S	1	1/4 TO 1/2	NOT LESS THAN 2 1/4 AND NOT MORE THAN 3 TIMES THE SUM OF THE VOLUMES OF THE CEMENT
- MASONRY MINIMUM DESIGN STRENGTH IS  $f_m = 1,500$  PSI.
- ALL BELOW GRADE MASONRY SHALL HAVE ALL CORES FILLED SOLID WITH CONCRETE GROUT.
- ALL CORES CONTAINING REINFORCEMENT SHALL BE FILLED SOLID WITH CONCRETE GROUT.
- GROUT SHALL BE VIBRATED WHILE PLACING TO ENSURE THAT CORES ARE COMPLETELY FILLED.
- WHEN GROUTING IS STOPPED FOR ONE HOUR OR MORE, HORIZONTAL CONSTRUCTION JOINTS SHALL BE FORMED BY STOPPING THE POUR 1/2" BELOW THE TOP OF THE UPPERMOST UNIT.
- VERTICAL REINFORCING SHALL BE PLACED AND GROUTED IN VERTICAL LIFTS OF NO MORE THAN 4'-0".
- PROVIDE 9 GAUGE GALVANIZED LADDER TYPE HORIZONTAL REINFORCING AT EVERY OTHER BLOCK COURSE IN ALL MASONRY WALLS, UNLESS DETAILED OTHERWISE.

- REINFORCE ALL BOND BEAMS WITH (2) #5 BOTTOM BARS, UNLESS DETAILED OTHERWISE.
- SEE TYPICAL MASONRY DETAILS MINIMUM REINFORCING REQUIREMENTS.
- SUBMIT GROUT MIXES TO ARCHITECT FOR REVIEW BEFORE COMMENCING MASONRY CONSTRUCTION.

### FOUNDATIONS

- COLUMN DOWELS SHALL BE INSTALLED WITH A TEMPLATE TO HOLD BARS IN THE PROPER POSITION AND SHALL BE PLACED WITH A TOLERANCE OF +/- 1/4 INCH.
- SPREAD FOOTINGS:
  - DESIGN SOIL BEARING PRESSURE = 2,000 PSF.
  - ALL FOOTINGS SHALL BEAR ON UNDISTURBED SOIL AND SHALL BE LOWERED TO FIRM BEARING IF SUITABLE SOIL IS NOT FOUND AT ELEVATIONS DETERMINED BY TOP OF FOOTING ELEVATION AND FOOTING DEPTH.
  - OWNER SHALL HIRE INDEPENDENT TESTIGN AGENCY TO CONFIRM DESIGN SOIL PRESSURE STATED ABOVE PRIOR TO STARTING FOUNDATION CONSTRUCTION.

### STRUCTURAL FILL

- ALL FILL PLACED TO SUPPORT SLABS ON GRADE, BEHIND PERMANENT WALLS, AND AROUND ALL DRAINS SHALL CONSIST OF WELL GRADED, GRANULAR MATERIAL PER THE SPECIFICATIONS.
- SOILS FOR STRUCTURAL FILL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER.
- STRUCTURAL FILL SHALL BE PLACED ON SOUND NATIVE MATERIAL.
- PROOF-ROLL CUT AREAS WHICH PROVIDE SUPPORT FOR PERMANENT STRUCTURES.
- AREAS WHICH ARE EXCESSIVELY YIELDING, AS DETERMINED BY THE CONTINUOUS OBSERVATION OF THE GEOTECHNICAL ENGINEER, SHALL BE OVERCUT AND REPLACED WITH STRUCTURAL FILL.
- STRUCTURAL FILL SHALL BE PLACED PER THE SPECIFICATION.

### MISCELLANEOUS METALS

- THE CONTRACTOR SHALL DESIGN AND SUPPLY ALL ADDITIONAL MISCELLANEOUS METALS THAT ARE INDICATED IN THE ARCHITECTURAL DRAWINGS OR THOSE METALS WHICH ARE FOUND TO BE NECESSARY TO SUPPORT THE ARCHITECTURAL FINISHES OR OTHER BUILDING SYSTEMS.
- ALL FRAMING AND CONNECTIONS DESIGNED BY THE CONTRACTOR SHALL NOT RESULT IN ECCENTRIC LOADS BEING APPLIED TO THE PRIMARY STRUCTURE NOR LATERAL LOADS BEING APPLIED TO THE BOTTOM FLANGE OF STEEL BEAMS. THE CONTRACTOR'S DESIGN SHALL VERIFY THAT THE CONNECTIONS DO NOT RESULT IN ADVERSE LOCAL CONNECTION STRESSES OCCURRING WITHIN THE PRIMARY STRUCTURE. SUBMIT CALCULATIONS STAMPED BY A STRUCTURAL ENGINEER LICENSED TO PERFORM THE WORK IN THE JURISDICTION WHERE THE PROJECT IS LOCATED AND SHOP DRAWINGS INDICATING IMPOSED LOADS ON THE PRIMARY STRUCTURE.

### BUILDING TOLERANCES

- STANDARD TOLERANCES SHALL BE BASED ON THE REQUIREMENTS OF THE AISC CODE OF STANDARD PRACTICE AND ACSI STANDARD SPECIFICATIONS FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS.

### SEQUENCING CONSTRUCTION AND LATERAL STABILITY

- THE STRUCTURAL COMPONENTS BY THEMSELVES ARE A NON-SELF-SUPPORTING STRUCTURE. LATERAL FORCES DUE TO WIND, EARTHQUAKE, OR SOIL ARE CARRIED BY THE ROOF AND FLOOR DIAPHRAGMS TO THE LATERAL SYSTEM. CERTAIN ELEMENTS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE CONSTRUCTED FIRST AND FLOOR SLABS, AND CONCRETE IN COMPOSITE COLUMNS) ARE REQUIRED FOR OVERALL OR LOCAL STABILITY OF OTHER ELEMENTS (SUCH AS BEAMS, COLUMNS, AND WALLS).
- IF DUE TO SEQUENCING OF CONSTRUCTION, THESE STABILITY ELEMENTS ARE NOT IN PLACE, THE CONTRACTOR SHALL RETAIN A STRUCTURAL ENGINEER LICENSED TO PERFORM THE WORK IN THE JURISDICTION WHERE THE PROJECT IS LOCATED, WHO SHALL INVESTIGATE WHERE TEMPORARY SHORING/BRACING IS REQUIRED, AND SHALL DESIGN THIS TEMPORARY SHORING/BRACING. THE CONTRACTOR SHALL PROVIDE THIS SHORING/BRACING UNTIL THE REQUIRED STRUCTURAL ELEMENTS AND THEIR CONNECTIONS HAVE BEEN INSTALLED AND REACH THEIR FINAL DESIGN STRENGTHS.

### EXISTING STRUCTURE

- EXISTING STRUCTURAL DIMENSIONS AND MEMBER SIZES ARE FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD PRIOR TO FABRICATION. THE CONTRACTOR SHALL VERIFY THE ACTUAL CONFIGURATION OF EXISTING CONSTRUCTION WITH THE CONDITION OF THE STRUCTURE BEFORE BEGINNING WORK.
- ANY DISCREPANCIES OF UNSOUND CONDITIONS SHALL BE REPORTED TO THE ARCHITECT FOR RESOLUTION BEFORE BEGINNING WORK.
- REFER TO ARCHITECTURAL PLANS FOR DIMENSIONS, EMBEDMENTS, AND OPENINGS NOT SHOWN.
- REFER TO MECHANICAL AND ELECTRICAL PLANS FOR DUCTS, PIPING, EMBEDMENTS, AND OPENINGS NOT SHOWN.
- TEMPORARY SHORING AND BRACING MAY BE NECESSARY IN ORDER TO PERFORM THE NECESSARY STRUCTURAL MODIFICATIONS TO THE EXISTING STRUCTURE SHOWN ON THE STRUCTURAL AND ARCHITECTURAL PLANS AND DETAIL. THE CONTRACTOR MUST RETAIN A STRUCTURAL ENGINEER LICENSED TO PERFORM THE WORK IN THE JURISDICTION WHERE THE PROJECT IS LOCATED, WHO SHALL INVESTIGATE WHERE THIS TEMPORARY SHORING/BRACING IS REQUIRED AND SHALL DESIGN THIS TEMPORARY SHORING/BRACING.

### SPECIAL INSPECTION

- THE FOLLOWING ITEMS REQUIRE SPECIAL INSPECTION AND TESTING PER IBC SECTION 1704.
- THIS WORK SHALL BE PERFORMED BY A SPECIAL INSPECTOR CERTIFIED BY THE GOVERNING BUILDING OFFICIAL TO PERFORM THE TYPES OF INSPECTIONS AND TESTS SPECIFIED.
- THE FREQUENCY OF INSPECTIONS AND TESTING SHALL BE AS OUTLINED IN THE IBC TABLE ITEMS LISTED BELOW.
- DEFICIENCIES SHALL BE REPORTED DAILY TO THE CONTRACTOR.
- SUMMARY REPORTS SHALL BE DISTRIBUTED WEEKLY TO THE OWNER, ARCHITECT, CONTRACTOR, BUILDING OFFICIAL, AND STRUCTURAL ENGINEER.
- SEE THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR SPECIAL INSPECTION AND TESTING.

SPECIAL INSPECTION TABLE		
ITEM	DESCRIPTION (SEE IBC SECT. 1704)	IBC TABLE REQUIREMENT
CONCRETE	CONCRETE THAT IS PART OF THE STRUCTURE	TABLE 1704.4 ITEMS 4, 5, 6, 7, 9 AND 10
BOLTS INSTALLED IN CONCRETE	ANCHOR BOLTS, HEADED STUDS (EXCEPT AT BEAM-TO-DECK INSTALLATION)	TABLE 1704.4 ITEM 3
REINFORCING STEEL	A. PLACEMENT OF REINFORCING STEEL	TABLE 1704.1 ITEM 1
	B. SPLICING OF REINFORCING BY BUTT WELDING, EXOTHERMIC WELDING PROCESS OR THREADED COUPLERS	TABLE 1704.1 ITEM 1
STRUCTURAL MASONRY	ALL MASONRY SHOWN ON THE STRUCTURAL DRAWINGS INCLUDING MASONRY SHOWN IN TYPICAL DETAILS BUT LOCATED ON ARCHITECTURAL DRAWINGS	TABLE 1704.5.1
SPECIAL GRADING, EXCAVATION AND FILLING	A. FOUNDATION EXCAVATIONS AND BEARING STRATA B. BACKFILL BEHIND WALL OR SUPPORTING SLAB-ON-GRADE	TABLE 1704.7

### SHOP DRAWINGS

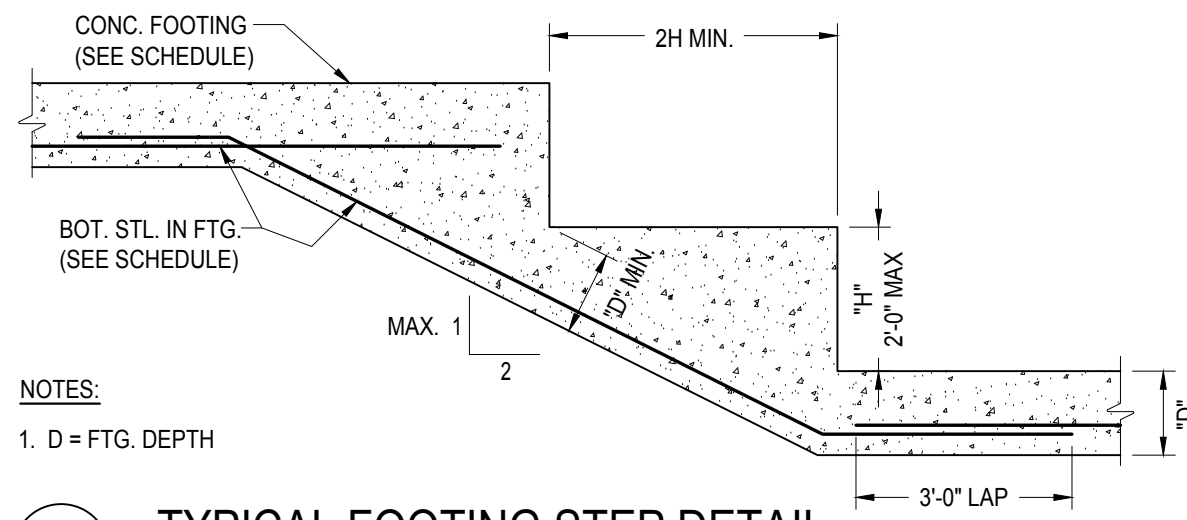
- SHOP DRAWINGS FOR THE FOLLOWING ITEMS SHALL BE SUBMITTED FOR REVIEW PRIOR TO FABRICATION:
  - REINFORCING STEEL
  - WOOD ROOF TRUSSES
- DIMENSIONS AND QUANTITIES ARE NOT REVIEWED BY THE ENGINEER OF RECORD. THEREFORE, THEY SHALL BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL REVIEW AND STAMP DRAWINGS PRIOR TO REVIEW BY THE ENGINEER OF RECORD. CONTRACTOR SHALL REVIEW DRAWINGS FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND OPERATIONS OF CONSTRUCTION, AND ALL SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO. SUBMITTALS SHALL INCLUDE ONE REPRODUCIBLE AND ONE COPY; REPRODUCIBLE WILL BE MARKED AND RETURNED.
- SHOP DRAWING SUBMITTALS PROCESSED BY THE ENGINEER ARE NOT CHANGE ORDERS. THE PURPOSE OF SHOP DRAWING SUBMITTALS BY THE CONTRACTOR IS TO DEMONSTRATE TO THE ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE DESIGN CONCEPT, BY INDICATING WHICH MATERIAL IS INTENDED TO BE FURNISHED AND INSTALLED, AND BY DETAILING THE INTENDED FABRICATION AND INSTALLATION METHODS. IF DEVIATIONS, DISCREPANCIES, OR CONFLICTS BETWEEN SHOP DRAWINGS SUBMITTALS AND THE CONTRACT DOCUMENTS ARE DISCOVERED EITHER PRIOR TO OR AFTER SHOP DRAWING SUBMITTALS ARE PROCESSED BY THE ENGINEER, THE DESIGN DRAWINGS AND SPECIFICATIONS SHALL CONTROL AND SHALL BE FOLLOWED.
- SHOP DRAWINGS FOR DEFERRED SUBMITTALS THAT ARE DEFINED AS DESIGN-BUILD COMPONENTS IN THE CONSTRUCTION DOCUMENTS SHALL INCLUDE THE DESIGNING PROFESSIONAL ENGINEER'S STAMP FOR THE JURISDICTION WHERE THE PROJECT IS LOCATED AND SHALL BE APPROVED BY THE COMPONENT DESIGNER PRIOR TO CURSORY REVIEW BY THE ENGINEER OF RECORD FOR LOADS IMPOSED ON THE BASIC STRUCTURE. THE COMPONENT DESIGNER IS RESPONSIBLE FOR CODE CONFORMANCE AND ALL NECESSARY CONNECTIONS NOT SPECIFICALLY CALLED OUT ON ARCHITECTURAL OR STRUCTURAL DRAWINGS. SHOP DRAWINGS SHALL INDICATE MAGNITUDE AND DIRECTION OF ALL LOADS IMPOSED ON BASIC STRUCTURE. DESIGN CALCULATIONS SHALL BE INCLUDED IN THE SUBMITTAL.

### WINTER CONSTRUCTION

- ALL SOIL BELOW FOOTINGS SHALL BE PROTECTED FROM FREEZING BY ALL NECESSARY MEANS (e.g. TEMPORARY HEAT AND BLANKETS, TEMPERATURE PROBES, ETC.).
- ALL CONCRETE SHALL BE PREVENTED FROM FREEZING AFTER POURING, AS DIRECTED BY THE CONCRETE SPECIAL INSPECTOR, BY ALL NECESSARY MEANS (e.g. TEMPORARY HEAT, BLANKETS, ETC.).
- ALL BACKFILL MUST BE PLACED ON UNFROZEN GROUND, IN UNFROZEN STATE AND COMPACTED PER THE GEOTECHNICAL REPORT.

### DEFERRED STRUCTURAL SUBMITTALS

- SOME STRUCTURAL SYSTEMS ARE DEFINED AS VENDOR-DESIGNED COMPONENTS PER THE STRUCTURAL DOCUMENTS. THESE ELEMENTS OF THE DESIGN ARE DEFERRED SUBMITTAL COMPONENTS AND HAVE NOT BEEN PERMITTED UNDER THE BASIC BUILDING APPLICATION. THE CONTRACTOR WILL



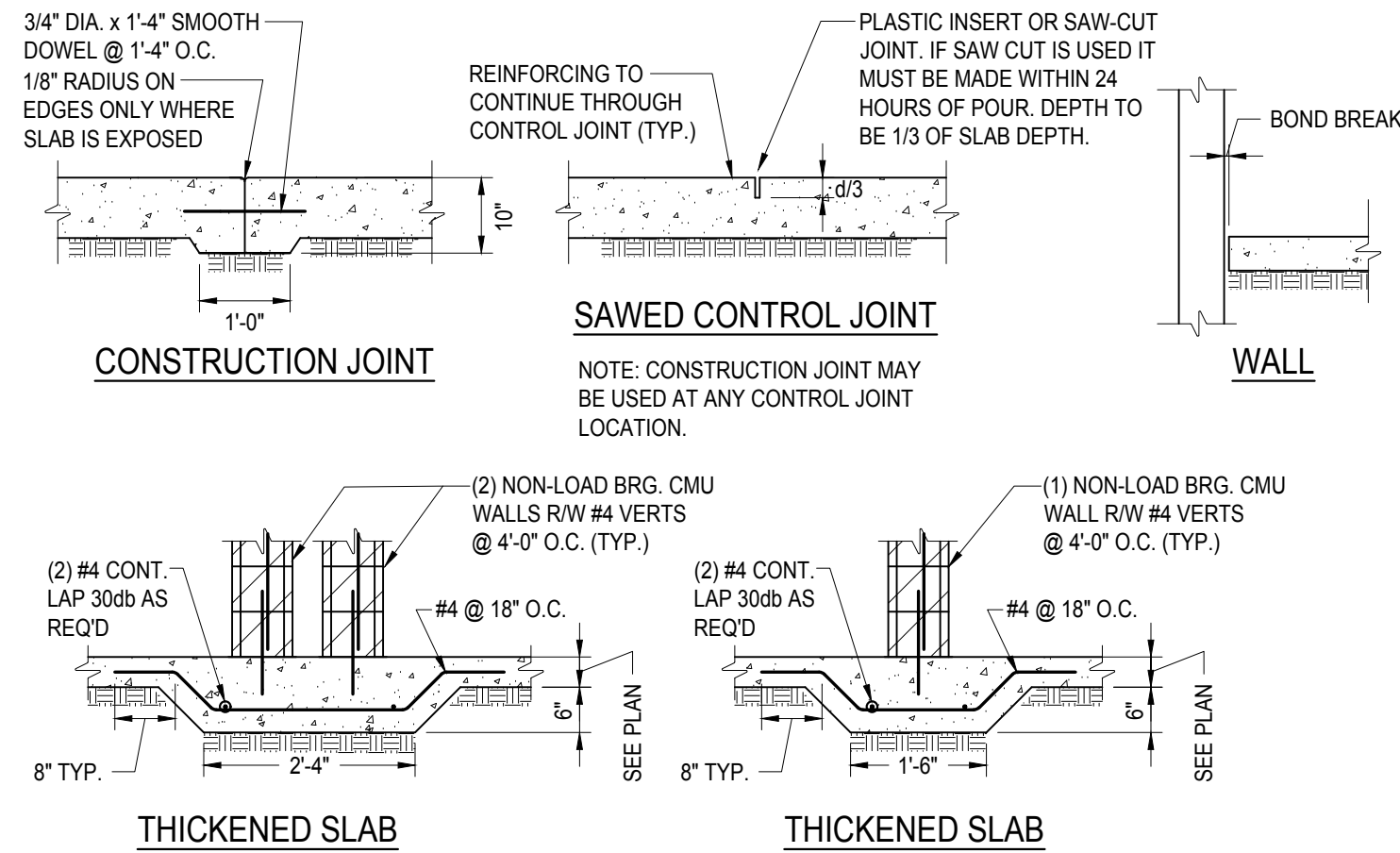
**NOTES:**

1. D = FTG. DEPTH

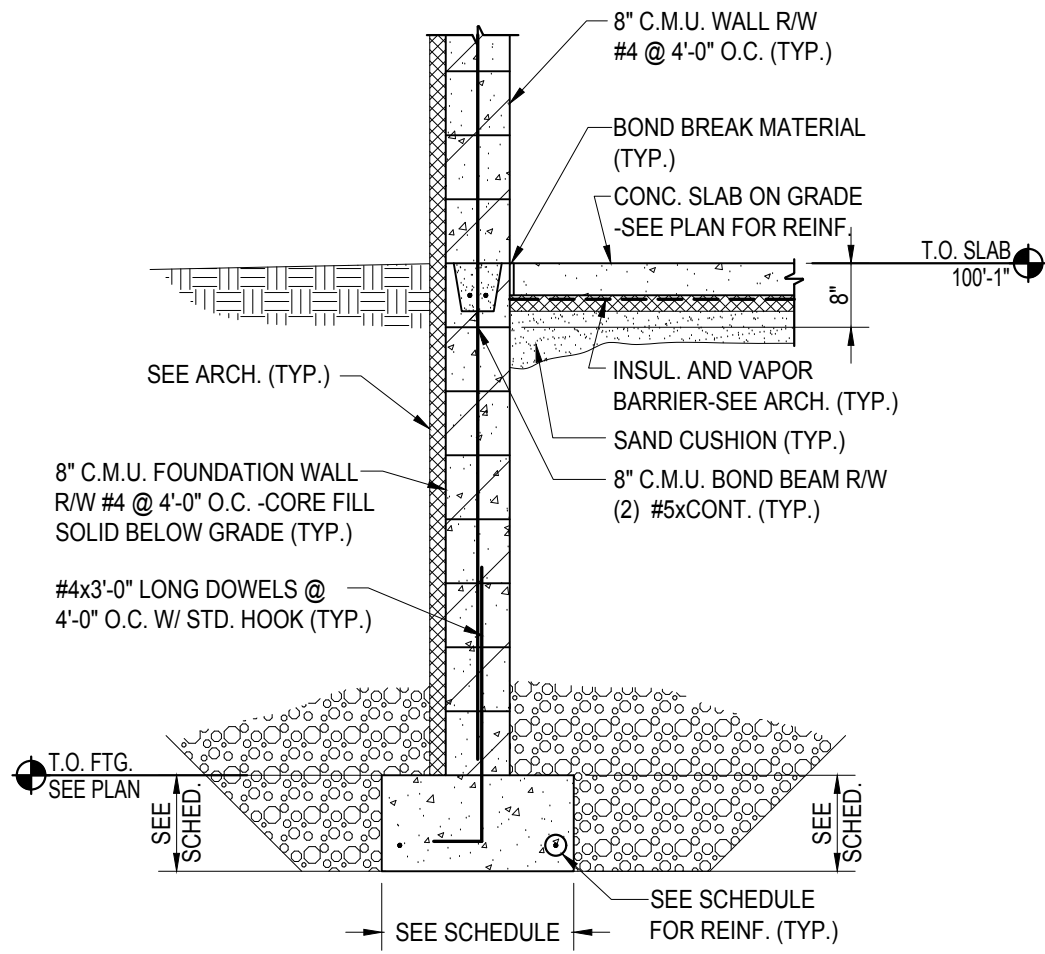
**3 TYPICAL FOOTING STEP DETAIL**  
S2.0 NOT TO SCALE

**NOTES:**

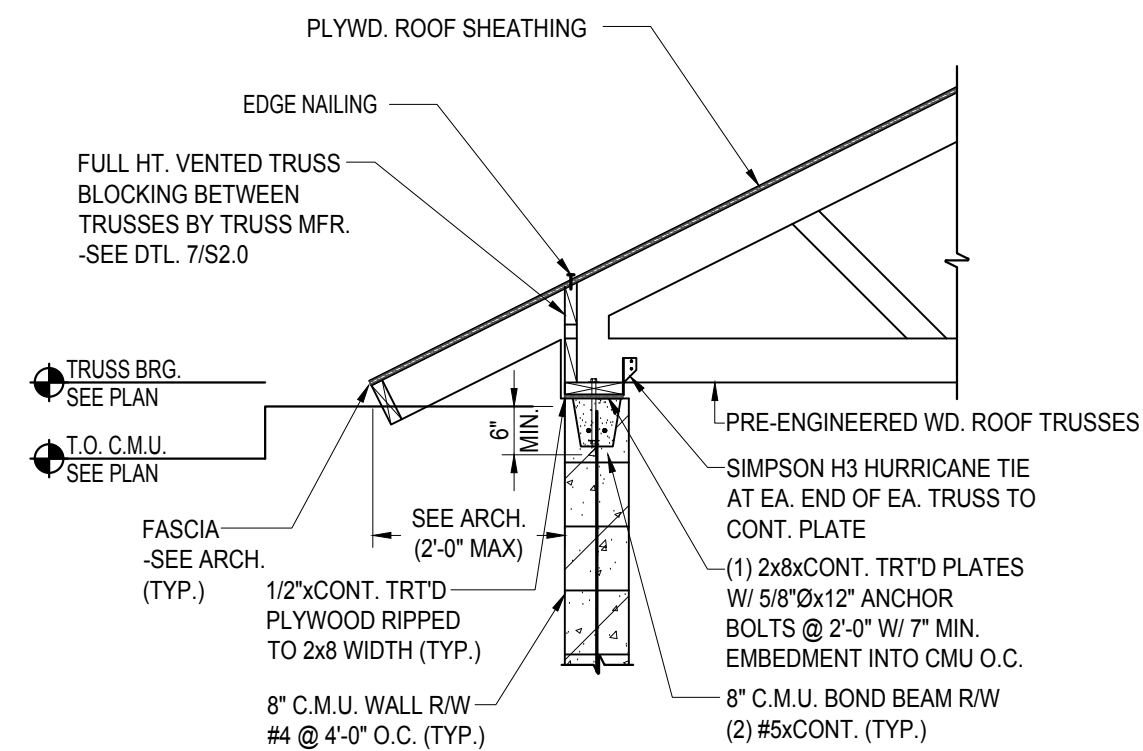
- SEE PLAN FOR SLAB ON GRADE THICKNESS.
- LOCATE CONSTRUCTION JOINTS UNDER PARTITIONS OR ON COLUMN LINES. PROVIDE CONTROL JOINTS ON ALL COLUMN LINES AND AT 30x SLAB THICKNESS MAXIMUM SPACING EACH WAY IN BETWEEN. PROVIDE CONTROL JOINTS AT ALL RE-ENTRANT CORNERS.
- SAWED JOINTS SHALL BE MADE AS SOON AS THE JOINT CAN BE CUT WITHOUT EDGES RAVELING AND WITHIN 24 HOURS OF SLAB PLACEMENT. SAWED JOINTS SHALL BE FILLED WITH SEALANT AS COORDINATED WITH THE ARCHITECT.
- SEE GENERAL NOTES FOR SPECIAL CONCRETE MIX DESIGN.
- FOLLOW RECOMMENDATIONS GIVEN IN GEOTECHNICAL REPORT IN STRICT ACCORDANCE IN REGARDS TO THE USE OF VAPOR BARRIER, CRUSHED STONE AND SOIL COMPACTION.



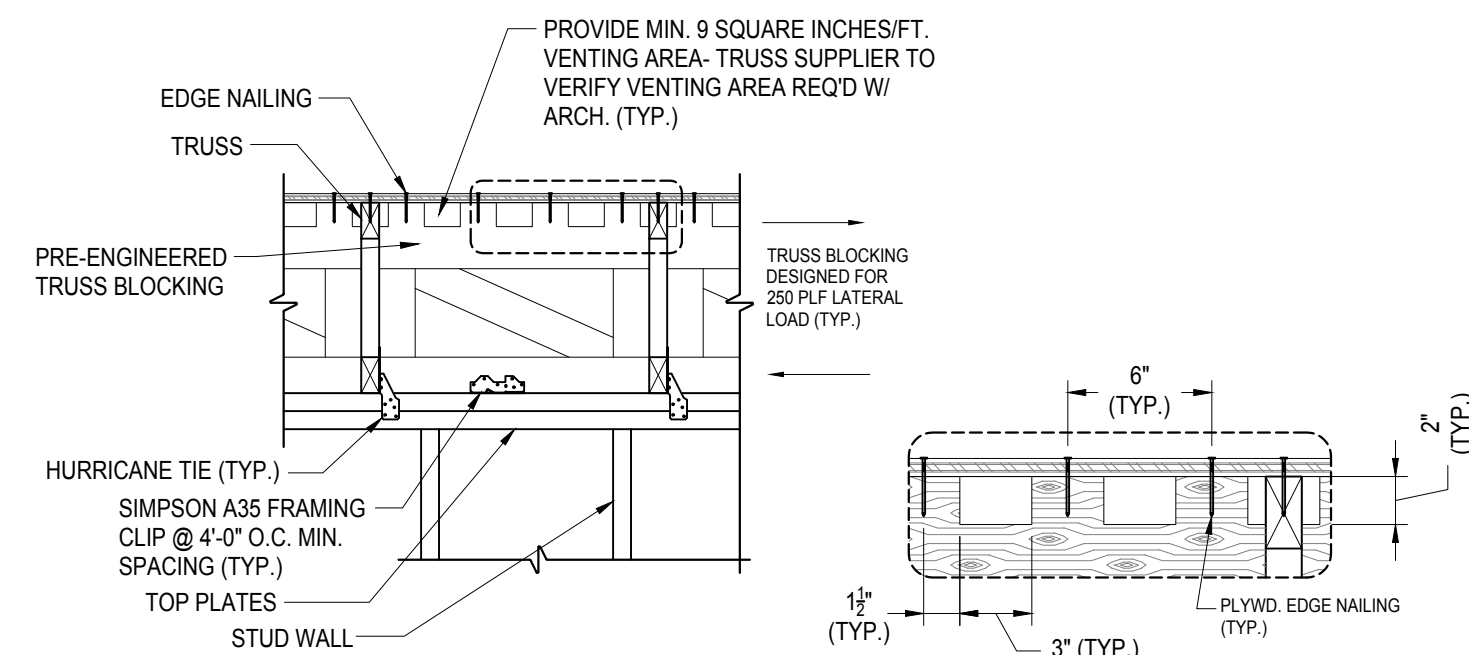
**4 TYPICAL FIBER REINFORCED SLAB ON GRADE**  
S2.0 NOT TO SCALE



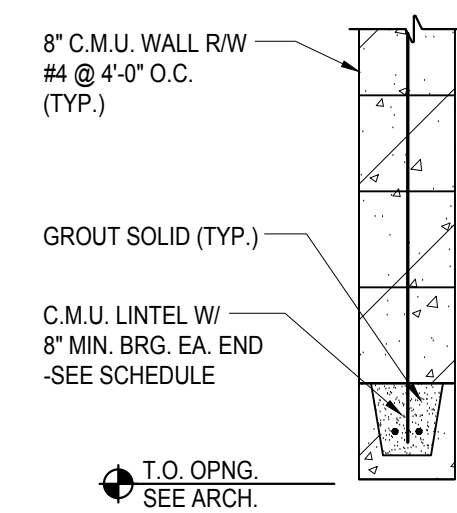
**5 SECTION @ FOUNDATION**  
S2.0 1/2" = 1'-0"



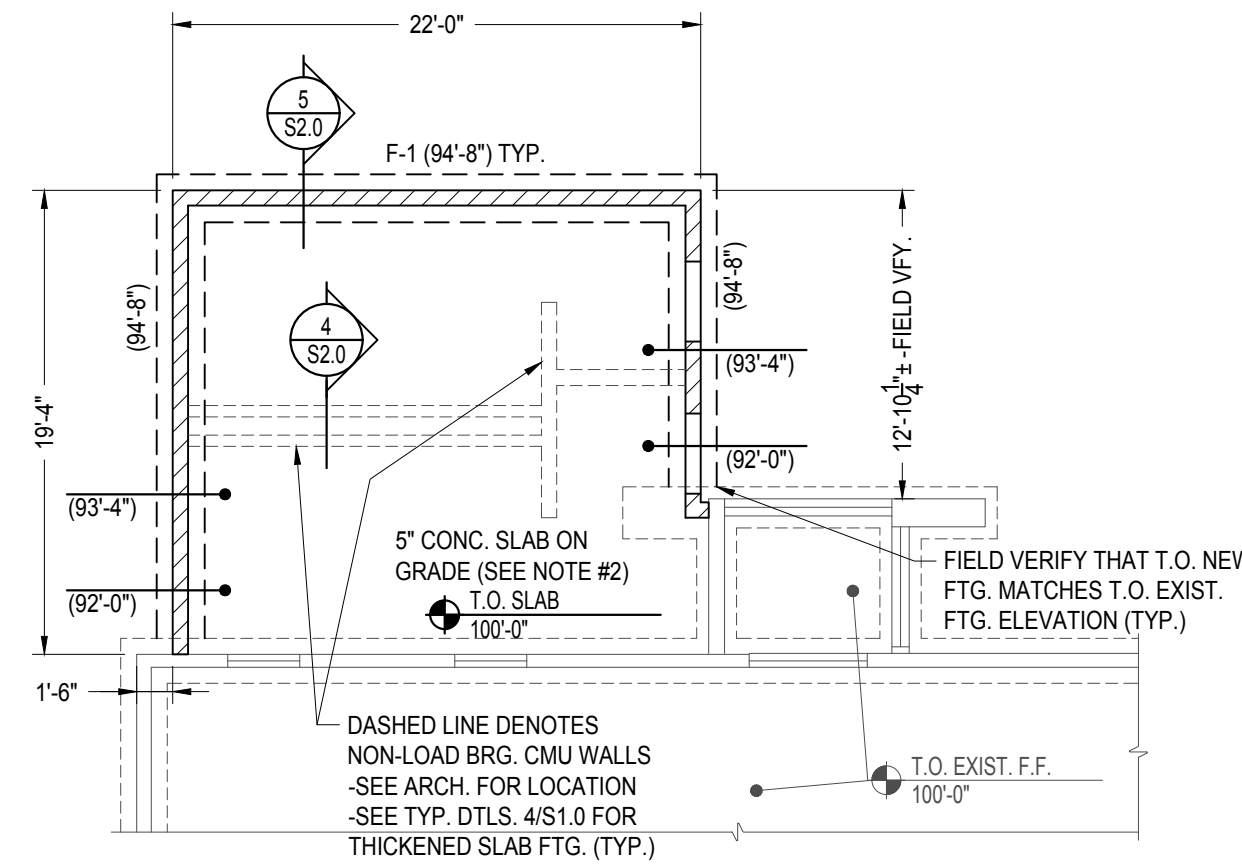
**6 TYPICAL EAVE DETAIL @ CONC. OR CMU WALL**  
S2.0 1/2" = 1'-0"



**7 VENTED TRUSS BLOCKING @ EAVE**  
S2.0 3/4" = 1'-0"



**8 SECTION @ LINTEL**  
S2.0 NOT TO SCALE

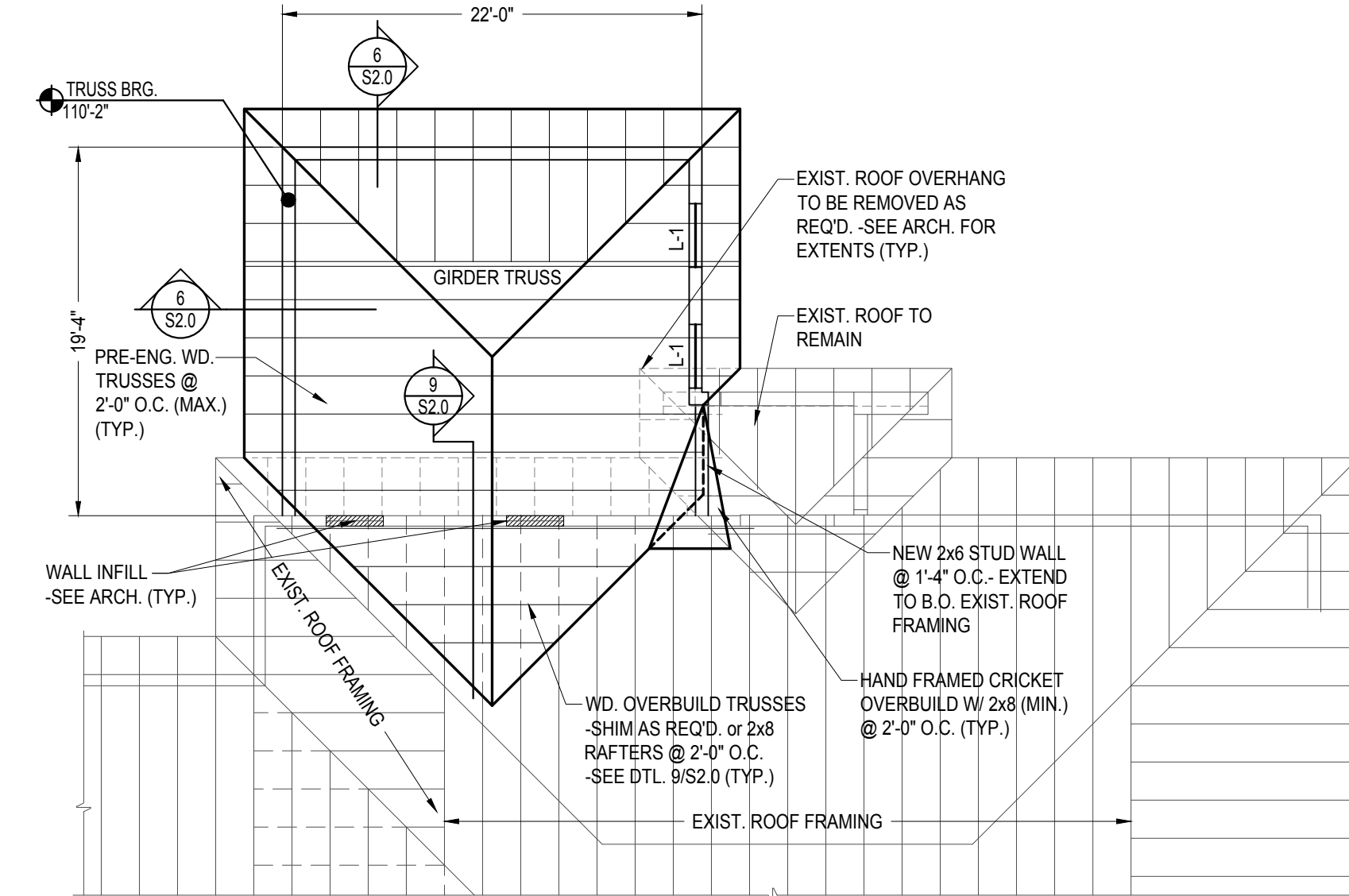


**1 FOUNDATION PLAN**  
S2.0 1/8" = 1'-0"

**FOUNDATION PLAN NOTES:**

- REFERENCE FLOOR ELEVATION IS 100'-0". TOP OF SLAB ON GRADE IS AT THE REFERENCE FLOOR ELEVATION UNLESS NOTED OTHERWISE.
- SEE PLAN FOR SLAB ON GRADE THICKNESS. FLOOR SLAB TO BE REINFORCED WITH SYNTHETIC FIBERS PER MANUFACTURER'S RECOMMENDATIONS. SEE TYPICAL FIBER REINFORCED SLAB ON GRADE DETAILS. SLAB ON GRADE SHALL BE PLACED ATOP COMPACTED STRUCTURAL FILL IN ACCORDANCE WITH THE GEOTECHNICAL REPORT.
- SEE 4/S2.0 FOR TYPICAL CONTROL/CONSTRUCTION JOINT DETAIL & JOINT SPACING REQUIREMENTS.
- (XXX-X) INDICATES TOP OF FOOTING ELEVATION. ALL FOOTINGS SHALL BEAR ON UNDISTURBED SUBGRADE OR STRUCTURAL FILL IN ACCORDANCE WITH THE GEOTECHNICAL REPORT.
- ALL NEW CONCRETE FOOTINGS SHALL BE TYPE 'F-1' PER FOOTING SCHEDULE.
- REPRESENTS FOOTING STEP LOCATION. SEE TYPICAL DTL. 3/S2.0.
- SEE ARCHITECTURAL AND CIVIL DRAWINGS FOR SIDEWALKS, PAVING, AND SITE DETAILS AT BUILDING EXTERIOR.
- REFERENCE ALL CONSTRUCTION DOCUMENTS FOR SIZE, EXTENT AND LOCATION OF CONCRETE CURBS, HOUSEKEEPING PADS, CMU WALLS, PLANTER WALLS, BOLLARDS, EDGE ANGLES, SLAB PENETRATIONS AND SLAB RECESSES. REINFORCE PER TYPICAL DETAILS.
- CONTRACTOR SHALL FIELD VERIFY ALL EXIST. DIMENSIONS & CONDITIONS. T.O. SLAB ELEVATIONS & T.O. FTG. ELEVATIONS. NOTIFY ARCHITECT / ENGINEER WITH ANY DISCREPANCIES.

FOOTING SCHEDULE		
MARK	DESCRIPTION	REMARKS
F-1	2'-0" WIDE x 1'-0" DEEP x CONT. FTG. R/W (2) #5xCONT.	SEE DTL. 5/S2.0

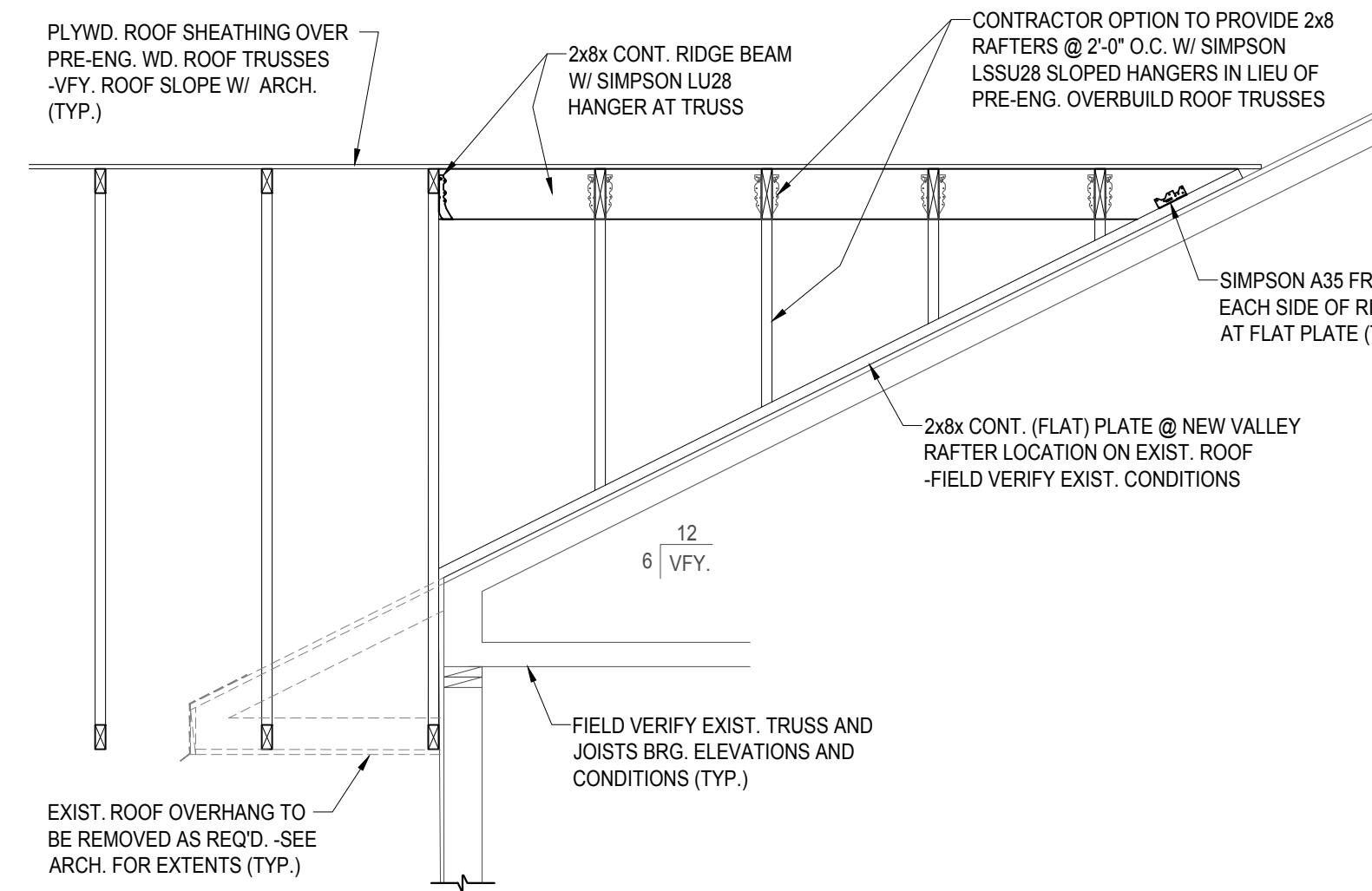


**2 ROOF FRAMING PLAN**  
S2.0 1/8" = 1'-0"

**ROOF FRAMING NOTES:**

- TRUSS BEARING ELEVATION AS NOTED ON PLAN IS RELATIVE TO T.O. SLAB ELEVATION = 100'-0"
- ROOF DECK IS 5/8" EXTERIOR PLYWOOD SHEATHING SPANNING TO SUPPORT FRAMING.
- "L" INDICATES LINTEL BEAM. SEE LINTEL SCHEDULE FOR MEMBER SIZES. VERIFY SIZE AND LOCATION WITH ARCHITECTURAL.
- FIELD VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. NOTIFY ENGINEER WITH ANY DISCREPANCIES.
- TRUSS BRIDGING AND BRACING TO BE SUPPLIED BY TRUSS SUPPLIER. SEE TRUSS SHOP DRAWINGS FOR SIZE, LOCATION AND ORIENTATION.

LINTEL SCHEDULE		
MARK	DESCRIPTION	REMARKS
L-1	8"x8" DEEP C.M.U. LINTEL R/W (2) #5xCONT.	SEE DTL. 8/S2.0



**9 SECTION @ EXISTING ROOF OVERBUILD**  
S2.0 1/2" = 1'-0"



- ARCHITECTURE
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 fax: 218.722.8483



**CITY OF DULUTH  
LAFAYETTE  
COMMUNITY CENTER**



**DULUTH, MN**

PROJECT NO. 17-080  
 DATE 05-MAY-2017  
 DRAWN GDB  
 REVISIONS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Mark R. Udd  
 MARK R. UDD 40443  
 ENGINEER REG. NO.

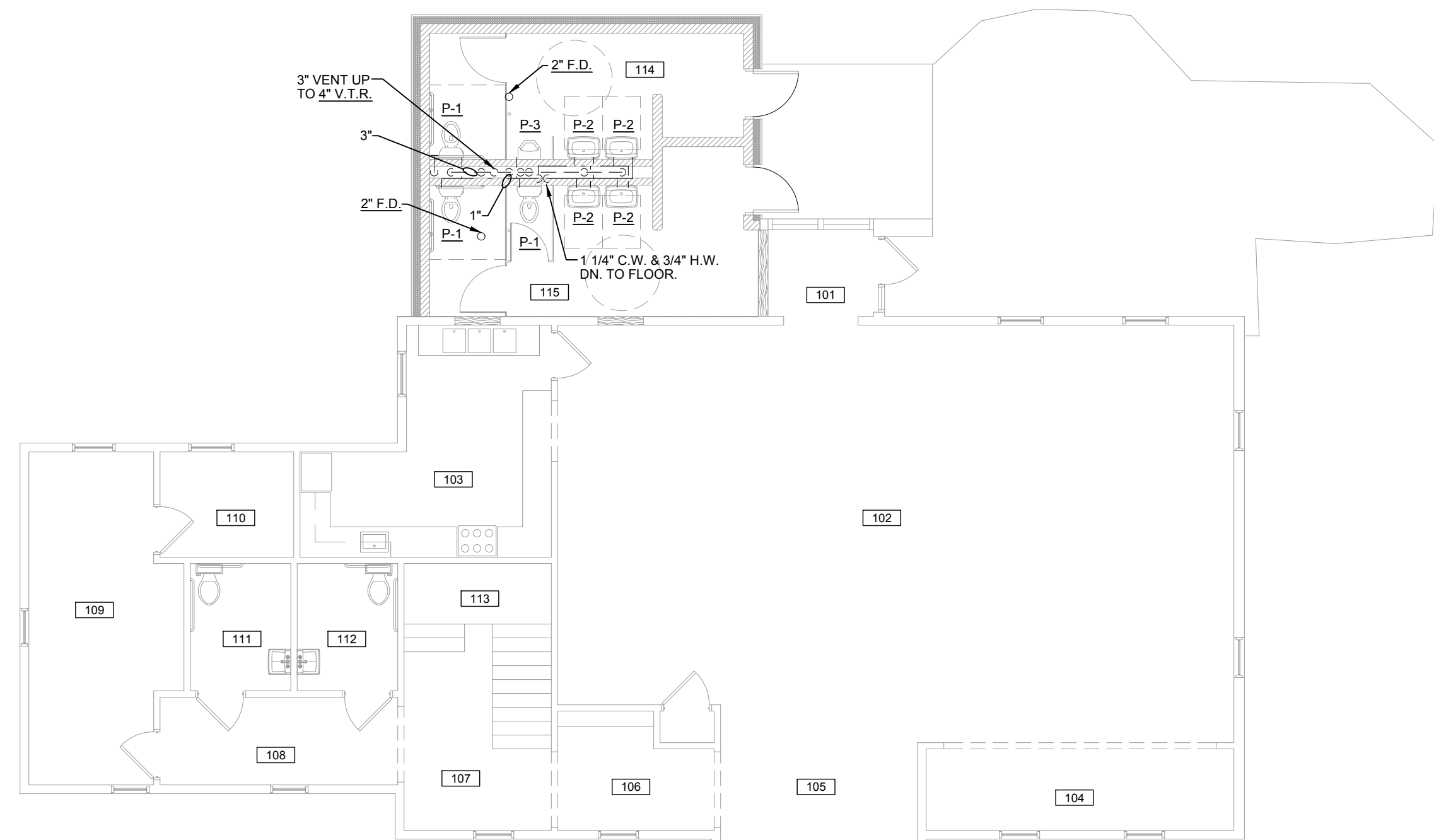
**FOUNDATION &  
ROOF FRAMING  
PLANS/  
SECTIONS/DETAILS**

**S  
2.0**

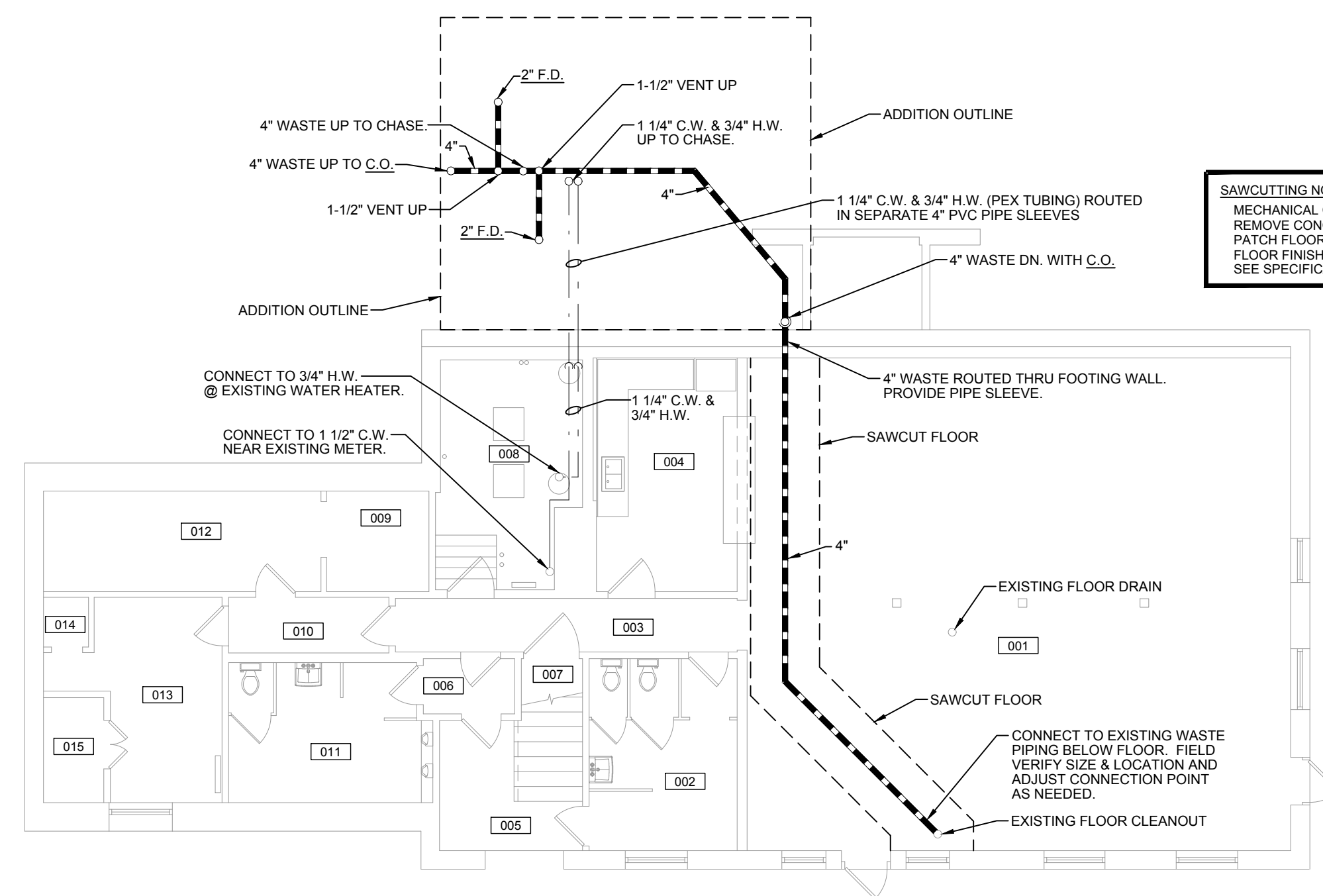
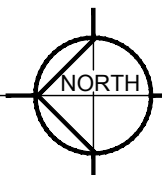
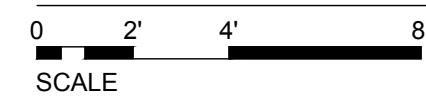


I HEREBY CERTIFY THAT THIS PLAN,  
 SPECIFICATION, OR REPORT WAS  
 PREPARED BY ME OR UNDER MY  
 DIRECT SUPERVISION, AND THAT I  
 AM A DULY LICENSED PROFESSIONAL  
 ENGINEER UNDER THE LAWS  
 OF THE STATE OF MINNESOTA.

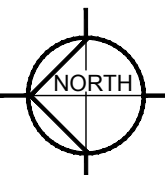
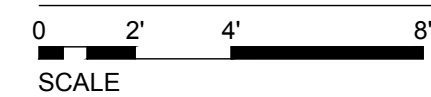
*Michael R. Washburn*  
 MICHAEL R. WASHBURN 52709  
 ENGINEER REG. NO.



FIRST FLOOR PLUMBING PLAN



BASEMENT PLUMBING PLAN



**SAWCUTTING NOTE:**  
 MECHANICAL CONTRACTOR TO SAWCUT FLOOR,  
 REMOVE CONCRETE, EXCAVATE, BACKFILL AND  
 PATCH FLOOR TO MATCH EXISTING CONCRETE.  
 FLOOR FINISHES BY GENERAL CONTRACTOR.  
 SEE SPECIFICATIONS FOR REQUIREMENTS.


PLUMBING FIXTURE SCHEDULE

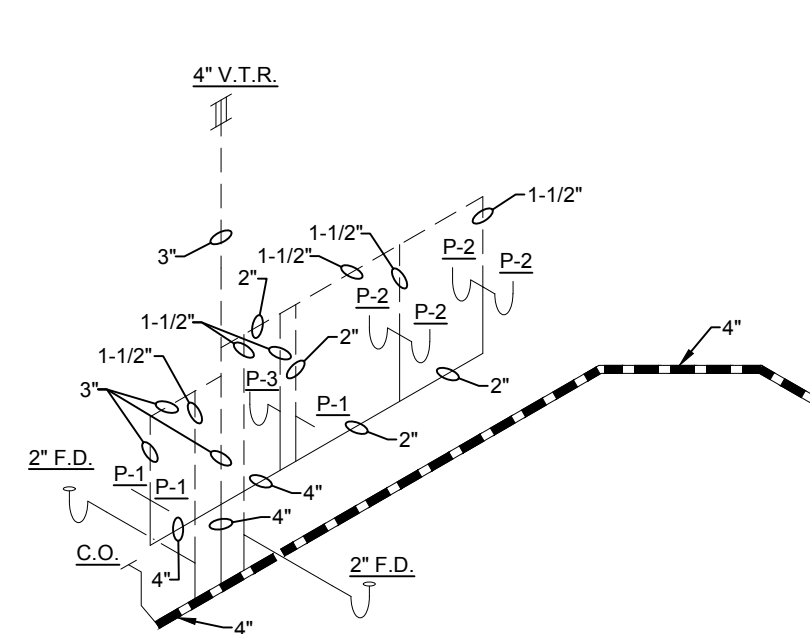
FIXTURE	CW	HW	WASTE	VENT
P-1 W.H. F.T. WATER CLOSET	1/2"	4"	2"	
P-2 WALL HUNG LAVATORY	1/2"	1/2"	1 1/2"	1 1/2"
P-3 W.H. F.V. URINAL	3/4"		2"	1 1/2"

ROOM SCHEDULE

NUMBER	NAME	NUMBER	NAME
001	RECREATION	101	VESTIBULE
002	WOMEN'S TOILET	102	AUDITORIUM
003	HALL	103	KITCHEN
004	KITCHEN	104	STORAGE
005	STAIR	105	ENTRY
006	VESTIBULE	106	COATS
007	STORAGE	107	STAIR LANDING
008	MECHANICAL	108	HALL
009	STORAGE	109	OFFICE
010	HALL	110	OFFICE
011	MEN'S TOILET	111	MEN'S TOILET
012	STORAGE	112	WOMEN'S TOILET
013	ELECTRICAL	113	STAIR LANDING
014	CLOSET	114	MEN'S TOILET
015	CLOSET	115	WOMEN'S TOILET

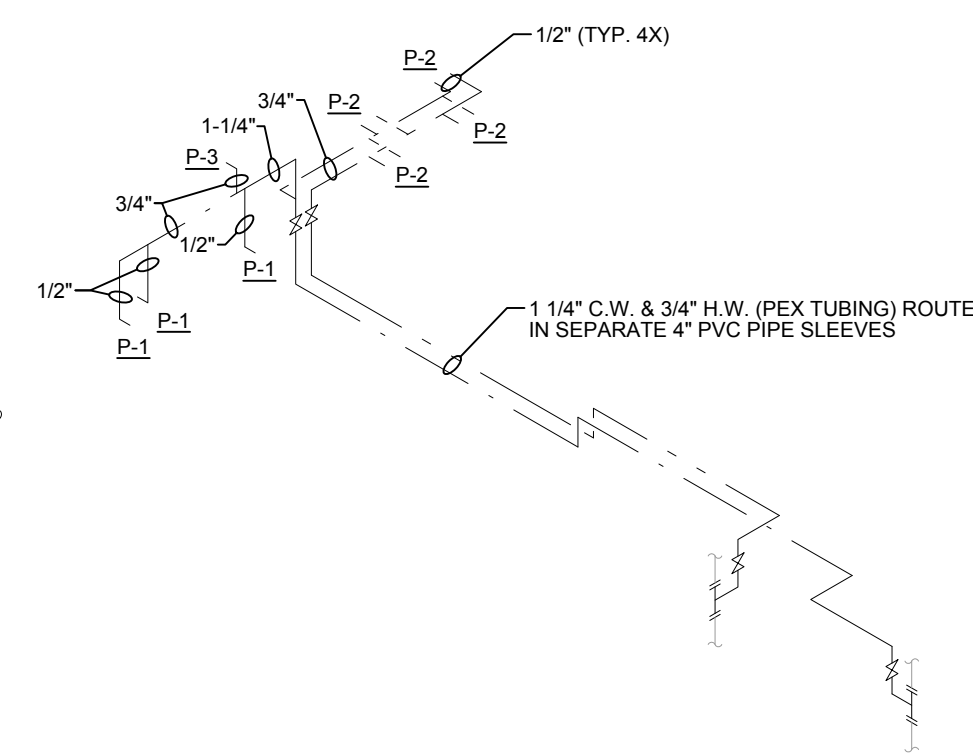
GENERAL CONSTRUCTION NOTES:

- CONTRACTOR SHALL COORDINATE WITH OWNER AND OTHER TRADES IN ORDER TO AVOID ALL INTERFERENCE.
- CONTRACTOR SHALL VERIFY ALL EXISTING SIZES, FUNCTIONS, LOCATIONS AND CONDITIONS PRIOR TO BID. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES.
- CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY FITTINGS AND/OR APPURTENANCES FOR THE COMPLETE INSTALLATION, OPERATION AND CONNECTION OF THE EQUIPMENT SHOWN AND/OR SPECIFIED.
- CONTRACTOR SHALL INSTALL EQUIPMENT, PIPING AND DUCTWORK IN SUCH A MANNER AS TO AVOID ALL INTERFERENCE WITH THE NEW AND EXISTING EQUIPMENT AND SYSTEMS.
-  INDICATES ONE HOUR RATED PARTITIONS, UNLESS NOTED. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIRE STOPPING ALL NEW PENETRATIONS OF FLOORS, WALLS AND CEILINGS (NEW AND EXISTING CONSTRUCTION) WHERE NEW PIPING AND DUCTWORK PASS THROUGH FIRE RATED PARTITIONS.
- ALL OPENINGS AND PENETRATIONS REQUIRED FOR INSTALLATIONS SHOWN ON THE DRAWINGS SHALL BE BY THIS CONTRACTOR, PATCH AND PAINT TO MATCH EXISTING.
- ALL DUCTWORK MUST BE FIELD VERIFIED PRIOR TO FABRICATION.



WASTE & VENT RISER

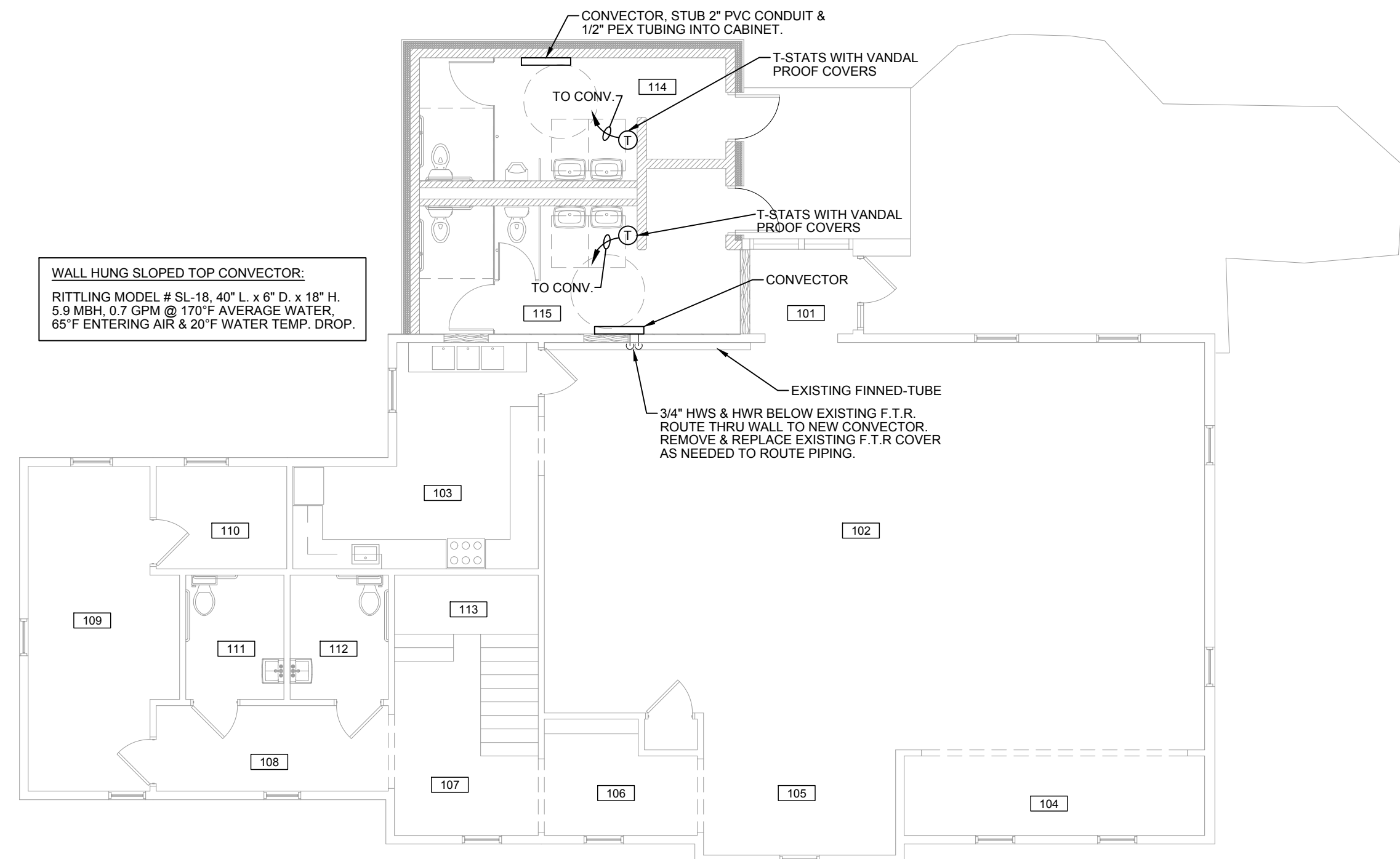
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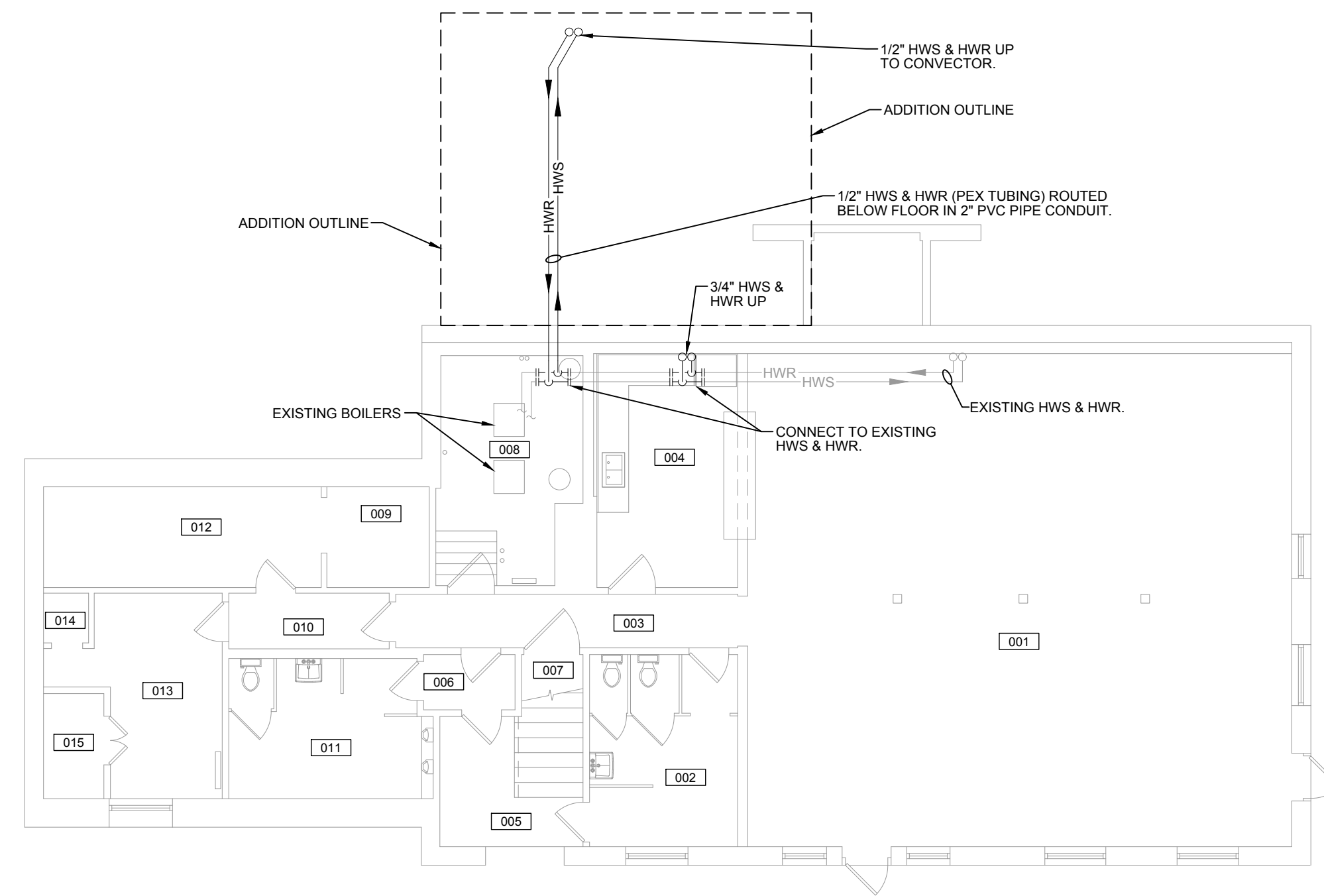
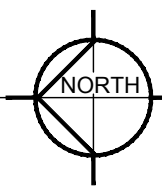
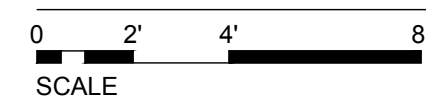
WATER RISER

NO SCALE

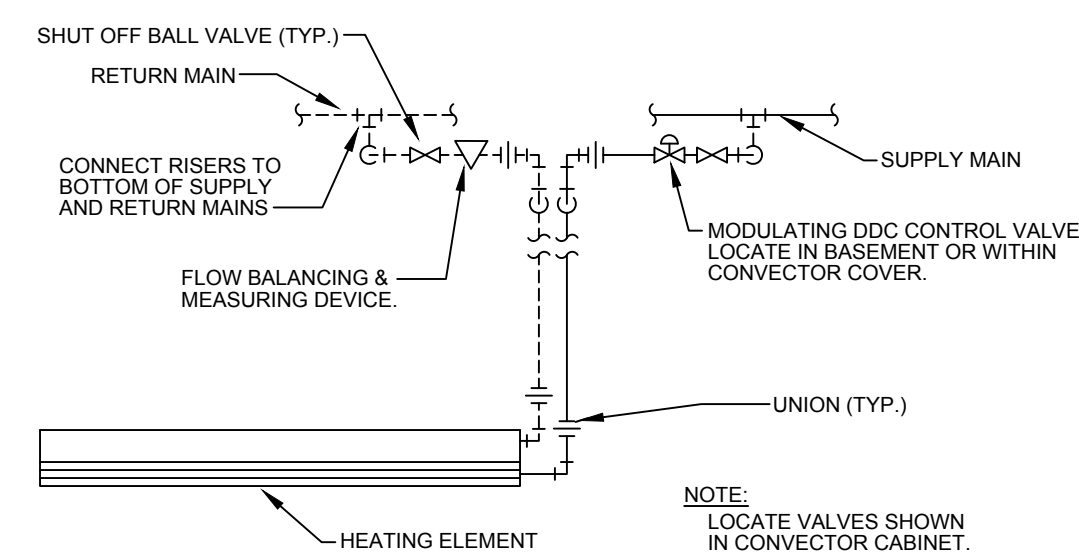
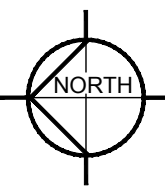




FIRST FLOOR HEATING PLAN

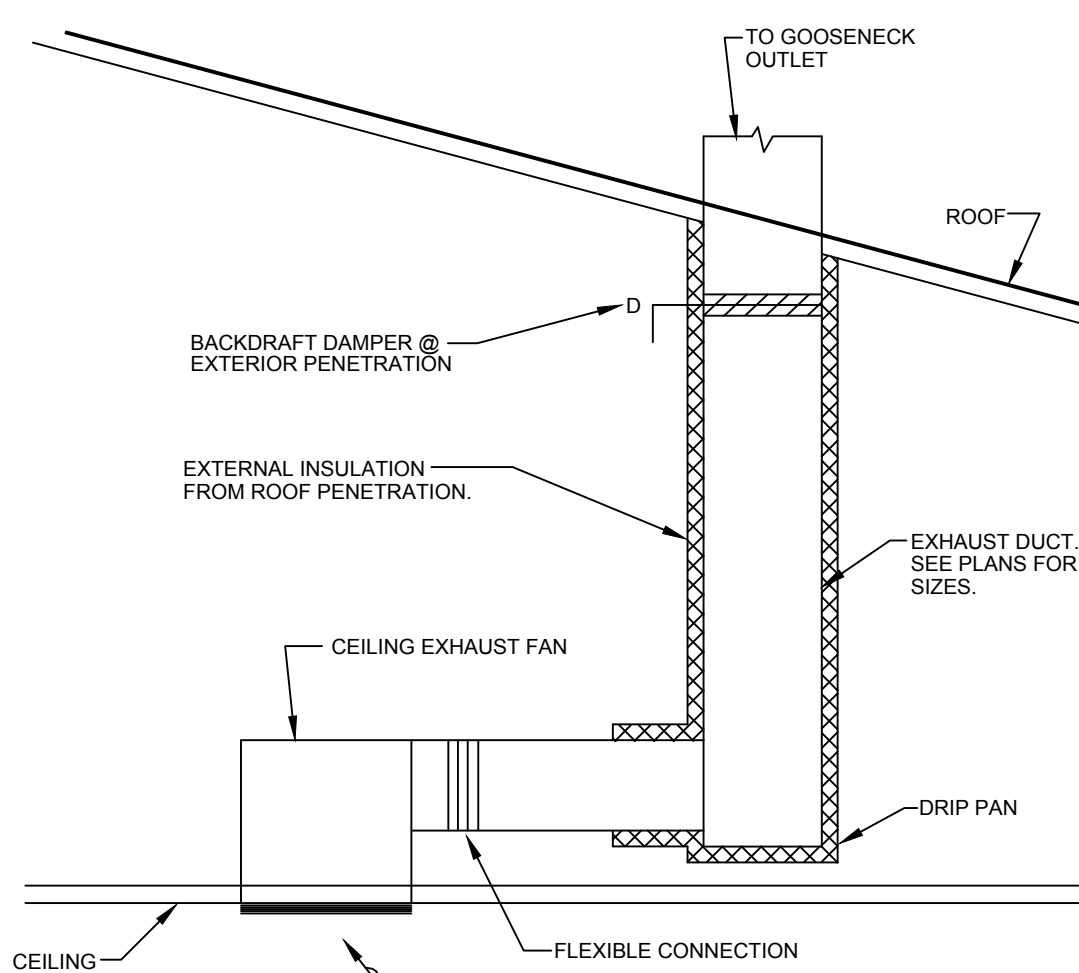


BASEMENT HEATING PLAN



CONVECTOR PIPING DETAIL

NO SCALE

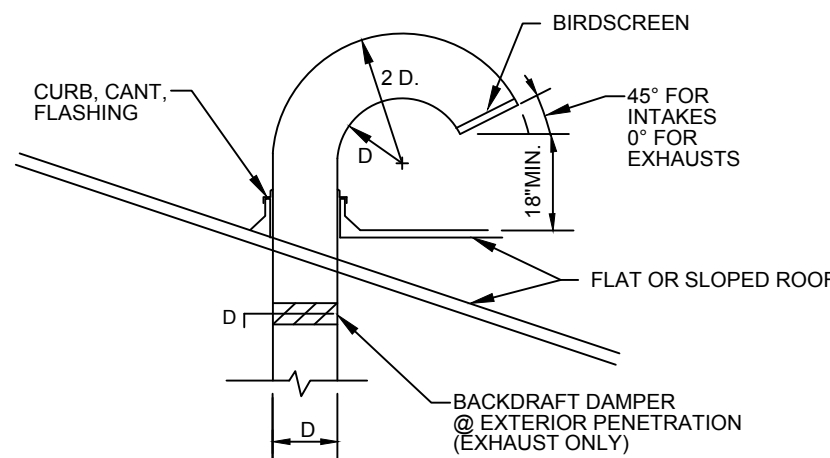


EXHAUST FAN DETAIL

NO SCALE

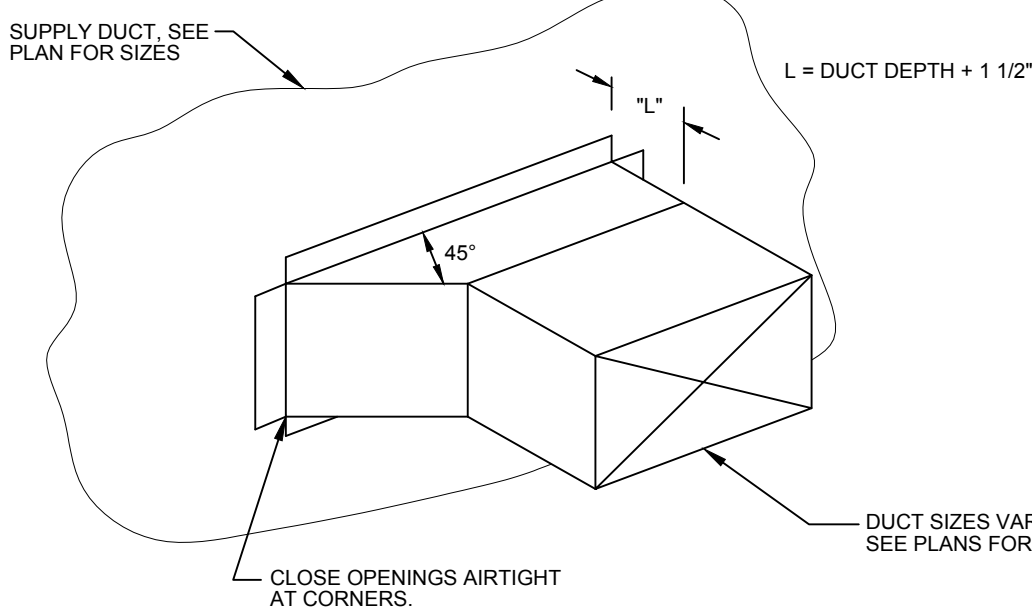
CEILING EXHAUST FAN (EQUIPMENT #1):

COOK "GEMINI" MODEL # GC-164, 150 CFM @ 3/8" STATIC PRESSURE, 3.0 SONES.  
 PROVIDE STANDARD DISCONNECT, BACKDRAFT DAMPER, VIBRATION ISOLATORS,  
 WHITE STEEL GRILLE WITH TAMPER PROOF SCREWS AND FAN SPEED CONTROLLER.  
 FANS TO BE OPERATED WITH LIGHTS CONTROLLED BY OCCUPANCY SENSORS.  
 ELECTRICAL: 112 WATTS, 120 VOLT, 1Ø.



TYPICAL GOOSENECK

NO SCALE



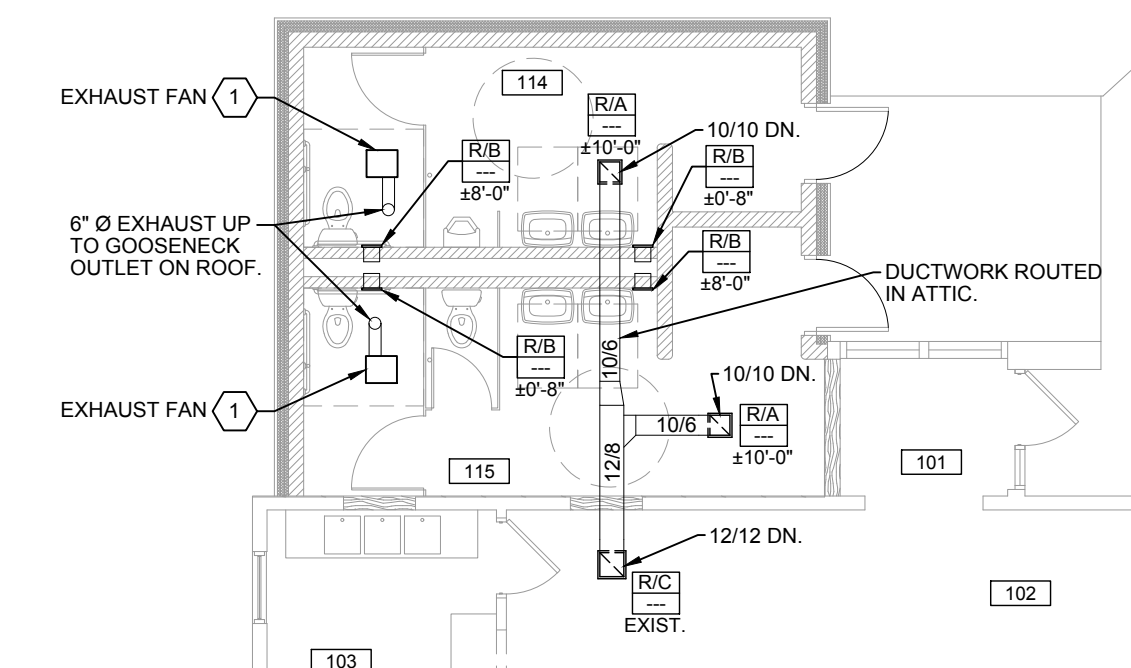
EXPANDED AREA TAKE-OFF DETAIL

NO SCALE

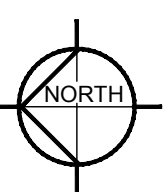
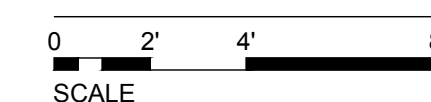
MARK	FACE SIZE L x W	CFM RANGE	USE		TYPE		LOCATION		MOUNTING HEIGHT A.F.F. BOTT DUCT ORG	FINISH	MODEL NUMBER TUTTLE & BAILEY NUMBERS GIVEN AS A MODEL		
			S = SUPPLY	R = RETURN	R = RELIEF	E = EXHAUST	REGISTER	GRILLE				DIFFUSER	LINEAR
A	12 x 12	----		X					X		SEE PLAN	W	CRE500 1010 SF - 01 -- WH
B	10 x 10	----		X					X		SEE PLAN	W	T70 08 08 SF - 01 -- WH
C	14 x 14	----		X					X		SEE PLAN	W	CRE500 1212 SF - 01 -- WH

NOTES:

1. "W" - INDICATES FINISH TO BE BAKED ENAMEL WHITE.
2. ALL RETURNS TO BE BALANCED AT SUPPLY AIR VOLUMES.
3. "X" INDICATES WHERE CONTRACTOR SHALL PAINT ALL INTERIOR DUCT FLAT BLACK WHICH IS VISIBLE THRU THE GRILLE.



FIRST FLOOR VENTILATION PLAN



ROOM SCHEDULE

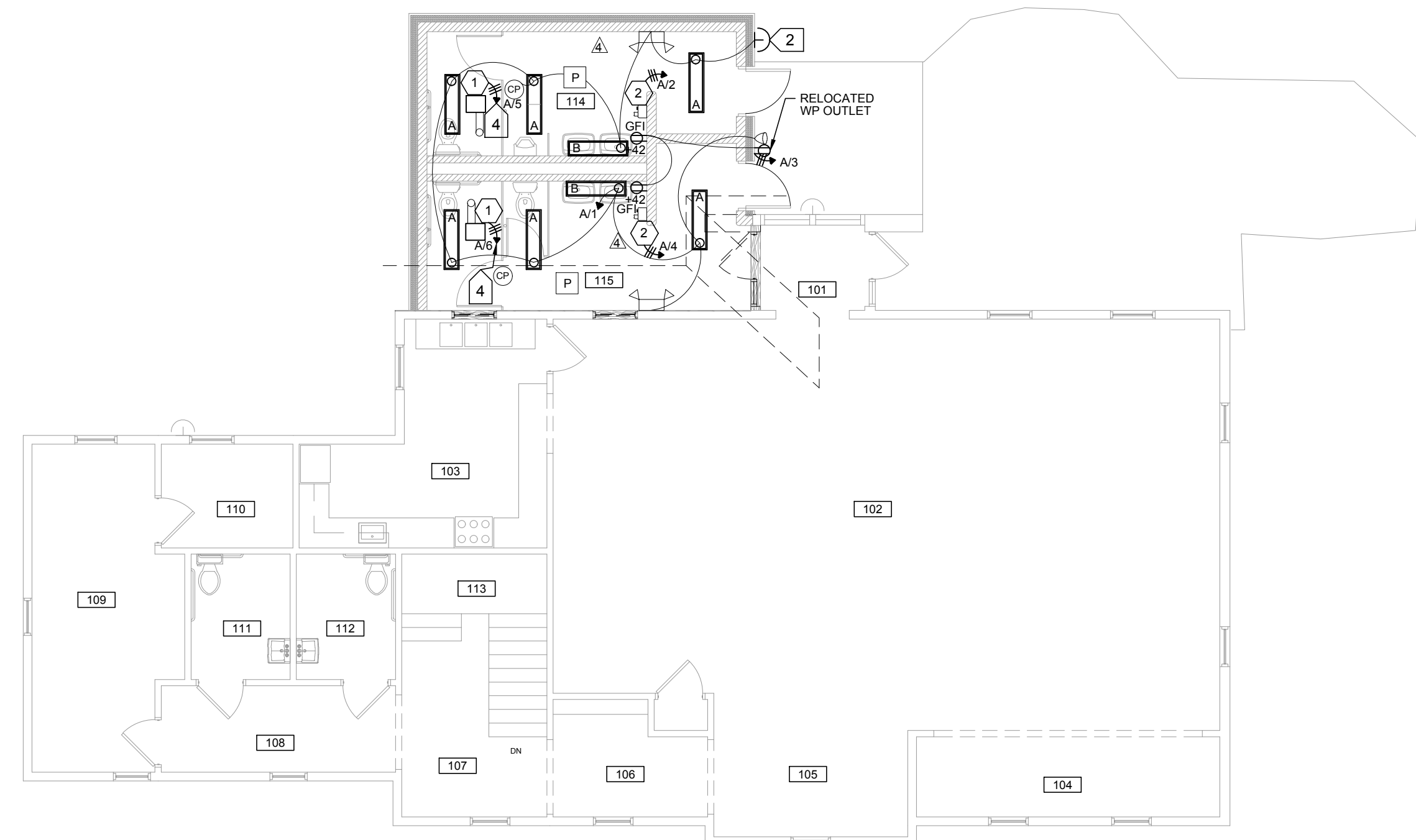
NUMBER	NAME	NUMBER	NAME
001	RECREATION	101	VESTIBULE
002	WOMEN'S TOILET	102	AUDITORIUM
003	HALL	103	KITCHEN
004	KITCHEN	104	STORAGE
005	STAIR	105	ENTRY
006	VESTIBULE	106	COATS
007	STORAGE	107	STAIR LANDING
008	MECHANICAL	108	HALL
009	STORAGE	109	OFFICE
010	HALL	110	OFFICE
011	MEN'S TOILET	111	MEN'S TOILET
012	STORAGE	112	WOMEN'S TOILET
013	ELECTRICAL	113	STAIR LANDING
014	CLOSET	114	MEN'S TOILET
015	CLOSET	115	WOMEN'S TOILET

GENERAL CONSTRUCTION NOTES:

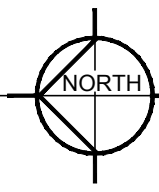
1. CONTRACTOR SHALL COORDINATE WITH OWNER AND OTHER TRADES IN ORDER TO AVOID ALL INTERFERENCE.
2. CONTRACTOR SHALL VERIFY ALL EXISTING SIZES, FUNCTIONS, LOCATIONS AND CONDITIONS PRIOR TO BID. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES.
3. CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY FITTINGS AND/OR APPURTENANCES FOR THE COMPLETE INSTALLATION, OPERATION AND CONNECTION OF THE EQUIPMENT SHOWN AND/OR SPECIFIED.
4. CONTRACTOR SHALL INSTALL EQUIPMENT, PIPING AND DUCTWORK IN SUCH A MANNER AS TO AVOID ALL INTERFERENCE WITH THE NEW AND EXISTING EQUIPMENT AND SYSTEMS.
5. **MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIRE STOPPING ALL NEW PENETRATIONS OF FLOORS, WALLS AND CEILINGS (NEW AND EXISTING CONSTRUCTION) WHERE NEW PIPING AND DUCTWORK PASS THROUGH FIRE RATED PARTITIONS.**
6. ALL OPENINGS AND PENETRATIONS REQUIRED FOR INSTALLATIONS SHOWN ON THE DRAWINGS SHALL BE BY THIS CONTRACTOR, PATCH AND PAINT TO MATCH EXISTING.
7. ALL DUCTWORK MUST BE FIELD VERIFIED PRIOR TO FABRICATION.

OCCUPANCY SENSOR LEGEND - LIGHTING CONTROL OPERATIONS

- CP STANDARD RANGE 360° SENSOR, CEILING MOUNT, LOW VOLTAGE, DUAL TECHNOLOGY (PDT)
- 4 AUTOMATIC ON - AUTOMATIC OFF (NO OVERRIDE)

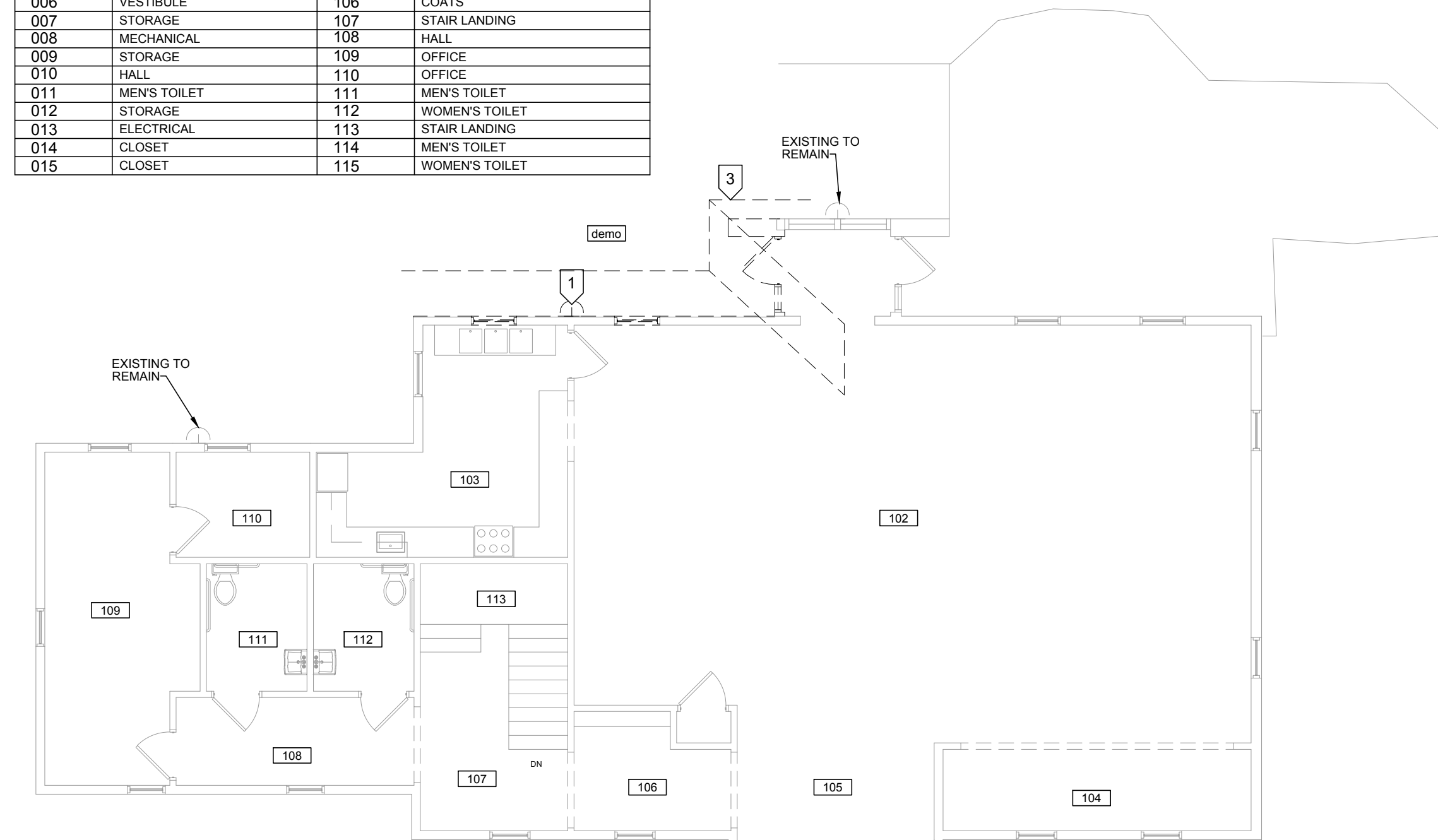


FIRST FLOOR LIGHTING & POWER PLAN

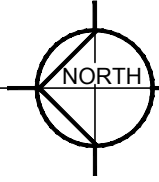
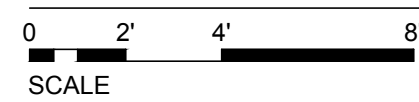


ROOM SCHEDULE			
NUMBER	NAME	NUMBER	NAME
001	RECREATION	101	VESTIBULE
002	WOMEN'S TOILET	102	AUDITORIUM
003	HALL	103	KITCHEN
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009	STORAGE	109	OFFICE
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011	MEN'S TOILET	111	MEN'S TOILET
012	STORAGE	112	WOMEN'S TOILET
013	ELECTRICAL	113	STAIR LANDING
014	CLOSET	114	MEN'S TOILET
015	CLOSET	115	WOMEN'S TOILET

- KEYED NOTE:
- DISCONNECT, REMOVE, & RELOCATE EXISTING LIGHT. EXTEND CONDUIT & WIRE AS REQUIRED. PROVIDE NEW J-BOX IF NEEDED.
  - NEW LOCATION FOR EXISTING LIGHT. RECONNECT TO EXISTING CIRCUIT.
  - DISCONNECT, REMOVE & RELOCATE EXISTING WP OUTLET. PROVIDE & EXTEND CONDUIT & WIRE AS REQUIRED.
  - SWITCH WITH LIGHTS.

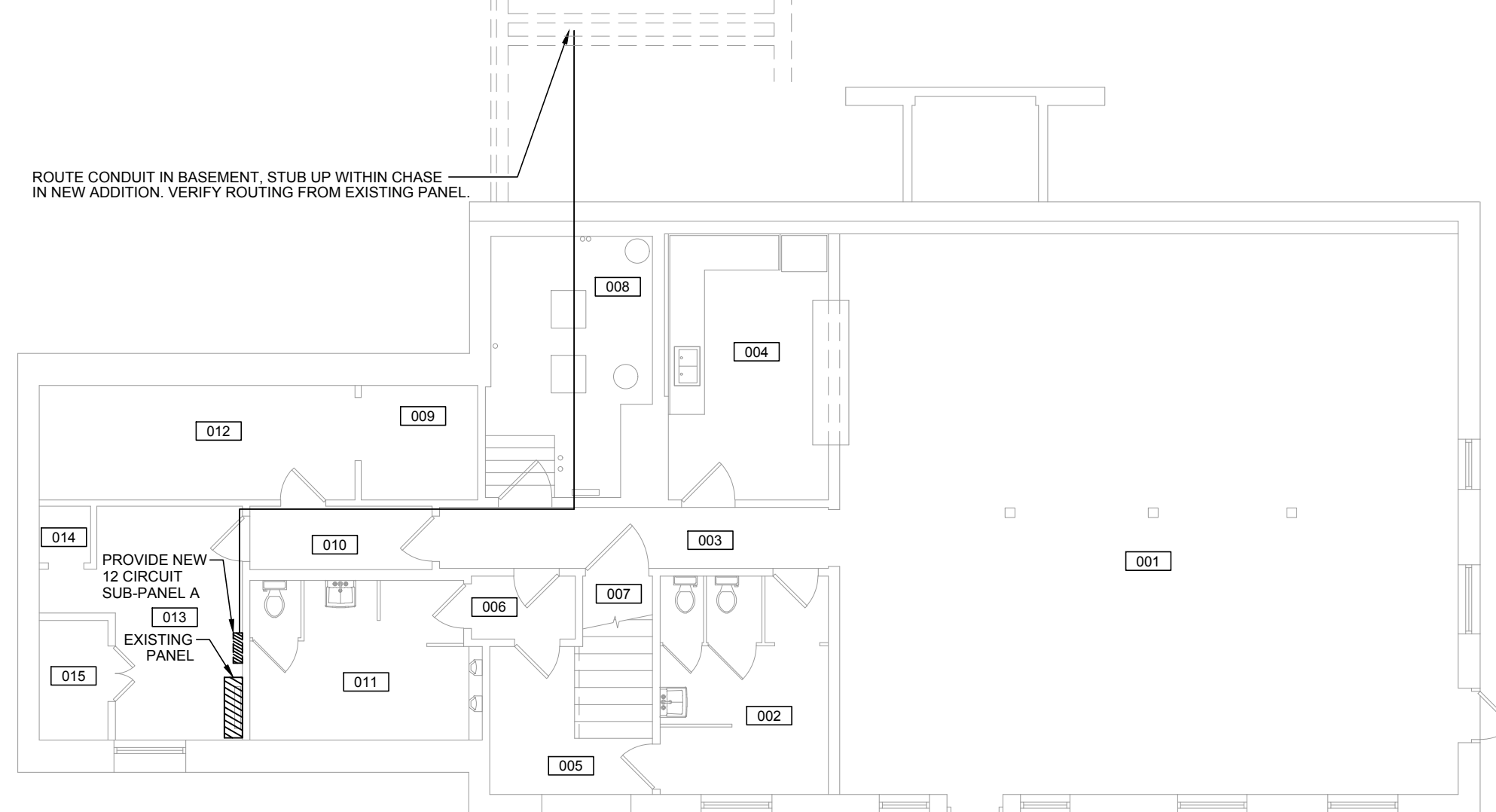


FIRST FLOOR DEMOLITION PLAN

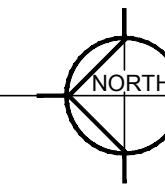


LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	VOLTAGE	LAMPS	SPECIFICATION
TYPE "A" ○	PHILIPS DAY-BRITE MODEL # DWAE51L840-4-UNV-MD360W OR PRIOR APPROVED EQUAL.	MVOLT	LED 5100 LUMENS	SURFACE MOUNT WET LOCATION INDUSTRIAL LED. ONE PIECE MOLDED POLYESTER BODY. DESIGNED FOR ANTI RUSTING, NO OXIDATION & NO CORROSION. MUST BE TIGHT SEALING GASKET. MOUNT IN LOCATIONS SHOWN. CONSULT OWNER FOR SENSOR SETTINGS.
TYPE "B" ○	COOPER MODEL# 22DW-2-L40-D-U-ED-S92HT OR PRIOR APPROVED EQUAL.	MVOLT	LED 4000K	WALL MOUNTED NARROW LED FIXTURE. EXTRUDED ALUMINUM HOUSING 4' LENGTH. MOUNT ON WALL OVER SINKS FOR BEST POSSIBLE LIGHTING. CONNECT TO OCCUPANCY SENSOR
EMERGENCY LIGHT ⬇	HUBBELL, DUAL LITE MODEL #EV2DI OR PRIOR APPROVED EQUAL.	120V 50W FOR 90 MIN.	LED	PROVIDE AND INSTALL WHERE SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED, EMERGENCY BATTERY LIGHTING UNITS. ENGINEERING GRADE, WHITE THERMOPLASTIC HOUSING SHALL BE IMPACT RESISTANT, SCRATCH PROOF, AND CORROSION PROOF. BATTERY TO BE MAINTENANCE FREE. INPUT VOLTAGE SHALL BE 120V.
REMOTE ◁ W.P.	HUBBELL, DUAL LITE, SHALL MATCH EMERGENCY LIGHT MODEL #PGR-W	12V	LED	OUTDOOR REMOTE HEADS SHALL BE WEATHERPROOF. 12V, 12W HALOGEN, PAIR 36 LAMP SUITABLE FOR WET LOCATIONS. REMOTE HEADS SHALL BE COMPATIBLE WITH EMERGENCY BATTERY UNIT.

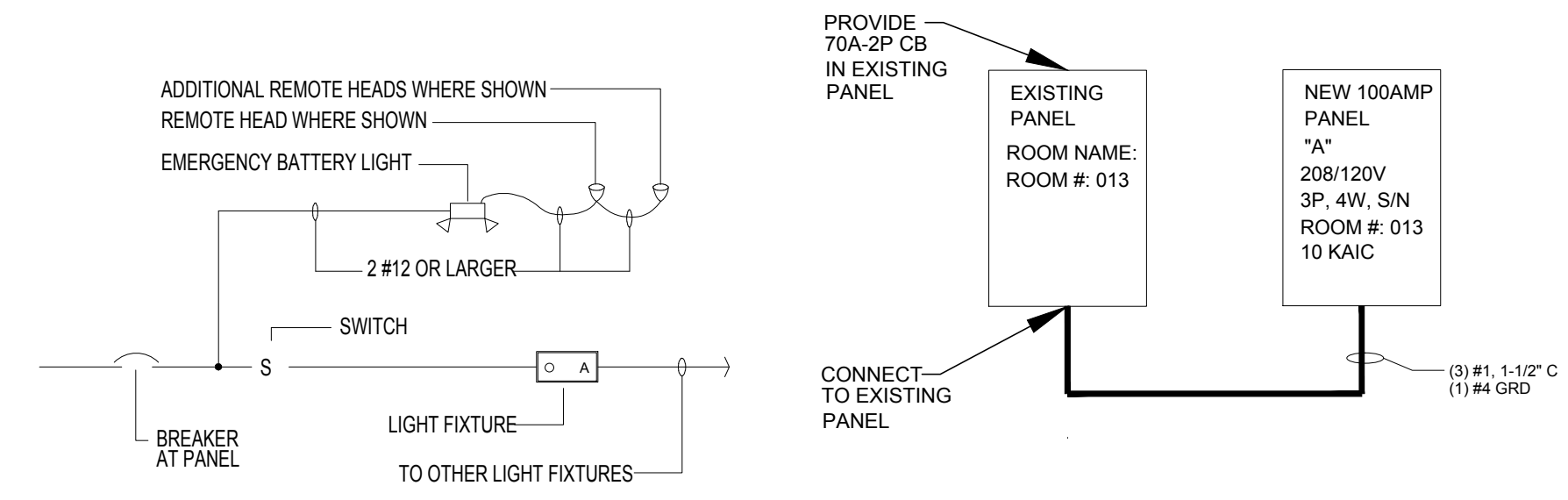


BASEMENT LIGHTING & POWER PLAN

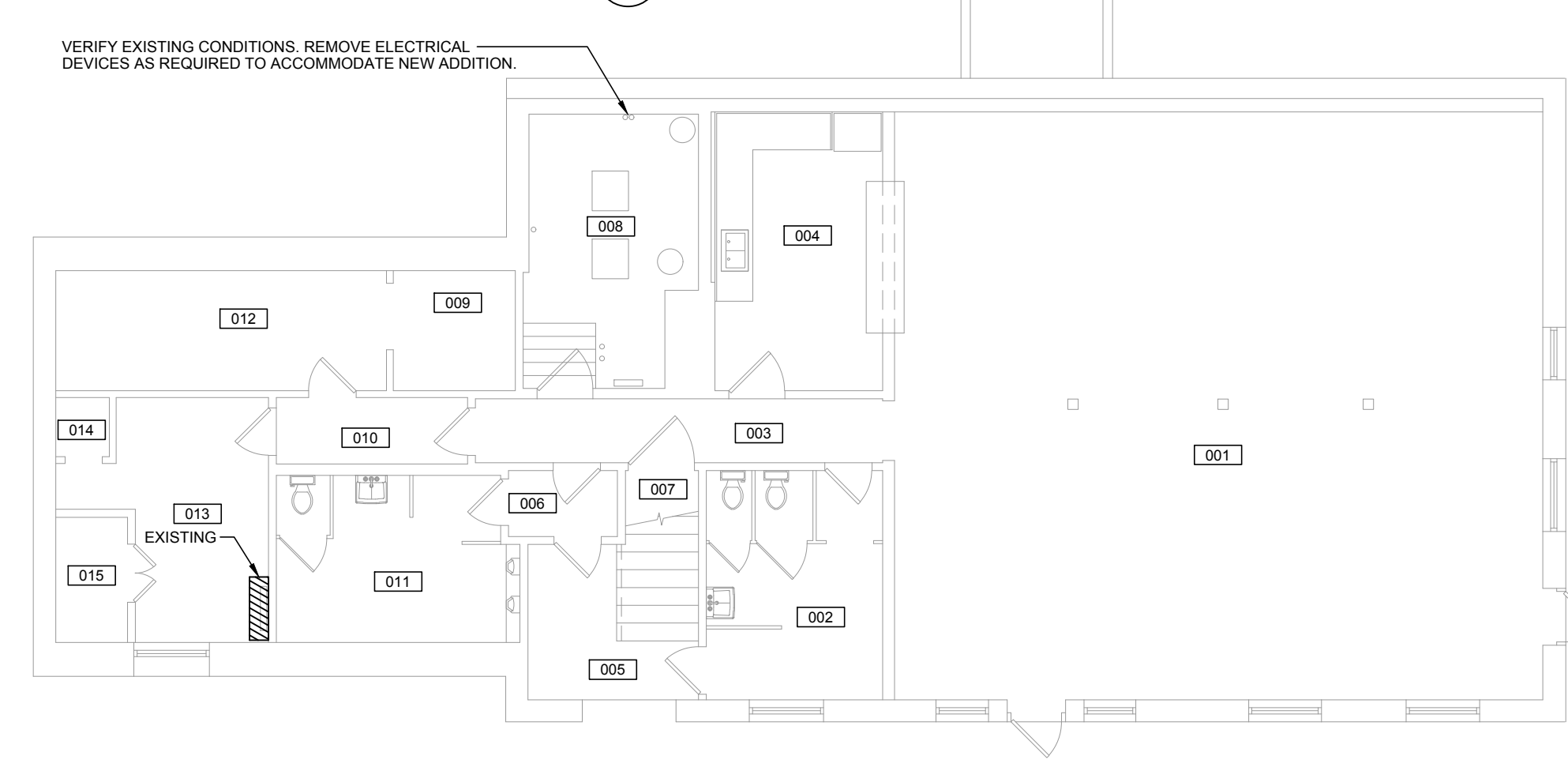


EQUIPMENT:

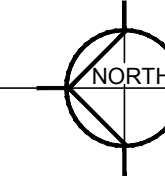
- 1 EXHAUST FAN. SEE M2-1
- 2 HAND DRYER - PROVIDE WORLD AIR MAX DXM5-973 WITH STAINLESS STEEL FINISH, 115V/120A, 2300W. AUTOMATIC SURFACE MOUNT. (2) #10, (1) #10 GRN, 3/4" C.



EMERGENCY LIGHT CONNECTION DETAIL



BASEMENT DEMOLITION PLAN



PANEL A SCHEDULE

TYPE: N00D VOLT: 208/120V 3Ø 4W S/N MNT: SURFACE FEED; BOTTOM MAIN-MAIN AMPS: 100

NO.	LOAD	WATTS	BRKR	PH	BRKR	WATTS	LOAD	NO.
1	LIGHTS	400	20A-1P	A	20A-1P	2300	HAND DRYER	2
3		540	20A-1P	B	20A-1P	2300	HAND DRYER	4
5	EXHAUST FAN	112	20A-1P	X	20A-1P	112	EXHAUST FAN	6
7	SPARE		20A-1P	X	20A-1P		SPARE	8
9	SPARE		20A-1P	X	20A-1P		SPARE	10
11	SPARE		20A-1P	X	20A-1P		SPARE	12

PANEL SHALL BE RATED AT 10 KAIC

ELECTRICAL LEGEND

- IN GROUND WIRING
- - - EXPOSED WIRING
- CONCEALED WIRING
- HOME RUN: A = PANEL, 1 = CIRCUIT NO.
- FLUORESCENT FIXTURE; SEE SPEC. FOR TYPE
- WALL PAK
- ⊕ DUPLEX GROUNDING RECEPTACLE
- ⊕ GFI GROUND FAULT INTERRUPTER
- ⊕ WP WEATHERPROOF
- +36 = INCHES A.F.F.
- ⊕ DOUBLE DUPLEX GROUNDING RECEPT.
- S SWITCH; SINGLE POLE
- S<sub>3</sub> SWITCH; 3-WAY
- ⊕ TELEPHONE/DATA OUTLET
- A.F.F. ABOVE FINISH FLOOR
- ▨ PANEL
- 1 EQUIPMENT DESIGNATION
- J JUNCTION BOX



- ARCHITECTURE
- LANDSCAPE ARCHITECTURE
- INTERIOR DESIGN
- ENGINEERING
- TECHNOLOGY

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704 EAST HOWARD STREET  
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fax: 218.722.6803

126 EAST SUPERIOR STREET  
DULUTH, MINNESOTA 55802

tel: 218.727.8481  
fax: 218.722.8483

CITY OF DULUTH  
LAFAYETTE  
COMMUNITY CENTER



DULUTH, MINNESOTA

PROJECT NO.: 16-076

DATE: 05-MAY-17

DRAWN BY: MPA / KJS / DJS

REVISIONS:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

David Jordan  
ENGINEER 42696 REG. NO.

ELECTRICAL PLAN

E  
1.1

SPECIFICATIONS:

CITY OF DULUTH  
LAFAYETTE COMMUNITY CENTER  
3026 Minnesota Avenue  
Duluth, MN 55802

OWNER:

City Of Duluth  
411 West First Street, Ground Floor  
Duluth, Minnesota 55802

ARCHITECTS/LANDSCAPE ARCHITECTS/ENGINEERS/INTERIOR DESIGNERS:

ARCHITECTURAL RESOURCES, INC.  
126 East Superior Street  
Duluth, MN 55802  
218/727-8481 (218/727-8483 fax)

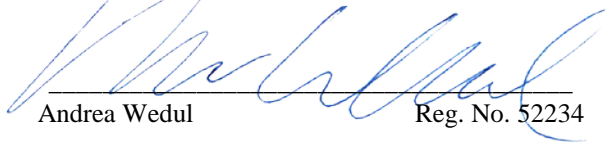
PROJECT NO: 16-076

SPECIFICATION DATE: May 5, 2017

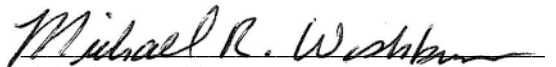
I hereby certify that this plan, specification or report was prepared by me or under my supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.

  
\_\_\_\_\_  
Ryan Erspamer                      Reg. No. 49444

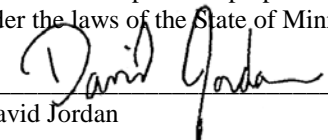
I hereby certify that this plan, specification or report was prepared by me or under my supervision and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota.

  
\_\_\_\_\_  
Andrea Wedul                      Reg. No. 52234

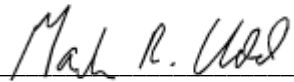
I hereby certify that this plan, specification or report was prepared by me or under my supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

  
\_\_\_\_\_  
Michael R. Washburn              Reg. No. 52709

I hereby certify that this plan, specification or report was prepared by me or under my supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

  
\_\_\_\_\_  
David Jordan                      Reg. No. 42696

I hereby certify that this plan, specification or report was prepared by me or under my supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

  
\_\_\_\_\_  
Mark R. Udd                      Reg. No. 40443

**SECTION 00 01 10 - TABLE OF CONTENTS****DIVISION 00 - PROCUREMENT & CONTRACTING REQUIREMENTS**

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Section 00 01 05	Certifications Page
Section 00 01 10	Table of Contents
Section 00 01 15	Schedule of Drawings

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Section 01 29 00	Measurement & Payment
Section 01 31 00	Coordination
Section 01 31 19	Project Meetings
Section 01 32 23	Field Engineering
Section 01 33 00	Submittals
Section 01 35 00	Special Project Procedures
Section 01 41 00	Regulatory Requirements
Section 01 45 00	Quality Control
Section 01 45 23	Special Inspections
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**END OF SECTION**

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SW1.1	SITE SURVEY
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E1.1	ELECTRICAL PLAN



**SECTION 01 11 00 - SUMMARY OF THE WORK****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

**1.02 DEFINITIONS**

- A. The word "Owner" as the same may be used herein refers to the City of Duluth, Minnesota.
- B. The word "Contractor" refers to a party or parties entering into a contract with the City of Duluth, Minnesota.
- C. The word "Work" refers to the specified undertaking, including the labor, materials, apparatus, equipment, etc., required in that connection.
- D. The words "Architect/Engineer" refers to Architectural Resources, Inc., 704 East Howard Street, Hibbing, MN 55746; phone 218/263-6868, fax 218/722-6803.

**1.03 GENERAL**

- A. All Articles in these General Requirements (Division 01) are applicable to all Divisions and Sections of the work included herein. The Conditions of the Contract, General and Supplementary General Conditions, and these General Requirements shall apply with equal force and effect to the Contractor and subcontractors engaged in this work.
- B. Sequence of operations or place of commencement may be determined by the Architect/Engineer as deemed to best serve the needs and convenience of the Owner, or as necessity of occasion requires.
- C. The Architect and his representatives, and designated representatives of the Owner shall have access to the construction site at all times. Contractor shall give Architect sufficient advance notice of when work specifically requiring Architects approval will be done to avoid delaying the work.

**1.04 SPECIAL SITE CONDITIONS**

- A. Confine all operations, equipment, apparatus and storage of materials to the immediate area of work to the greatest possible extent. Contractor shall ascertain, observe and comply with all rules and regulations in effect on the project site, including, but not limited to parking and traffic regulations, use of walks, security restrictions, environmental timelines and hours of allowable ingress and egress.
- B. Information pertaining to existing conditions that appear on the drawings, are based on available records. While such data has been collected with reasonable care, there is no expressed or implied guarantee that conditions so indicated are entirely representative of those actually existing or that unlooked for developments may not occur. They are merely provided to assist the Contractor in the investigation of conditions.

**1.05 INSPECTION OF SURFACES**

- A. Contractor shall obtain complete data at the site and inspect surfaces that are to receive the work before proceeding with fabricating, assembling, fitting or erecting his work.
- B. The Contractor shall notify the Architect/Engineer in writing in case of discrepancies between existing work and drawings, and defects in such surfaces that are to receive the contractor's work. The Architect/Engineer will direct such work or surfaces to be remedied.

- C. Starting of work implies acceptance of the work of others. Removal and replacement of work applied to defective surfaces, in order to correct defects, shall be done at the expense of the contractor who applied work to defective surfaces.

#### **1.06 CUTTING AND PATCHING**

- A. The Contractor shall do all cutting or fitting of the work as required to make its several parts fit together, or to receive the work of others, as shown or reasonably implied by the drawings or specifications, or as may be directed by the Architect/Engineer. Holes cut in exterior walls shall be waterproofed.
- B. The Contractor who cuts shall also be responsible for patching. Where cutting and patching is required, the Contractor shall hire individuals skilled in such work to do cutting and patching.
- C. Contractor shall not endanger any work by cutting, digging or otherwise and shall not cut or alter the work of others without their consent.
- D. Wherever any material, finish, or equipment is damaged, the repair or replacement shall be accomplished by the trade skilled in that particular work and the cost shall be charged to the party responsible for the damage.

#### **1.07 MANUFACTURER'S DIRECTIONS**

- A. Contractor shall apply, install, connect, erect, use, clean and condition manufactured articles, materials, and equipment as recommended by the manufacturer.
- B. Where specific installation instructions are given in this specification it shall be understood that these instructions are based on the installation system of one of the specified manufacturers and the minimum standards required by the Architect.
- C. Bidders shall verify the material and installation requirements of the specific specified manufacturer they intend to use to verify if the specific manufacturer's requirements are more or less stringent than those considered the minimum by the Architect. Standards which are below the minimum of those established by the Architect shall be brought into conformance with the minimum standards of the Architect. Standards of a specific manufacturer that are above those established by the Architect as the minimum shall be installed to the requirements of the specific manufacturer.

#### **1.08 PROTECTION IN GENERAL**

- A. Structures and equipment shall be constructed, installed and operated with guards, controls, and other devices in conformance with applicable safety regulations.
- B. Temporary pumps required for pumping water from building excavation or from building proper shall be provided by the Contractor/General Trade, including temporary connections. Plumbing Trade shall install permanent sump basins and piping where and when required. Permanent sump pumps shall not be installed until building is substantially complete and when approved by the Architect/Engineer. The Contractor/General Trade shall remove temporary pumps and connections when approved by the Architect/Engineer.
- C. The Contractor/General Trade shall:
  - 1. Provide, erect and maintain all required planking, barricades, guard rails, temporary walkways, etc., of sufficient size and strength necessary for protection of stored material and equipment; paved surfaces, walks, curbs, gutters, and drives; streets adjacent to or within project area; adjoining property and the new building as well as to prevent accidents to the public and the workmen at the job site.

2. Notify owners of corporate or private property if their property interferes with the work so that arrangements for proper protection can be made.
3. Provide and maintain proper shoring and bracing to prevent earth from caving or washing into the building excavation. Provide temporary protection around openings through floors and roofs, including elevator openings, stair wells, and edge of slabs.
4. Provide and maintain proper shoring and bracing for existing underground utilities, sewers, etc., encountered during excavation work, to protect them from collapse or other type of damage until such time as they are to be removed, incorporated into the new work, or can be properly backfilled upon completion of new work.
5. Provide protection against rain, snow, wind, ice, storms or heat so as to maintain all work, materials, apparatus, and fixtures, incorporated in the work or stored on the site, free from injury or damage. At the end of the day's work, cover all new work likely to be damaged. Remove snow and ice as necessary for safety and proper execution of the work.
6. Protect building and foundations from damage at all times from rain, ground water and backup from drains or sewers. Provide all equipment and enclosures as necessary to provide this protection.
7. Damaged property shall be repaired or replaced in order to return it to its original condition. Damaged lawns shall be replaced with sod.
8. Protect materials, work and equipment, as specified in 5 above until construction proceeds to a point where they can be moved into the building and the building will provide this protection. Protect work outside of the building lines such as trenches and open excavations, as specified above.
9. Take any and all necessary precautions to protect Owner's property as well as adjacent property, including trees, shrubs, buildings, sanitary and storm sewers, water piping, gas piping, electric conduit or cable, etc., from any and all damage which may result due to work on this project.
10. Repair work outside of property line in accordance with the requirements of the authority having jurisdiction.
11. Repair any work, damaged by failure to provide proper and adequate protection, to its original state, to the satisfaction of the Owner or remove and replace with new work at the contractor's expense.

#### **1.09 TREE PROTECTION**

- A. Protect trees and shrubs from damage unless specifically noted to be removed. Protection shall be placed before any work is started at the site and shall be maintained in good repair until the work is completed. Trees which are to remain shall not be used for crane stays, guy anchors or other fastenings. Do not light fires, store materials, pile debris or park motorized equipment within the spread of the branches of any tree.
- B. Protection shall consist of boxing or fencing as described herein unless indicated otherwise on the drawings.
  1. Trees with low hanging branches and shrubbery shall be fenced around the outer perimeter of the spread of the branches with standard 48" high snow fence mounted on steel post spaced six feet on center.

- C. If any tree which is to remain is severely injured or should die because of contract operations, replace it with the same caliper and species. If a replacement is not available, reimburse the Owner in an amount equal to two hundred dollars (\$200.00) for each inch of diameter of the tree injured or lost.

### **1.10 CLEANING**

- A. The Contractor shall be responsible for all cleaning required within the technical sections of the specifications governing work under the Contractor's jurisdiction as well as for keeping all work areas, passageways, ramps, stairs and all other areas of the premises free of rubbish, debris and scrap which may be caused by the Contractor's operations or that of the subcontractors.
  - 1. Remove rubbish, debris and scrap promptly upon its accumulation and in no event later than the end of each week.
  - 2. Combustible waste shall be removed immediately or stored in fire resistive containers until disposed of in an approved manner.
  - 3. No burning of rubbish or debris will be allowed at the site. Rubbish, debris and scrap shall not be thrown through any window or other opening, or dropped from any great height; it shall be conducted to the ground, to waiting truck(s) or removable container(s) by means of approved chutes or other means of controlled conveyance.
  - 4. Form or scrap lumber shall have all nails withdrawn or bent over; shall be neatly stacked, placed in trash bins, or removed from the premises.
  - 5. Spillages of oil, grease or other liquids which could cause a slippery or otherwise hazardous situation or stain a finished surface, shall be cleaned up immediately.
  - 6. Dust, dirt or other foreign matter shall be removed completely from all internal surfaces of all mechanical and electrical units, cabinets, ducts, pipes, etc.
  - 7. Dirt, soil, fingerprints, stains and the like shall be completely removed from all exposed finished surfaces.
- B. Contractor/General Trade shall wash all glass immediately prior to the occupancy of this project. Work shall include the removal of labels, paint splattering, glazing compound and sealant. Surfaces shall include mirrors and both sides of all glass in windows, borrowed lights, partitions, doors and side lights.
- C. Broken scratched or otherwise damaged glass shall be removed and replaced with new.
- D. In addition to the above, the Contractor/General Trade shall be responsible for the general "broom" cleaning of the premises and for expediting all of the cleaning, washing, waxing and polishing required within the technical sections of the specifications governing work under his contract. The Contractor/General Trade shall also perform "Final" cleaning of all exposed surfaces to remove all foreign matter, spots, soil, construction dust, etc., so as to put the project in a complete and finished condition ready for acceptance and use intended.
- E. If rubbish and debris is not removed, or surfaces cleaned as specified above, the Owner reserves the right to have said work done by others and the related cost(s) will be deducted from monies due the Contractor.

### **1.11 PARKING**

- A. Construction personnel shall confine parking of private vehicles to within the area of the project limits, to those parking spaces available on public streets, or other locations with prior approval of the Owner.

**1.12 STORMWATER MANAGEMENT & EROSION CONTROL**

- A. In accordance with good soil conservation practices, the Contractor/General Trade shall be governed by the following:
1. The Contractor hereby covenants to maintain all project grounds, public streets and associated areas, including fill areas in a manner consistent with the general policy to conserve soil and soil resources and to control and prevent soil erosion and to control and prevent siltation into lakes, rivers and streams. This clause is to be liberally construed to further the above stated objectives. The following shall include, but not limit areas in which control is to be exercised.
    - a. **Minimum Stripping:** Strive to limit stripping of sod and vegetation to a period that will expose bare soil to least possibility of erosion that construction requirements will allow.
    - b. **Stockpiling:** Material shall be stored in a manner that will not result in runoff of stockpiled material into streets or drainage facilities in the event of rain.
    - c. **Stormwater Runoff and Erodible Materials:** Take positive measures to prevent soil erosion from the construction area and areas disturbed by construction activities by employing such means as: mulches, intercepting embankments, settling basins, ditch checks, riprap, erosion mats, or other temporary erosion control devices or methods.

**END OF SECTION**

**SECTION 01 22 00 - UNIT PRICES****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. List of unit prices requested for the purpose of changing quantities of work from those indicated on the Contract Documents.
- B. Measurement and payment criteria applicable to work performed under a unit price payment method.

**1.02 COSTS INCLUDE**

- A. Unit prices shall include full compensation for all required labor, materials, tools, equipment, removal, transportation, overhead, profit, insurances, taxes, bonds, etc to cover the finished work as scheduled.

**1.03 UNIT PRICE BIDS**

- A. Spaces are provided on the bid form for the requested unit prices.
- B. Failure to submit a price for any requested unit price shall result in rejection of the entire bid.
- C. Additional unit prices beyond those requested shall not be included and will not be accepted.
- D. Unit prices submitted shall be used to compute adjustments of the contract sum for approved unit price items of work. Adjustments shall be made by means of change order.

**1.04 MEASUREMENT OF QUANTITIES**

- A. Measurement method delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Take all measurements and compute quantities of work in place. Measurements and quantities will be verified by Architect.

**1.05 ADVANCED COORDINATION**

- A. Immediately notify the Architect when conditions require the use of unit price work items.
- B. Contractor shall not proceed with work without Architect approval.

**1.06 PAYMENT**

- A. Payment for work governed by unit prices will be made on the basis of the actual, not estimated, measurements and quantities of work that is incorporated in or made necessary by the work and accepted by the Architect, multiplied by the unit price.
  - 1. Provide bills of lading, shipment manifests, order forms, survey reports or other documentation as required by Architect or Owner to verify materials and quantities place or received.
- B. Payment will not be made for any of the following:
  - 1. Products wasted or disposed of in a manner that is not acceptable.
  - 2. Products determined as unacceptable before or after placement.
  - 3. Products not completely unloaded from the transporting vehicle.

4. Products placed beyond the lines and levels of the required work.
5. Products remaining on hand after completion of the work.
6. Loading, hauling and disposing of rejected products.
7. Products furnished or installed contrary to Contract Document requirements.

#### **1.07 SCHEDULE OF UNIT PRICES**

A. Unit Prices shall be provided as follows:

- Unit Price #1. Mass Excavation Per One Cubic Yard: Once the excavation has been carried down to the elevations required for the installation of the footings, the Special Inspector will ascertain the bearing capacity of the earth upon which the footings shall rest. If, in the opinion of the Special Inspector, the excavation shall be made deeper to reach a better strata for bearing of footings, and such excavation is ordinary earth (not rock) which can be excavated by power equipment, the additional mass excavation required shall be accomplished on a unit price basis. See Section 31 23 00 (Excavation & Backfilling).
- Unit Price #2. Hand Excavation Per One Cubic Yard: Once the excavation has been carried down to the elevations required for the installation of the footings, the A/E will ascertain the bearing capacity of the earth upon which the footings shall rest. If, in the opinion of the A/E, the excavation shall be made deeper to reach a better strata for the bearing of the footings and such excavation is ordinary earth (not rock) which can be excavated only by hand tools, the additional excavation required shall be accomplished on a unit price basis. See Section 31 23 00 (Excavation & Backfilling).
- Unit Price #3. Granular Fill Per One Cubic Yard Before Compaction: If additional granular fill is required, it shall be on a unit price basis for one cubic yard before compaction. Refer to Section 31 23 00 (Excavation & Backfilling) for type and placing of fill. Quantities will be based on delivery tickets of trucks from the fill supplier.
- Unit Price #4. Silt Fence Per One (1) Lineal Foot, Installed: If additional silt fence is required beyond that which is shown on the drawings, it shall be on a unit price basis per lineal foot installed. Refer to Section 31 25 00 (Erosion & Sedimentation Controls) for type.
- Unit Price #5. Tree & Brush Clearing & Grubbing Per One (1) Square Yard: If additional tree or brush removal is required beyond that which is shown on the drawings, it shall be on a unit price basis per square yard. This quantity should include removal of material from work area and proper disposal at off-site facility, OR, chipping to remain on site, per direction of project Landscape Architect. Refer to Section 31 11 00 (Clearing & Grubbing).
- Unit Price #6. Tree Protection - Fencing Per One (1) Lineal Foot, Installed: If additional tree protection fence is required beyond that which is shown on the drawings, it shall be on a unit price basis per lineal foot installed. Refer to Section 01 56 39 (Temporary Tree and Plant Protection).
- Unit Price #7. Tree Protection - Mulch & Geogrid Per One (1) Square Foot, Installed: If additional tree protection mulch and geogrid is required beyond that which is shown on the drawings, it shall be on a unit price basis per square foot installed. Refer to Section 01 56 39 (Temporary Tree and Plant Protection).

Unit Price #8. Tree Protection - Tree Pruning Per Hour: If additional tree pruning is required beyond that which is shown on the drawings, it shall be on a unit price basis per hour. Refer to Section 01 56 39 (Temporary Tree and Plant Protection).

Unit Price #9. Tree Protection - Tree Removal Per Hour: If additional tree removal is required beyond that which is shown on the drawings, it shall be on a unit price basis per hour. Refer to Section 01 56 39 (Temporary Tree and Plant Protection).

Unit Price #10. Native Seeding Per One (1) Square Foot: If additional native seeding is required beyond that which is shown on the drawings, it shall be on a unit price basis per square foot installed. Refer to Section 32 92 00 (Turf and Grasses).

**PART 2 - PRODUCTS - NOT USED**

**PART 3 - EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 29 00 - MEASUREMENT AND PAYMENT****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

**1.02 SCHEDULE OF VALUES**

- A. At the time the Contractor submits his signed contract and list of subcontractors, he shall submit a schedule of values prepared in such a manner that each major item of work and each subcontracted item of work is shown as a single line item.
- B. The value of the work shall generally be itemized by specification section. When an item of work may be furnished by one Subcontractor or material supplier and installed by the Trade Contractor or another subcontractor, separate items shall be included for the value of the material or equipment furnished to the site and the value of its site handling costs and installation.
- C. Items of a general or temporary nature, such as bond premiums or temporary heat, shall be itemized in sufficient detail so that payment may be made as the item of work is completed.
- D. Each item in the Schedule of Values shall contain its proper share of overhead and profit.
- E. Prepare schedule of values on AIA Document G703, Certificate For Payment, Continuation Sheet.
- F. Scheduling of values will be used as a basis for reviewing the Contractor's Applications for Payment.

**1.03 APPLICATION FOR PAYMENT**

- A. Progress payments shall be made on a monthly basis as outlined in Article 9.3 of the General Conditions.
- B. Contractor shall submit Applications for Payment to the Architect for certification ten (10) days before the date established for progress payment in the Owner-Contractor Agreement.
- C. Application for Payment shall be submitted on AIA Document G702 Application And Certificate For Payment and G703 Continuation Sheet. Application shall be notarized.
- D. Applications for Payment may only include changes in the work that have been authorized and processed as Change Orders. Such items shall be paid for on the basis of the percentage of their value completed at the time Application for Payment is made.

**1.04 RETAINAGE**

- A. As per Article 9.3.1 of the General Conditions, the Owner will retain 5% of the amount of each Certificate For Payment issued by the Architect. Such amount will be retained by the Owner until final payment.

**1.05 CHANGES IN THE WORK**

- A. When changes in the work are requested or ordered which will require a change in the contract amount, the Contractor shall submit a proposal to the Architect for review. Proposal shall include a complete itemized listing of the following:
  - 1. Description of quantities of materials.

2. Hours of labor.
  3. Hourly rates (including fringe benefits) and total labor cost.
  4. Equipment rental or pro rata share (items of equipment must have an individual cost in excess of \$1,000.00 when new).
  5. Contractor's and Subcontractor's overhead & profit on labor, material and equipment rental.
  6. Liability insurance, travel allowances, subsistence allowances, social security, bond costs and unemployment insurances when applicable may be added, but without the Contractor's overhead and profit fee.
- B. Among the items considered as overhead are the services of Contractor, his general office and the services of his superintendent, all field office expense, the user of tools and equipment other than mentioned above, the making of shop drawings, and the services of draftsmen, engineer or layout men.
- C. On a change involving additions and deductions, the values of labor and materials added and deducted shall be balanced against each other and overhead and profit shall be applied to the net result only if the balance is an addition.
- D. On changes that involve a net credit to the Owner, no allowances shall be made for overhead and profit.
- E. Percentage of overhead and profit allowed on Change Orders is stated in the General Conditions or as mutually agreed between the Owner and Contractor.

#### **1.06 UNIT PRICES**

- A. Unit prices are requested for the purpose of changing quantities of work from those indicated on the contract drawings.
- B. Unit prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.
- C. Spaces are provided in the bid form for requested unit prices. Failure to submit a price for any requested unit price shall result in rejection of the entire bid.
- D. Unit prices shall be provided as per Section 01 22 00.

**END OF SECTION**

**SECTION 01 31 00 - COORDINATION****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

**1.02 NOTIFICATION OF ARCHITECT**

- A. Foundations are figured for soil pressure indicated. Because of variation in bearing capacity of the ground, some foundations may have to be revised after excavation has been completed. The Architect's approval to proceed with foundation work must be obtained before concrete is poured. Changes in the work due to revisions of foundations because of unsatisfactory soil conditions will be classed as additional work. The Special Inspector is responsible for testing soils to verify conformance with specified requirements.

**1.03 MUTUAL RESPONSIBILITY**

- A. Contractor shall coordinate the work with adjacent work and shall cooperate with all other trades so as to facilitate the general progress of the work. Each trade shall afford all other trades every reasonable opportunity for the installation of their work and for the storage of their material. In no case will any contractor be permitted to exclude from the premises or work, any other Contractor or employees thereof, or interfere with any Contractor in the executing or installation of the work.
- B. Each trade shall perform its work in proper sequence in relation to that of other trades and as approved by the Architect/Engineer. Any cost caused by defective or ill-timed work shall be borne by the trade responsible therefore.
- C. Contractor shall arrange the work and dispose of materials so as not to interfere with the work or storage of materials of others and each shall join their work to that of others in accordance with the intent of the drawings and specifications.
- D. All trades shall work in cooperation with the Contractor and with each other, and fit their work into the structure as job conditions may demand. All final decisions as to right-of-way and run of pipes and ducts, etc. shall be made by the Architect/Engineer or an authorized representative at prearranged meetings with responsible representatives of the Trades involved. The General Contractor is responsible for hosting a coordination meeting with all trades to establish an acceptable layout of all materials and equipment.

**1.04 SUPERVISION**

- A. The Contractor/General Trade shall take complete charge of the work under this Contract and coordinate the work of all trades on the project.

**1.05 CONSTRUCTION SCHEDULE & SUBMITTAL SCHEDULES**

- A. Contractor shall prepare a schedule showing the anticipated start and completion of each major division of work based on the sections of this specification. This schedule shall be submitted to the Architect at or before the Preconstruction Meeting.
- B. Contractor shall update the schedule as more accurate information becomes available as to deliveries, subcontractor schedules, and delays in the work. Schedule shall be updated monthly and presented at progress meetings.

- C. Items requiring submittal to and review by the Architect (shop drawings, color samples, etc.) shall be submitted sufficiently in advance of their scheduled start to allow time for review. Architect will require ten (10) working days review time from the date submittals are received at the Architect's office.

**END OF SECTION**

**SECTION 01 31 19 - PROJECT MEETINGS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

**1.02 GENERAL**

- A. Architect will schedule and administer a mandatory pre-bid meeting, a preconstruction meeting, periodic progress and coordination meetings, and specially called meetings throughout the progress of the work. The Architect will:
1. Notify trade contractors and Owner's representative of time and location.
  2. Record and distribute the minutes of the meetings.
- B. Representatives of Trade Contractors, subcontractors and suppliers attending the meetings shall be qualified and authorized to act on behalf of the entity each represents.
- C. Architect may attend meetings to determine if the work is being expedited consistently with Contract Documents.

**1.03 PRECONSTRUCTION MEETING**

- A. A preconstruction meeting may be scheduled after date of Notice to Proceed is issued.
- B. The following items will be distributed and discussed at this meeting:
1. Organization arrangement of Owner's and Architect's forces and personnel, and those of contractors, subcontractors and material suppliers.
  2. Channels and procedures for communications.
  3. Construction schedule, including sequence of critical work.
  4. Contract Documents, including distribution of required copies of original Documents and revisions.
  5. Processing of Shop Drawings and other data submitted to the Architect for review.
  6. Processing of field decisions and Change Orders.
  7. Rules and regulations governing performance of the work.
  8. Procedures for quality control, housekeeping, and other related matters.

**1.04 PROJECT MEETINGS**

- A. Project meetings will be held at the time designated by the Owner. Contractor, when requested, shall attend project meetings. A responsible representative of the Contractor who can bind the contractor to a decision at the meetings shall attend.
- B. The Architect/Engineer, or a representative thereof, may write a report covering items discussed and distribute copies of the report to all parties identified at preconstruction meeting.

C. Proposed Agenda:

1. Review, revise as necessary, and approve minutes of the previous meeting.
2. Review progress of the Work since last meeting, including status of submittals for approval.
3. Identify problems which impede planned progress.
4. Develop corrective measures and procedures to regain planned schedule.
5. Complete other current business.
6. Verify contractor's schedule.

**END OF SECTION**

**SECTION 01 32 23 - FIELD ENGINEERING****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

**1.02 SITE CONDITIONS**

- A. Contractor shall become acquainted with the location of underground services, utilities, structures, etc., which may be encountered or be affected by the Contractor's work, and shall be responsible for any damage caused by neglect to provide proper precautions or protection.
- B. Existing pipes, electrical work and all other utilities encountered, which may interfere with new work, shall be rerouted, capped, cut off or replaced by the trades having jurisdiction.

**1.03 LAYOUT**

- A. The Contractor shall immediately upon entering the site for purpose of beginning work, locate general reference points and take such action as is necessary to prevent their destruction. The Contractor shall lay out the work and be responsible for all lines, elevations and measurements of the building and other work executed by the Contractor under the contract. The Contractor must exercise proper precaution to verify figures on the drawings before laying out work and will be held responsible for any error resulting from failure to exercise such precaution.
- B. Using datum furnished by the Owner, the lot lines and present levels have been established as shown on the Site Plan. Other grades, lines, levels and bench marks shall be established and maintained by the contractor, who shall be responsible for them.
- C. As work progresses, the Contractor shall lay out on forms and floor, the locations of all partitions, walls and fix column center lines as a guide to all trades.
- D. The Contractor shall make provision to preserve property line stakes, bench marks or datum point. If any are lost, displaced or disturbed through neglect of the contractor, contractor's agents or employees, the Contractor shall pay the cost of restoration.
- E. Contractor shall verify grades, lines, levels, locations, and dimensions as shown on drawings and report any errors or inconsistencies to the Architect/Engineer before commencing work. Starting of work by the Contractor shall imply acceptance of existing conditions.

**END OF SECTION**

**SECTION 01 33 00 - SUBMITTALS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. Provide submittals as noted in each Section of this Specification.
- C. Allow for at least two weeks review of submittals to avoid delay of the Work.
- D. Include with submittal preparation, field verifications of measurements, field construction criteria, verification of catalog numbers and similar data, and coordination of Work requirements and Contract Documents.

**1.02 SCHEDULE OF VALUES**

- A. At the time the Contractor submits his signed Contract and list of subcontractors, he shall submit a schedule of values prepared in such a manner that each major item of work and each subcontracted item of work is shown as a single line item.
- B. The value of the work shall generally be itemized by specification section. When an item of work may be furnished by one Subcontractor or material supplier and installed by the Trade Contractor or another subcontractor, separate items shall be included for the value of the material or equipment furnished to the site and the value of its site handling costs and installation.
- C. Items of a general or temporary nature, such as bond premiums or temporary heat, shall be itemized in sufficient detail so that payment may be made as the item of work is completed.
- D. Each item in the Schedule of Values shall contain its proper share of overhead and profit.
- E. Prepare schedule of values on AIA Document G703, Certificate For Payment, Continuation Sheet.
- F. Scheduling of values will be used as a basis for reviewing the Contractor's Applications for Payment.

**1.03 CONSTRUCTION SCHEDULE**

- A. At the preconstruction meeting contractor shall present a Contractors Construction Schedule for the Work. The Schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.
- B. The Contractor shall prepare and keep current, for the Architect's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals.

**1.04 SHOP DRAWINGS, SAMPLE SUBMITTALS**

- A. Shop drawings shall consist of drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the work.
- B. Samples shall consist of physical examples furnished by the Contractor in sufficient size and quantity to illustrate materials, equipment or workmanship, and to establish standards by which work will be judged.



- C. Prior to submitting samples and shop drawings to the Architect, Contractor shall review and stamp them with his shop drawing review stamp. Shop drawings shall be signed by the person who reviewed them. By stamping and signing shop drawings and samples the Contractor affirms that he has reviewed and coordinated each shop drawing and sample with the requirements of the contract documents. He further represents that he has, or will, verify all field measurements, field construction criteria and similar data. Shop drawings and samples not so noted and stamped will be returned to the Contractor without being examined by the Architect/Engineer.
- D. Submit five (5) copies or one (1) PDF electronic copy of all shop drawings for General Construction Divisions for distribution as follows by the Architect:
  - 1. 1 set for the Architect.
  - 2. 1 set of Mechanical/Electrical for the Engineer.
  - 3. 1 set for the Owner.
  - 4. 3 sets for the Contractor distributed as follows:
    - a. 1 set for job site.
    - b. 1 set for contractor's office.
    - c. 1 set for the supplier.
- E. Submit two (2) of each sample requested. Samples shall be of adequate size to show quality, type, color range, finish and texture. Label each sample stating material, type, color, thickness, size, project name and contractor's name. Submit transmittal letter requesting approval along with samples. One (1) set of approved samples shall become the property of the Architect. The other shall be kept at the job site until substantial completion and then turned over to the Owner.

#### **1.05 PHOTO SUBMITTALS**

- A. Contractor shall have means to take and transmit photos electronically to communicate/discuss with the Architect the design intent.
- B. Contractor shall maintain daily photo logs - with date and time stamp of work progress and shall turn over digital photo archive at completion of the project.
- C. Contractor shall make photos available to architect at request during the project.

#### **1.06 OPERATING AND MAINTENANCE INSTRUCTIONS**

- A. Contractor shall provide the Architect with three sets of the following, covering each and every item of equipment and devices furnished or erected by the Contractor prior to "Substantial Completion":
  - 1. Catalog data or literature.
  - 2. Manufacturer's operating instructions.
  - 3. Manufacturer's maintenance instructions.
  - 4. Installation instructions.
  - 5. Parts list (including name and address of nearest vendor).
- B. These materials shall be submitted in 3-ring loose leaf binders on 8-1/2" x 11" paper with the entire contents indexed and thumb-tabbed.
- C. The correct model number shall be checked off in ink where the literature covers more than one model number.
- D. For items assembled by the Contractor for special functions, the Contractor shall write up and provide duplicate operating and maintenance instructions.

- E. The manual shall contain narrative of the control cycle for the control equipment.
- F. Provide field instruction to Owner's personnel as required to fully instruct them in correct operation and maintenance procedures for all mechanical and electrical equipment.

#### **1.07 WARRANTIES AND BONDS**

- A. Assemble and submit to the Owners representative warranties, bonds and service and maintenance contracts as specified in the respective sections of the specifications. The table of contents for this submittal shall include the product or work item; the firm, with the name of the principal, address and telephone number; scope; date of beginning of warranty, bond or service and maintenance contract; duration; information for the Owner's personnel providing the proper procedure in case of failure and instances which might affect the validity of the warranty or bond.
- B. The beginning date of the warranty will be the date of substantial completion or a later date when the work is finally accepted.
- C. Prime Contractors shall guarantee and make good without cost to the Owner any defects, settlements, shrinkages or other faults in work arising from improper materials or workmanship on his part which may appear within one (1) year after the acceptance of the work (except for specified guarantees for another length of time specified elsewhere). The Contractor shall, immediately upon notification by the Architect, proceed at his own expense to replace and repair such work together with any damages to finish, fixtures, equipment, furnishings that may result due to defective work or faults. Any payments for this work shall not relieve him in any way from his responsibility. In case the Contractor fails to do work so ordered, the Owner may have work done, charge the cost thereof against monies retained as provided for in the agreement. If said retained monies are insufficient to pay such cost or if no money is available, the Contractor and his sureties agree to pay the Owner the cost of such work. Nothing herein intends or implies that guarantee shall apply to work which has been abused or neglected by the Owner.

#### **1.08 TEST REPORTS**

- A. Reports of inspections, tests and approvals required by the Contract Documents shall be submitted directly to the Architect in duplicate.

#### **1.09 SUBSTITUTION OF MATERIALS**

- A. Whenever a material, article or piece of equipment is identified on the drawings or in the specification by reference to manufacturers or vendors name, trade name, catalog number, etc., it is intended to establish a standard; and any material, article, or equipment of other manufacturers and vendors which will perform adequately the duties imposed by the general design will be considered equally accepted provided the material, article or equipment so proposed is, in the opinion of the Architect/Engineer, or equal in substance and function. It shall not be purchased or installed by the Contractor without the Architect/Engineer's written approval prior to bid opening.
- B. Materials or equipment items of other manufacture may be submitted for approval only upon the following conditions:
  - 1. That, in the opinion of the Architect/Engineer, the proposed material or equipment item is fully equal (in design, materials, construction, workmanship, performance, finish, etc.) to the named item. No compromise in quality level, however small, is acceptable.

2. That in substituting materials or equipment, Contractor assumes responsibility for any changes in system or for modifications required in adjacent or related work to accommodate such substitution, despite the Architect/Engineer approval and all costs growing out of the approval of "or equal" items shall be the responsibility of the Contractor. None of the extra costs resulting from such approval shall devolve upon the Owner, the Architect/Engineer or any other separate Contractor.
- C. It shall be understood that the use of materials or equipment other than those specified, or approved equal by the Architect/Engineer, shall constitute a violation of contract and that the Architect/Engineer shall have the right to require the removal of such materials or equipment and their replacement with the specified materials or equipment at the Contractor's expense.
- D. Manufacturers and suppliers seeking approval of their products during the bidding phase shall submit requests to the Architect/Engineer in the following manner:
1. Submit two (2) copies of all requested material to the Architect five (5) working days prior to bid closing. Any material requests for approval received by the Architect less than five (5) working days prior to bid closing will not be considered and are thereby not approved. Submittal shall include a self-addressed, stamped envelope of sufficient size to hold one (1) copy of all submitted material and enough postage to insure its return.
  2. Submit a "Request for Approval" letter which shall state the name and location of the project; the name, address, phone number, fax number of the supplier or manufacturer and the name of the person representing the product. Letter shall further state the name and model number of the product being requested "or equal".
  3. Submit product literature on the proposed "or equal" product. Literature shall contain sufficient data, tests, and manufacturing information to allow the Architect to judge if the product will be considered equal.
  4. Approval of a product as "or equal" prior to bid closing will not relieve the successful bidder of complying with Paragraph B above.
  5. All products approved to bid will be listed in an addendum.
  6. Fax and electronic submittals will be accepted until **noon** local time five (5) working days prior to bid closing. Any material received less than five (5) working days prior to bid closing will not be considered, will not be recorded by addendum and thereby is not approved.
- E. No request for approval of "or equal" materials will be entertained except from the prime contractor after contracts have been awarded. Such request will only be considered under the following conditions:
1. Failure of the supplier/subcontractor of the specified material to comply with the specifications and job requirements.
  2. An excessively long delivery date of the specified material which will cause a delay in the job.
  3. Cost of the specified material is substantially more than an equal product, and this cost savings will be passed on to the Owner in the form of a credit.

**END OF SECTION**

**SECTION 01 35 00 - SPECIAL PROJECT PROCEDURES**

**THIS SECTION DEALS WITH HAZARDOUS SUBSTANCES AND IS BASED ON UNIVERSITY REQUIREMENTS, MAY NEED TO BE REDONE FOR WORK IN THE PRIVATE SECTOR.**

**PART 1 - GENERAL****1.01 GENERAL**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.

**1.02 DESCRIPTION**

- A. This Section specified administrative and procedural requirements for work involving hazardous materials.
- B. Hazardous materials include the following:
1. Asbestos containing materials, which may include pipe and duct insulation, plaster, countertops, and vinyl asbestos tile.
  2. Polychlorinated biphenyls (PCBs) and PCB containing equipment.
  3. Lead.

**1.03 REFERENCES**

- A. Minnesota Employee Right-to-Know Act of 1983, and current revisions.
- B. Regulations governing the handling of asbestos-containing materials and the disposal of asbestos-containing debris include:
1. Code of Federal Regulations (CFR), Title 29, U.S. Department of Labor - Occupational Safety and Health Administration (OSHA), Section 1910.1001 - Asbestos.
  2. 29 CFR 1910.1200(f) - OSHA Hazard Communication Standard.
  3. Minnesota Pollution Control Agency Rules, Chapter 17 - Emission Standards for Asbestos.
  4. Minnesota Department of Health "Asbestos Abatement Rules"; Sections 7005-1611 through 7005.1618.
- C. If a material is encountered which the Contractor suspects may contain asbestos, leave the material undisturbed and immediately notify the Construction Administrator. The Owner will test the suspected material for asbestos content. If the material contains asbestos in a concentration of 1.0% or more by weight, the Owner will remove the material by separate contract.

- D. If the concentration of asbestos is found to be less than 1.0% but more than 0.1% by weight, or if the fiber content in the air exceeds 0.1 fiber/cc, comply with OSHA regulations which require special handling and procedures. Regulations include provisions for training of personnel, air monitoring, and medical surveillance.
- E. Perform demolition work required to expose asbestos containing materials, which will be removed by others.
- F. Limit dust and dirt dispersal to lowest practicable level. Use water misting for cutting, hammering, and other operations which might generate dust. Control water to prevent hazardous conditions, spread of pollutants, and damage of products to remain or be reused. Comply with governing regulations regarding environmental hazards. Notify Construction Administrator of possible exposure to harmful dusts and vapors, flammable or explosive materials, and other potential hazards.
- G. Provide local exhaust system to capture dust and dirt. Use tools with integral ventilation hoods connected to exhaust system. Exhaust air through HEPA filter system. Dispose of filters as contaminated material.

#### **1.04 DEFINITIONS**

- A. Abatement Awareness Training: Certificate course work in asbestos awareness, including health hazards and handling, disposal, and monitoring methods.

**END OF SECTION**

**SECTION 01 41 00 - REGULATORY REQUIREMENTS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

**1.02 REGULATORY REQUIREMENTS**

- A. All work and material shall conform strictly to the respective requirements of the latest adopted editions of the following:
1. Rules of the National Board of Fire Underwriters.
  2. Standard Specifications of the American Society of Testing Materials.
  3. Local ordinances and codes.
  4. State Laws of Minnesota.
  5. Latest Edition of NFPA Life Safety Code 101.
  6. Requirements of the International Building Code and applicable State Code.

**1.03 MISCELLANEOUS**

- A. Contractor shall perform all work in accordance with other regulatory requirements as listed in the individual technical sections of this specification.

**END OF SECTION**

**SECTION 01 45 00 - QUALITY CONTROL****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. The Owner shall select and pay for services of a testing laboratory to perform tests as called for in other sections of this specification. Testing lab shall be approved by the Architect and the Owner. All tests performed shall be as per Special Inspections required by Section 01 45 23.
- C. Inspection and testing in connection with mechanical and electrical work is specified in Divisions 21, 22, 23, 26, 27 and 28.

**1.02 DUTIES OF TESTING LABORATORY**

- A. Cooperate with Architect, Owner and Trade Contractors; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction as directed by the Architect and these specifications.
  - 1. Comply with specified standards.
  - 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify Architect, Owner and Trade Contractor of observed irregularities or deficiencies of work or products.
- D. Promptly submit two copies of written report of each test and inspection to Architect and Owner, and as many copies as the Contractor requires. Each report shall include the following:
  - 1. Date issued.
  - 2. Project title and number.
  - 3. Testing Laboratory name, address and telephone number.
  - 4. Name and signature of laboratory inspector.
  - 5. Date and time of sampling or inspection.
  - 6. Record of temperature and weather conditions.
  - 7. Date of test.
  - 8. Identification of product and specification section.
  - 9. Location of sample or test in the project.
  - 10. Type of inspection or test.
  - 11. Results of tests and compliance with Contract Documents.
  - 12. Interpretation of results when requested by the Architect.
- E. Architect or Owner may request additional testing, basis of payment shall be as outlined in Article 13.5 of the General Conditions.
- F. All tests required by this specification, including concrete and soil compaction tests, shall be performed by an approved testing laboratory. Cost of all tests shall be paid for by the Owner. When the performance of items installed by the Contractor is found to be defective or below the design level set forth in the specifications, these items shall be removed and replaced with new or adjustments made to correct deficiencies. Cost of additional tests for such replacement or adjusted items shall be paid for by the Contractor.

### **1.03 CONTRACTOR'S RESPONSIBILITIES**

- A. Cooperate with laboratory personnel, provide access to the work and to manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Work with the laboratory to develop the design mix proposed to be used for concrete, and other materials mixes that require control by the testing laboratory.
- D. Furnish incidental labor and facilities as follows:
  - 1. Provide access to the work to be tested.
  - 2. Obtain and handle samples at the project site or at the source of the product to be tested.
  - 3. Facilitate inspections at the site.
  - 4. Storage and curing of test samples at the site.
- E. Notify the Architect, Owner and Laboratory 24 hours in advance for on-site testing and 48 hours in advance for off-site testing to allow for laboratory assignment of personnel and scheduling of tests.
- F. Furnish labor as necessary to obtain and handle samples at the project site or at other sources of material; repair structures from which samples of solid materials have been taken.
- G. Furnish all electrical power, turning, or moving of members, hoisting, staging and other facilities required for inspection.

### **1.04 QUALIFICATION TESTING**

- A. In addition to tests specified, should the Contractor propose a product, material, method of assembly that is of unknown or questionable quality to the Architect or Owner, the Architect or Owner may require and order suitable tests to establish a basis for acceptance or rejection of a proposed product, material or method of assembly that is of unknown or questionable quality. Such tests will be paid for by the Contractor. "Standard" test reports on "similar" material will not be accepted.

### **1.05 MISCELLANEOUS INSPECTIONS**

- A. Where Specifications, Architect's instructions, laws, ordinances or any public authority require any work to be inspected or approved; give timely notice of its readiness for inspection and a reasonable date fixed for such inspection. If any work should be covered up without approval or consent of approving agency, or Architect or Owner, it must be uncovered for examination at the Contractor's expense.

### **1.06 TESTS AND ADJUSTMENTS - INSTALLED EQUIPMENT**

- A. The complete installation, consisting of the several parts and systems and all equipment installed according to the requirements of the specification and as shown on the drawings, shall be ready in all respects for use by the Owner and shall be subject to a test at full operating conditions and pressures for normal conditions of use.
- B. Contractor shall make all necessary adjustments and replacements affecting the work which are necessary to fulfill the Owner's requirements and to comply with the directions and recommendations of the manufacturer of the several pieces of equipment, and to comply with all codes and regulations which may apply to the entire installation. Contractor shall also make all required adjustments to comply with all provisions of the drawings and specifications.

**END OF SECTION**



**SECTION 01 45 23 - SPECIAL INSPECTIONS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. Special Inspection Firm is to be hired directly by the Owner; this Section is to assist the Contractor in scheduling and coordination of special inspections.
- C. This Section includes all labor, materials, equipment and services necessary to perform all special inspections and testing as required by Chapter 17 of the International Building Code and as shown on the drawings and specified herein.
- C. Related Work Specified Elsewhere:
  - 1. Subsurface Investigation - Section 02 30 00
  - 2. Concrete Reinforcement – Section 03 20 00
  - 3. Cast-In-Place Concrete - Section 03 30 00
  - 4. Unit Masonry - Section 04 20 00
  - 5. Structural Metals – Section 05 10 00
  - 6. Metal Decking - Section 05 30 00
  - 7. Miscellaneous Metal - Section 05 50 00
  - 8. Excavating & Backfilling - Section 31 23 00
  - 9. Asphalt Paving – Section 32 12 16

**1.02 SPECIAL INSPECTOR**

- A. Special Inspector/Testing Laboratory shall be qualified to perform the tests involved and shall be acceptable to the Building Official.
- B. The Special Inspector/Testing Laboratory shall be responsible to perform the following duties along with requirements listed in the individual Sections of this specification:
  - 1. Observe the work assigned for conformance with the approved design drawings and specifications.
  - 2. Furnish inspection reports to the Building Official, Contractor, Architect, Owner and other designated persons. All discrepancies shall be brought to the immediate attention of the contractor for correction, then, if uncorrected, to the proper design authority and to the building official.
  - 3. Submit a final signed report stating whether the work requiring special inspection was to the best of his/her knowledge, in conformance with the approved plans and specifications and the applicable workmanship provision of this code.

**1.03 WAIVER OF SPECIAL INSPECTION**

- A. The Building Official may waive the requirements for the employment of a Special Inspector if he/she finds that the construction is of minor nature. This Bidder shall verify with the Building Official prior to bidding the amount or scope of Special Inspections that will be required for this project.

- B. Periodic Special Inspection - Some inspections may be made on a periodic basis and satisfy the requirements of continuous inspection, provided this periodic scheduled inspection is performed as outlined in the project plans and specifications and is approved by the Building Official. This Bidder shall verify with the Building Official prior to bidding if the schedules listed for periodic inspection are satisfactory or if more extensive inspections are required.

#### **1.04 APPROVED FABRICATORS**

- A. Special inspections required by Chapter 17 of the International Building Code shall not be required where the work is done on the premises of a fabricator registered and approved by the Building Official to perform such work without special inspection. The certificate of registration shall be subject to revocation by the Building Official if it is found that any work done pursuant to the approval is in violation of this code. The approved fabricator shall submit a Certificate of Compliance that the work was performed in accordance with the approved plans and specifications to the Building Official and to the Architect of record. The approved fabricator's qualifications shall be contingent on compliance with the following:
1. The fabricator has developed and submitted a detailed fabrication procedural manual reflecting key quality control procedures which will provide a basis for inspection control of workmanship and the fabricator plant.
  2. Verification of the fabricator's quality control capabilities, plant and personnel as outlined in the fabrication procedural manual shall be by an approved inspection or quality control agency.
  3. Periodic plant inspections shall be conducted by an approved inspection or quality control agency to monitor the effectiveness of the quality control program.
  4. It shall be the responsibility of the inspection or quality control agency to notify the approving authority in writing of any change to the procedural manual. Any fabricator approved may be revoked for just cause. Reapproval of the fabricator shall be contingent on compliance with quality control procedures during the past year.

#### **1.05 SPECIAL INSPECTIONS**

- A. **Concrete:** Furnished under this Section. Requirements for concrete testing are spelled out under Section 03 30 00 Cast-In-Place Concrete. Refer to Table 1705.3 of the IBC.
- B. **Bolts Installed In Concrete:** As per Table 1705.3 of the IBC.
- C. **Structural Masonry:** Continuous and periodic testing of masonry (Section 04 20 00) is to be completed by IBC 1705.4.
- D. **Special Grading, Excavation and Filling:** Furnished under this Section as per testing requirements as noted under Section 31 23 00. Subsurface soil investigation has been furnished by the Owner under a separate contract, see Section 02 30 00. Testing shall comply with IBC 1705.6.

**END OF SECTION**

**SECTION 01 50 00 CONSTRUCTION FACILITIES & TEMPORARY CONTROLS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. Provide facilities of a temporary nature required for the execution of the work including, but not necessarily limited to, those described herein.
- C. Temporary facilities shall conform to applicable safety regulations and to the requirements of municipalities and utility companies involved.
- D. Remove temporary facilities as soon as a permanent replacement facility is available or as soon as the need for a temporary facility no longer exists.

**1.02 FIELD OFFICES**

- A. Temporary office space will be assigned within the building for use by the Contractor as an office. Space shall be kept neat and clean at all times and shall be restored to its original condition at the completion of the Contract.
- B. If other offices are provided as needed by other Contractors, they will be located as agreed to by the Contractor and approved by the Architect/Engineer.
- C. Office shall be removed at the completion of all work or when and if the Contractor sets up similar facilities within the building.

**1.03 STAIRS AND SCAFFOLDS**

- A. Others requiring scaffolds shall make arrangements with the Contractor/General Trade or, shall provide their own and remove them on completion of the work.
- B. Underlay interior scaffolds with planking to prevent uprights from resting directly on the floor construction.

**1.04 SIGNS**

- A. The Contractor shall provide and maintain temporary warning signs and other temporary signs required for the safe and proper execution of the Work. No billboards, advertisements or similar signs shall be erected on site unless otherwise indicated in Contract Documents or prior approved by the Owner.

**1.05 FENCE**

- A. Each contractor shall erect and maintain necessary fences and protective barricades for his portion of the work for the protection of the work and the public.
- B. Provide barricades, warning lights, general illumination, audible warning devices, colored flasher lights, and warning signs in accordance with code requirements of governing agencies to inform construction personnel and the general public of the hazard being protected.

### **1.06 TOILETS**

- A. The Contractor/General Trade shall provide and maintain sanitary temporary toilets, located where directed, in sufficient number required for the force employed. The toilets shall comply with the requirements of State and local regulations relating to health and sanitation.
- B. The Contractor/General Trade shall maintain the temporary toilets in a sanitary condition at all times and shall supply toilet paper until completion of job.

### **1.07 WATER SUPPLY**

- A. Water is available at the site for use by the Contractor on this project. Contractor shall install temporary water lines at place and times required for the proper execution of the work. All temporary lines shall be removed at the completion of the project.
- B. Contractor/General Trade shall prevent waste of water and shall maintain valves, connections, and hoses in perfect condition at all times. Trades shall provide their own hose or piping from hose bibbs.

### **1.08 TEMPORARY ELECTRICAL WORK**

- A. The Owner will provide the energy at no cost to the Contractor provided it is conservatively used. The Contractor shall be responsible for the temporary connections including their cost and shall remove them upon completion of the work. Work shall be done to insure protection to the existing system and power demands shall not exceed existing service capabilities. Damage to the existing service shall be made good by the Contractor at his own expense. Energy shall be provided from the nearest point of service.

### **1.09 COLD WEATHER PROTECTION**

- A. None required.

### **1.10 ENCLOSURE**

- A. Before the building, or portion thereof, can be considered enclosed, the Contractor/General Trade shall have advanced the construction of the building to conform with the requirements stated hereinafter.
  - 1. The exterior walls shall be erected to their full thickness (exclusive of any interior finish materials related to them) and their height shall extend to the top of the horizontal level which encloses the space intended to receive heat. If erection of full thick walls is not feasible, erection of back-up wall only will be accepted if approved weatherproofing of back-up materials is provided to avoid damage to back-up materials.
  - 2. The horizontal slab, which will serve as the overhead enclosure of the spaces to receive heat (whether it be the roof slab or intermediate floor slab) shall have all openings covered with closures capable of sustaining any loads imposed therein. The entire overhead enclosure shall be made weatherproof.
  - 3. Provide approved translucent material for temporary enclosure of window openings if they have not been glazed. Plain or reinforced polyethylene film or other suitable translucent material will be acceptable, provided it is installed in or on a well fitting rigid wood frame and kept in good repair. This means of temporary enclosure shall be used for other minor openings in walls.

4. Construct temporary walls as required to protect contents and to separate the interior enclosed sections from the exterior open section of the building during construction. Temporary wall enclosure shall consist of plywood panels, at least 3/8" thick, fastened to wood framework, consisting of 2 x 4 studs spaced 24" o.c., securely spiked to wood plates, top and bottom. Provide intermediate girts between studs as required for fastening of plywood. Temporary walls must provide protection from dirt, dust, and drafts.
  5. Provide exterior doors with hinges, self-closing device and locks.
  6. Make suitable provisions for passage of air to permit proper drying out of the building.
- B. At end of day's work, securely close temporary enclosures. Padlock exterior doors. The Contractor/General Trade shall supervise effectiveness of enclosures.
- C. Where reference is made to a "portion of the building", it is intended to mean definable areas of the building such as a group of floor levels or an entire wing of the building. It is not intended to require a room-by-room or erratic piece-meal enclosure operation, but shall provide for an orderly expansion of large adjacent or related areas to be enclosed which are advantageous to the progress of the work and approved by the Architect/Engineer.

#### **1.11 TEMPORARY HEAT**

- A. None required.

#### **1.12 FIRE PROTECTION**

- A. The Contractor/General Trade shall provide and maintain in working order during the entire construction period, a minimum of two (2) fire extinguishers on each floor level, including basement of the building, and one (1) in temporary office. Extinguishers shall be non-freeze type such as A-B-C rated dry chemical of not less than 10 pounds capacity each. In addition, any Subcontractor who maintains an enclosed shed on the site shall provide and maintain, in an accessible location, one or more similar non-freezing type fire extinguishers in each enclosed shed.
- B. Do not allow combustible debris to accumulate; refer to General Conditions, Article 3.15. Smoking by workers shall be confined to designated safe areas. Keep adhesives and materials containing solvents in tightly sealed containers.

#### **1.13 WATCHMEN**

- A. Watchmen will not be furnished by Owner. The Contractor shall provide such precautionary measures, to include the furnishing of watchmen if deemed necessary, to protect persons and property from damage or loss where the Contractor's work is involved.

#### **1.14 TREE PROTECTION**

- A. Protect trees and shrubs from damage unless specifically noted to be removed. Protection shall be placed before any work is started at the site and shall be maintained in good repair until the work is completed. Trees which are to remain shall not be used for crane stays, guy anchors or other fastenings. Do not light fires, store materials, pile debris or park motorized equipment within the spread of the branches of any tree.

- B. Protection shall consist of boxing or fencing as described herein unless indicated otherwise on the drawings.
  - 1. Trees with low hanging branches and shrubbery shall be fenced around the outer perimeter of the spread of the branches with standard 48" high snow fence mounted on steel posts spaced six feet on center.
- C. Additional requirement indicated on the drawings.

**1.15 PARKING**

- A. Automobiles, trucks and other vehicles belonging to the contractors, subcontractors, suppliers and their employees shall be parked on the site in areas designated by the Owner.

**END OF SECTION**

**SECTION 01 56 39 TEMPORARY TREE AND PLANT PROTECTION****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, tools, equipment, facilities, transportation and services necessary for, and incidental to performing all operations in connection with protection of existing trees and other plants as shown on the drawings and as specified herein.
  - 1. Provide tree and plant protection fencing.
  - 2. Provide protection of root zones and above ground tree and plants
  - 3. Coordinate with the requirements of Section 32 91 13 - Soil Preparation for modifications to the soil within the root zone of existing trees and plants.
  - 4. Remove tree protection fencing and other protection from around and under trees and plants.
  - 5. Clean up and disposal of all excess and surplus material.
- C. Related Work Specified Elsewhere:
  - 1. Planting Preparation - Section 32 91 00
  - 2. Soil Preparation - Section 32 91 13

**1.02 REFERENCES**

- A. In the event that the requirements of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail.
  - 1. ANSI A 300 (Part 5) – Standard Practices for Tree, Shrub and other Woody Plant Maintenance, current version.
  - 2. Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign Il, current version.

**1.03 VERIFICATION**

- A. All scaled dimensions on the drawings are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities, and shall immediately inform the Owner's Representative of any discrepancies between the information on the drawings and the actual conditions, refraining from doing any work in said areas until given approval to do so by the Owner's Representative.

**1.04 PERMITS AND REGULATIONS**

- A. The Contractor shall obtain and pay for all permits related to this section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner's Representative in writing including a description of any necessary changes and changes to the contract price resulting from changes in the work.

### **1.05 DEFINITIONS**

All terms in this specification shall be as defined in the “Glossary of Arboricultural Terms” or as modified below.

- A. Owner’s Representative: The person appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner’s Representative may appoint other persons to review and approve any aspects of the work.
- B. Shrub: Woody plants with mature height approximately less than 25 feet.
- C. Tree and Plant Protection Area: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and defined by a circle centered on the trunk with each tree with a radius equal to the crown/canopy dripline unless otherwise indicated by the owner’s representative.
- D. Tree: Single and multi-stemmed plants, including palms with anticipated mature height approximately greater than 25 feet or any plant identified on the plans as a tree.

### **1.06 SUBMITTALS**

- A. PRODUCT DATA: Submit manufacturer product data and literature describing all products required by this section to the Owner’s Representative for approval. Provide submittal four weeks before the start of any work at the site.

### **1.07 OBSERVATION OF THE WORK**

- A. The Owner’s Representative may inspect the work at any time.

### **1.08 QUALITY ASSURANCE**

- A. Contractor qualifications:
  - 1. All pruning, branch tie back, tree removal and root pruning required by this section shall be performed by or under the direct supervision of the Landscape Architect.
  - 2. Any application of pesticide or herbicide shall be performed by a person maintaining a current state license to apply chemical pesticides valid in the jurisdiction of the project. Submit copies of all required state licensing certificates including applicable chemical applicator licenses.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

#### **2.01 MULCH**

- A. Mulch shall be coarse, ground, from tree and woody brush sources. The minimum range of fine particles shall be 3/8 inch or less in size and a maximum size of individual pieces shall be approximately 1 to 1-1/2 inch in diameter and maximum length of approximately 4 to 8 inches. No more than 25% of the total volume shall be fine particles and no more than 20% of total volume be large pieces.  
It is understood that Mulch quality will vary significantly from supplier to supplier and region to region.
  - 1. The above requirements may be modified to conform to the source material from locally reliable suppliers as approved by the Owner’s Representative.
- B. Submit suppliers product data that product meets the requirements and two gallon sample for approval.



**2.02 TREE PROTECTION FENCING**

- A. **PLASTIC MESH FENCE:** Heavy - duty orange plastic mesh fencing fabric 48 inches wide. Fencing shall be attached to metal "U" or "T" post driven into the ground of sufficient depth to hold the fabric solidly in place without sagging. The fabric shall be attached to the post using attachment ties of sufficient number and strength to hold up the fabric without sagging. The Owner's Representative may request, at any time, additional post(s), deeper post depths, and/or additional fabric attachments if the fabric begins to sag, leans or otherwise not present a sufficient barrier to access.

**2.03 TREE PROTECTION SIGN**

- A. Heavy-duty cardboard signs, 8.5 inches x 11 inches, white colored background with black 2 inch high or larger letters block letters. The signs shall be attached to the tree protection fence every 50 feet o.c. The tree protection sign shall read "Tree and Plant Protection Area- Keep Out".

**2.04 GEOGRID**

- A. Geogrid shall be woven polyester fabric with PVC coating, Uni-axial or biaxial geogrid, inert to biological degradation, resistant to naturally occurring chemicals, alkalis, acids.
  - 1. Geogrid shall be Miragrid 2XT as manufactured by Ten Cate Nicolon, Norcross, GA. <http://www.tencate.com>
  - 2. Approved equal.
- B. Submit suppliers product data that product meets the requirements for approval.

**PART 3 - EXECUTION****3.01 SITE EXAMINATION**

- A. Examine the site, tree, plant and soil conditions. Notify the Owner's Representative in writing of any conditions that may impact the successful Tree and Plant Protections that is the intent of this section.

**3.02 TREE AND PLANT PROTECTION AREA**

- A. The Tree and Plant Protection Area is defined as all areas indicated on the drawings. Where no limit of the Tree and Plant Protection area is defined on the drawings, the limit shall be the drip line (outer edge of the branch crown) of each tree.

**3.03 PREPARATION**

- A. Prior to the preconstruction meeting, layout the limits of the Tree and Plant Protection Area and then alignments of required Tree and Plant Protection Fencing and root pruning. Obtain the Owner's Representative's approval of the limits of the protection area and the alignment of all fencing and root pruning.
- B. Flag all trees and shrubs to be removed by wrapping orange plastic ribbon around the trunk and obtain the Owner's Representative's approval of all trees and shrubs to be removed prior to the start of tree and shrub removal. After approval, mark all trees and shrubs to be removed with orange paint in a band completely around the base of the tree or shrub 4.5 feet above the ground.
- C. Flag all trees and shrubs to remain with white plastic ribbon tied completely around the trunk or each tree and on a prominent branch for each shrub. Obtain the Owner's Representative's approval of all trees and shrubs to be remain prior to the start of tree and shrub removal.
- D. Install all tree protection fencing, silt fence, tree protection signs and mulch as shown on the drawings.

- E. Prior to commencing any construction activity at the site including utility work, grading, storage of materials, or installation of temporary construction facilities,

### **3.04 ROOT PRUNING**

- A. Prior to any excavating into the existing soil grade within 25 feet of the limit of the Tree and Plant Protection Area or trees to remain, root prune all existing trees to a depth of 24 inches below existing grade in alignments following the edges of the Tree and Plant Protection Area or as directed by the Owner's Representative. Root pruning shall be in conformance with ANSI A300 (part 8) latest edition.
  - 1. Using a rock saw, chain trencher or similar trenching device, make a vertical cut within 2 feet of the limit of grading.
  - 2. After completion of the cut, make clean cuts with a lopper, saw or pruner to remove all torn root ends on the tree side of the excavation, and backfill the trench immediately with existing soil, filling all voids.

### **3.05 INSTALLATION OF GEOGRIDS AND/OR MULCH**

- A. Install Geogrids and/or Mulch in areas and depths shown on the plans and details or as directed by the Owner's representative. In general it is the intent of this specification to provide the following levels of protection:
  - 1. All areas within the Tree and Plant Protection area provide a minimum of 5 inches of Wood Chips or Mulch.
  - 2. Areas where occasional vehicle traffic is anticipated to be unavoidable provide a layer of Geogrid under 8 inches of Mulch.

### **3.06 PROTECTION**

- A. Protect the Tree and Plant Protection Area at all times from compaction of the soil; damage of any kind to trunks, bark, branches, leaves and roots of all plants; and contamination of the soil, bark or leaves with construction materials, debris, silt, fuels, oils, and any chemicals substance. Notify the Owner's Representative of any spills, compaction or damage and take corrective action immediately using methods approved by the Owner's Representative.

### **3.07 GENERAL REQUIREMENTS FOR OPERATIONS WITHIN THE TREE AND PLANT PROTECTION AREA**

- A. The Contractor shall not engage in any construction activity within the Tree and Plant Protection Area without the approval of the Owner's Representative including: operating, moving or storing equipment; storing supplies or materials; locating temporary facilities including trailers or portable toilets and shall not permit employees to traverse the area to access adjacent areas of the project or use the area for lunch or any other work breaks. Permitted activity, if any, within the Tree and Plant Protection Area may be indicated on the drawings along with any required remedial activity as listed below.
- B. In the event that construction activity is unavoidable within the Tree and Plant Protection Area, notify the Owner's Representative and submit a detailed written plan of action for approval. The plan shall include: a statement detailing the reason for the activity including why other areas are not suited; a description of the proposed activity; the time period for the activity, and a list of remedial actions that will reduce the impact on the Tree and Plant Protection Area from the activity. Remedial actions shall include but shall not be limited to the following:
  - 1. In general, demolition and excavation within the drip line of trees and shrubs shall proceed with extreme care either by the use of hand tools, directional boring where required or with other low impact equipment that will not cause damage to the tree, roots or soil.

2. When encountered, exposed root, 1 inch in diameter and larger shall be worked around in a manner that does not break the outer layer of the root surface (bark). These roots shall be covered in Wood Chips and shall be maintained (e.g. watered) at all times. Roots one inch and larger in diameter shall not be cut without the approval of the Owner's Representative. Excavation shall be tunneled under these roots without cutting them. In the areas where roots are encountered, work shall be performed and scheduled to close excavations as quickly as possible over exposed roots.
3. Tree branches that interfere with the construction may be tied back or pruned to clear only to the point necessary to complete the work. Other branches shall only be removed when specifically indicated by the Owner's Representative. Tying back or trimming of all branches and the cutting of roots shall be in accordance with accepted arboricultural practices (ANSI A300, part 8) and be performed under supervision of the arborist.

### 3.08 TREE REMOVAL

- A. Remove all trees indicated by the drawings and specifications, as requiring removal, in a manner that will not damage adjacent trees or structures or compacts the soil.
- B. Remove trees that are adjacent to trees or structures to remain, in sections, to limit the opportunity of damage to adjacent crowns, trunks, ground plane elements and structures.
- C. Do not drop trees with a single cut unless the tree will fall in an area not included in the Tree and Plant Protection Area. No tree to be removed within 50 feet of the Tree and Plant Protection Area shall be pushed over or up-rooted using a piece of grading equipment.
- D. Protect adjacent paving, soil, trees, shrubs, ground cover plantings and understory plants to remain from damage during all tree removal operations, and from construction operations. Protection shall include the root system, trunk, limbs, and crown from breakage or scarring, and the soil from compaction.
- E. Remove stumps and immediate root plate from existing trees to be removed. Grind trunk bases and large buttress roots to a depth of the largest buttress root or at least 18 inches below the top most roots which ever is less and over the area of three times the diameter of the trunk (DBH).
  1. For trees where the stump will fall under new paved areas, grind roots to a total depth of 18 inches below the existing grade. If the sides of the stump hole still have greater than approximately 20% wood visible, continue grinding operation deeper and or wider until the resulting hole has less than 20% wood. Remove all wood chips produced by the grinding operation and back fill in 8 inch layers with controlled fill of a quality acceptable to the site engineer for fill material under structures, compacted to 95% of the maximum dry density standard proctor. The Owner's Representative shall approve each hole at the end of the grinding operation.
  2. In areas where the tree location is to be a planting bed or lawn, remove all woodchips and backfill stump holes with planting soil as defined in Specification Section Planting Soil, in maximum of 12 inch layers and compact to 80 - 85% of the maximum dry density standard proctor.

### 3.09 PRUNING

- A. Within six months of the estimated date of substantial completion, prune all dead or hazardous branches larger than 2 inch in diameter from all trees to remain.
- B. Implement all pruning recommendations found in the arborist report.
- C. Prune any low, hanging branches and vines from existing trees and shrubs that overhang walks, paved pedestrian areas in the work area shown on the drawings as follows:
  1. Walks - within 8 feet vertically of the proposed walk elevation.
  2. Parking areas - within 12 feet vertically of the proposed parking surface elevation.
  3. Streets and drives - within 14 feet vertically of the proposed driving surface elevation.

- D. All pruning shall be done in accordance with ANSI A300 (part 1) and ISA BMP Tree Pruning (latest edition).
- E. Perform other pruning task as indicated on the drawings or requested by the Owner's Representative.
- F. Where tree specific disease vectors require, sterilize all pruning tools between the work in individual trees.

### **3.10 WATERING**

- A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants to be preserved during the entire construction period. Adequate water is defined to be maintaining soil moisture above the permanent wilt point to a depth of 8 inches or greater.
- B. The Contractor shall adjust the automatic irrigation system, if available, and apply additional water, using hoses or water tanks as required.
- C. Periodically test the moisture content in the soil within the root zone to determine the water content.

### **3.11 WEED REMOVAL**

- A. During the construction period, control any plants that seed in and around the fenced Tree and Plant Protection area at least three times a year.
  - 1. All plants that are not shown on the planting plan or on the Tree and Plant Protection Plan to remain shall be considered as weeds.
- B. At the end of the construction period provide one final weeding of the Tree and Plant Protection Area.

### **3.12 INSECT AND DISEASE CONTROL**

- A. Monitor all plants to remain for disease and insect infestations during the entire construction period. Provide all disease and insect control required to keep the plants in a healthy state using the principles of Integrated Plant Management (IPM). All pesticides shall be applied by a certified pesticide applicator.

### **3.13 CLEAN-UP**

- A. During tree and plant protection work, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.
  - 1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.
- B. Once tree protection work is complete, wash all soil from pavements and other structures. Ensure that Mulch is confined to planting beds.
- C. Make all repairs to grades, ruts, and damage to the work or other work at the site.
- D. Remove and dispose of all excess Mulch, Wood Chips, packaging, and other material brought to the site by the Contractor.

### **3.14 REMOVAL OF FENCING AND OTHER TREE AND PLANT PROTECTION**

- A. At the end of the construction period or when requested by the Owner's Representative remove all fencing, Mulch, Geogrid and any other Tree and Plant Protection material.

**3.15 DAMAGE OR LOSS TO EXISTING PLANTS TO REMAIN**

- A. Any trees or plants designated to remain and which are damaged by the Contractor shall be replaced in kind by the Contractor at their own expense. Trees shall be replaced with a tree of similar species and of equal size, or 6-inch caliper whichever is less. Shrubs shall be replaced with a plant of similar species and equal size or the largest size plant available whichever is less. Where replacement plants are to be less than the size of the plant that is damaged, or of substitute type, the Landscape Architect shall approve the size and quality or species substitution of the replacement plant.
  - 1. All trees and plants shall be installed per the requirements of Section 32 93 00 - Plants.
- B. Plants that are damaged shall be considered as requiring replacement or appraisal in the event that the damage affects more than 25 % of the crown, 25% of the trunk circumference, or root protection area, or the tree is damaged in such a manner that the tree could develop into a potential hazard. Trees and shrubs to be replaced shall be removed by the Contractor at his own expense.
  - 1. The Owner's Representative may engage an independent arborist to assess any tree or plant that appears to have been damaged to determine their health or condition.
- C. Any tree that is determined to be dead, damaged or potentially hazardous by the Landscape Architect and upon the request of the Owner's Representative shall be immediately removed by the Contractor at no additional expense to the owner. Tree removal shall include all clean up of all wood parts and grinding of the stump to a depth sufficient to plant the replacement tree or plant, removal of all chips from the stump site and filling the resulting hole with topsoil.
- D. Any remedial work on damaged existing plants recommended by the Landscape Architect shall be completed by the Contractor at no cost to the owner. Remedial work shall include but is not limited to: soil compaction remediation and vertical mulching, pruning, watering and additional mulch application.
- E. Remedial work may extend up to two years following the completion of construction to allow for any requirements of multiple applications or the need to undertake applications at required seasons of the year.

**END OF SECTION**

**SECTION 01 60 00 - MATERIAL AND EQUIPMENT****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

**1.02 GENERAL**

- A. Contractor or the Contractor's authorized representative must be present to accept delivery of all equipment and material shipments. The Owner's employees will not knowingly accept, unload or store anything delivered to the site for the Contractor's use. Inadvertent acceptance of delivered items by any representative of the Owner shall not constitute acceptance or responsibility for any of the materials or equipment. It shall be the Contractor's responsibility to assume all liability for any equipment or material delivered to the job site.
- B. Comply with all posted regulations, signs, and directions regarding traffic, parking or loading/unloading.

**1.03 STORAGE OF MATERIALS**

- A. Contractor shall confine equipment, apparatus, storage of materials and operations to limits, indicated by directions of the Architect/Engineer and shall not bring material onto the site until they are needed for the progress of the work.
- B. The storage of materials on the grounds and within the building shall be in strict accordance with the instructions of the Architect/Engineer. Storage of materials within the building shall at no time exceed the design carrying capacity of the structural system.
- C. Deliver, handle, and store material and equipment in accordance with manufacturer's recommendations using methods and means which will prevent damage, deterioration, and loss, including theft.
- D. All materials affected by moisture shall be stored on platforms and protected from the weather.
- E. The Owner assumes no responsibility for materials stored in building or on the site. The Contractor assumes full responsibility for damage due to the storing of materials.
- F. Repairing of areas used for placing of sheds, offices, and for storage of materials shall be done by the Contractor.

**1.04 PROTECTION OF FINISHED CONSTRUCTION**

- A. Contractor shall assume the responsibility for the protection of all finished construction under his Contract and shall repair and restore any and all damage of finished work to its original state.
- B. Where responsibility can be established for damage to finished construction, the cost for repair or replacement shall be charged to the party responsible. If responsibility cannot be fixed, the cost shall be prorated among all contractors in proportion to their activities at the building at the time the damage was done.
- C. Wheeling of any loads over any type of floor, either with or without plank protection, will be permitted only in rubber tired wheelbarrows, buggies, trucks or dollies.
- D. Where structural concrete is also the finished surface, care must be taken to avoid marking or damaging those surfaces.

**1.05 LABELS, NAMEPLATES AND TRADEMARKS**

- A. Provide a permanent nameplate on each item of service connected or power operated equipment. Locate nameplate on an easily accessible surface. Nameplate shall indicate manufacturer, model number, serial number, capacity, speed, electrical characteristics, and similar essential operating data.
- B. UL fire rating labels and other labels which must be visible after installation shall be located on inconspicuous surfaces. Other labels and trademarks shall be located on concealed surfaces or shall be removable without damaging surfaces. Do not permanently attach or imprint labels or trademarks on surfaces which will be exposed to view in occupied spaces.
- C. Do not paint, deface or conceal required nameplates or labels.

**END OF SECTION**

**SECTION 01 70 00 - PROJECT CLOSEOUT****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

**1.02 SUBSTANTIAL COMPLETION**

- A. When the Contractor considers the Work Substantially Complete, submit to the Owner and Architect the following:
1. A written notice that the Work, or designated portion thereof, is substantially complete.
  2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, Architect and Owner will make an inspection to determine the status of completion.
- C. Should the Architect determine that the Work is not Substantially Complete:
1. Architect will promptly notify the Contractor, in writing, giving the reasons thereafter.
  2. Remedy the deficiencies in the Work, and send a second written notice of Substantial Completion to the Architect.
  3. Architect will reevaluate the Work.
- D. When the Architect finds that the Work is Substantially Complete, he will:
1. Prepare and deliver to the Owner a tentative Certificate of Substantial Completion on AIA Form G704, with a tentative list of items to be completed or corrected before final payment.
  2. After consideration of any objections made by the Contractor or the Owner as provided in the Conditions of the Contract, and when the Architect considers the Work Substantially Complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised list of items to be completed or corrected.

**1.03 FINAL INSPECTION**

- A. When the Work is considered complete, submit written certification to the Architect that:
1. Contract documents have been reviewed.
  2. Work has been inspected for compliance with Contract Documents.
  3. Work has been completed in accordance with Contract Documents.



4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
  5. Work is clean and ready for final inspection.
- B. Architect will make an inspection to verify the status of completion with reasonable promptness after the receipt of such certification.
- C. Should Architect consider that the Work is incomplete or defective:
1. Architect will promptly notify the Contractor in writing, listing the incomplete or defective work.
  2. Take immediate steps to correct the stated deficiencies, and send a second written certification to Architect that the Work is complete.
  3. Architect will reinspect the Work.

#### **1.04 CLOSEOUT SUBMITTALS**

- A. When the Owner has determined that the Work is acceptable under the Contract Documents and the Contract fully performed, prepare and submit final Application for Payment to the Architect, together with the following:
1. Contractor's Affidavit of Payment of Debts and Claims, AIA Document G706.
  2. Contractor's Affidavit of Release of Liens, AIA Document G706A.
  3. Contractor's lien waiver in the full amount of the Contract Sum.
  4. Lien waivers from all subcontractors, sub-subcontractors and major material suppliers who have furnished material for the Work under contract with the Contractor or subcontractor. The lien waivers shall be in the full amount of the Contract involved.
  5. Consent of surety to final payment on Consent of Surety Company to Final Payment, AIA Document G707.
  6. Affidavit for obtaining final settlement of Contract with the State of Minnesota and any of its Political or Governmental Subdivisions, Department of Revenue Form IC-134.
  7. Evidence of compliance with the requirements of governing authorities:
    - a. Certificate of Inspection from all required agencies and departments.
  8. Project record documents including Record Drawings and complete final approved and noted shop drawings.
  9. Operating and Maintenance Data, Instructions to Owner's Personnel.
  10. Warranties and Bonds.

11. Special tools required for Owner maintenance.
  12. Project Progress Photographs.
- B. Submit four copies each of items #1 thru #5 above, and two copies each of items #6, #7 and #9 above. In addition, provide one (1) digital copy of all documents.
  - C. All Contractors shall retain all loose and small detachable parts of apparatus and equipment furnished under this contract, until completion of the work, and shall turn them over to the Owner or Owner's representative designated to receive them. Contractor shall obtain from the Owner an itemized receipt thereof in triplicate. Contractor shall retain one copy of receipt for their files and shall attach the other two to request for final payment for the work.

### **1.05 RECORD DRAWINGS**

- A. The Architect/Engineer will provide the Contractor with a suitable set of contract drawings on which daily records of changes and deviations from contract will be recorded. All buried or concealed piping, conduit, or similar items shall be located by dimensions and elevations on the record drawings. Maintain at the site a complete set of drawings, specifications, shop drawings, and product data in clean undamaged condition and mark thereon actual installation which varies significantly from the work as originally shown. Mark whichever document is capable of showing the actual condition most fully and accurately; if shop drawings are used for such marking, cross reference the drawings and specifications to reflect this marking. Pay particular attention to exact location of concealed utilities, pipes, ducts, control valves, dampers and other features which would be difficult or impractical to locate at a future time. Include modifications made by change order or by direction of the construction administrator. Keep record documents current.
- B. The daily record of changes shall be the responsibility of Contractor's field superintendent. No arbitrary mark-ups will be permitted.
- C. During the first week of each month, the Contractor shall present, at the project site, the job copy showing variations and changes to date to the Architect/Engineer and Project Representative for their review.
- D. At completion of the project, the Contractor shall submit the marked up record drawings to the Architect/Engineer prior to final payment. Clearly mark documents with erasable colored pencil. Organize documents into manageable sets, mark "Record Copy", affix contractor's name and date, indicate Owners project name, and deliver to the Architect. Final payment will not be made until these documents have been received by the Owner.

### **1.06 GUARANTEE DOCUMENTS**

- A. Upon "Substantial Completion" of the project, Contractor shall submit such written guarantees to the Architect/Engineer for presentation to the Owner. Furnish guarantees in triplicate unless otherwise indicated.
- B. Prime Contractors shall guarantee and make good without cost to the Owner any defects, settlements, shrinkages or other faults in work arising from improper materials or workmanship on his part which may appear within one (1) year after the acceptance of the work (except for specified guarantees for another length of time specified elsewhere). The Contractor shall, immediately upon notification by the

Architect, proceed at his own expense to replace and repair such work together with any damages to finish, fixtures, equipment, furnishings that may result due to defective work or faults. Any payments for this work shall not relieve him in any way from his responsibility. In case the Contractor fails to do work so ordered, the Owner may have work done, charge the cost thereof against monies retained as provided for in the agreement. If said retained monies are insufficient to pay such cost or if no money is available, the Contractor and his sureties agree to pay the Owner the cost of such work. Nothing herein intends or implies that guarantee shall apply to work which has been abused or neglected by the Owner.

- C. Unless otherwise stated in the specifications, warranties required by the contract documents shall commence on the date of substantial completion.

**1.07 FINAL APPLICATION FOR PAYMENT**

- A. Submit the final Application for Payment in accordance with the procedures and requirements stated in the Conditions of the Contract.

**1.08 PUNCH LIST**

- A. It is required that the punch list items be completed and initialed by the Contractor or Subcontractor that has performed the work and that the punch list must be returned to Architectural Resources, Inc., for the Owner's and Architect's review before final payment can be made.

END OF SECTION

**SECTION 02 40 00 - DEMOLITION****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. The work in this section includes all labor, materials, equipment and services to do all demolition necessary to the construction for a complete job in accordance with the drawings and as specified herein.
- C. Removal of mechanical and electrical work in connection with this work is included in the Mechanical and Electrical Sections of the Specifications except as noted otherwise in this section. Demolition of landscape features as identified on the drawings.

**1.02 PROTECTION**

- A. Do all demolition in a careful and workmanlike manner so as not to impair the strength and safety of the existing building.
- B. Do all shoring, blocking and underpinning in a secure manner to provide adequate support for all loads imposed.
- C. Do all cutting carefully to minimize the amount of patching required.
- D. Where renovation occurs in existing construction, provide and install dust partition of non-combustible construction covered with polyethylene film. Make all joints tight with contact tape and sill sealer to prevent dust and other products of the construction process or demolition from spreading into occupied areas of the building.
- E. Where new construction is being added to an existing building, provide and install one hour rated partitions with all joints tight to prevent dust, odors and smoke from spreading into adjoining building(s). Where doors or other openings are required through this partition, one hour rated penetrations are required.
- F. It is the responsibility of this contractor to protect the existing building against damage from the elements and other causes due to his operations while this work is in progress.
- G. The general contractor shall do all necessary patching of floors, walls, ceilings, etc., which have been disturbed, modified or changed by the work.
- H. All debris from wrecking operations shall not be left to accumulate and shall be removed from the site immediately.

**1.03 DEMOLITION**

- A. Refer to all drawings for demolition items. All notes are general and do not relieve the contractor from removing and patching all work required or necessary for a complete job.
- B. Refer to all drawings for selective demolition notes.

**END OF SECTION**

**SECTION 03 11 00 - CONCRETE FORMWORK****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. The Contractor shall provide all wood or steel forms, cores, centering, molds, etc., required for the proper execution of the concrete work in sufficient quantities to execute and expedite the work properly without endangering the safety or strength of any part of the construction.
- C. Related Work Specified Elsewhere:
  - 1. Concrete Reinforcement - Section 03 20 00
  - 2. Cast-In-Place Concrete - Section 03 30 00
  - 3. Rough Carpentry - Section 06 10 00

**1.02 DESIGN**

- A. The Contractor shall be responsible for the design, engineering and construction of the formwork.
- B. Design removable forms for the loads and lateral pressures outline in the American Concrete Institute Standard "Recommended Practice for Concrete Formwork" (ACI 347).

**PART 2 - PRODUCTS****2.01 FORM MATERIAL**

- A. Unlined forms may be used for all concrete work.
- B. Formwork for concrete surfaces that will be unexposed in the finished structure shall provide a tight fit and relatively smooth surface. Forms shall be of the following types:
  - 1. 5/8" minimum plywood conforming to the American Plywood Association, Plyform, Class I, B-B, Exterior.
  - 2. One or two inch nominal thickness lumber as specified.
  - 3. Metal forms.
- C. Formwork for concrete surfaces that will be exposed in the finished structure shall be new or undamaged and provide a tight fit and smooth surface. Forms shall be of the following types:
  - 1. 5/8" minimum plywood conforming to the American Plywood Association, Plyform, Class I, B-B, Exterior.
  - 2. Metal forms.
- D. All other types of formwork shall be approved by the Architect.

**2.02 ACCESSORIES**

- A. Ties shall be adjustable with a minimum working strength of 3000 lbs. Do not use wire ties and wood spreaders.

- B. Form release agent shall be a non-staining liquid chemical form release agent free of kerosene, oil and wax that leaves no residue. Form release agent shall be one of the following or approved equal:
  - 1. Sonneborn - Cast-Off
  - 2. Sika - Formtex
  - 3. W.R. Meadows - Duogard I
  - 4. Conspec - React
  - 5. Tamms - Tammscoat

### **PART 3 - EXECUTION**

#### **3.01 CONSTRUCTION**

- A. Build formwork, plumb, level, rigid, true to sizes required, properly braced and supported and of sufficient strength to safely support all loads occurring during construction without deflection.
- B. Construct sufficiently tightly to prevent leakage of grout or cement paste. Construct forms for exposed concrete with particular care to avoid appreciable deflection to eliminate bulges, offsets or other unsightly features in the finished surfaces.
- C. Provide camber in the form work to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and the construction loads.
- D. Provide satisfactory foundations for formwork supported on ground to carry the loads imposed during and after construction without appreciable settlement. Positive means of adjustment of formwork shall be provided to take up all settlement during concrete placing operations.
- E. Protect forms from deterioration, weather and shrinkage prior to concreting. In warm weather, forms are to be wet down with a hose before placing concrete.
- F. Leave clean-out openings in the bottom of all walls until after final cleaning of the forms immediately prior to pouring concrete. Forms shall be swept clean before reinforcement or structural steel is in place.
- G. Build all chases and sleeves in forms. Provide all openings required. Sleeves for mechanical and electrical trades shall be furnished and set by those Contractors. General Contractor shall coordinate installation of all sleeves and chases. All sleeves, pipe, etc., shall be approved by Owners representative prior to placing concrete.
- H. Coat surfaces of forms in contact with concrete with form release agent applied in strict accordance with manufacturer's instructions. Forms shall be coated before steel reinforcing is placed.

#### **3.02 CONSTRUCTION JOINTS**

- A. Joints not indicated on the drawings shall be so made and located so as not to impair the strength of the structure. Where a horizontal joint is to be made, any excess of water and laitance shall be removed from the surface after concrete is deposited. Before depositing of concrete is resumed, the hardened surface shall be cleaned and roughened and all weak concrete removed and the joints grouted with neat cement and water.
- B. Construction joints through footings shall be vertical. Keys shall be provided in construction joints as directed by the Architect. In walls, the joints shall be keyed and provided with 5/8" x 3'-0" reinforcing bars set 12" o.c.

**3.03 REMOVAL OF FORMS**

- A. Forms shall be removed only after concrete has attained sufficient strength to withstand without injury the strain to which it may be subjected. The time after pouring when forms may be removed will vary with the conditions. Days when the temperature at the concrete is below 40° shall not be considered in computing the time for removal of forms.

**END OF SECTION**

**SECTION 03 20 00 - CONCRETE REINFORCEMENT****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material, equipment and services necessary to furnish and install all reinforcing steel and accessories as specified herein or shown on the drawings. All work shall be done in accordance with the latest A.C.I. Code unless otherwise detailed.
- C. Related Work Specified Elsewhere:
  - 1. Concrete Formwork - Section 03 11 00
  - 2. Cast-In-Place Concrete - Section 03 30 00
  - 3. Concrete Unit Masonry - Section 04 22 00

**1.02 REFERENCE STANDARDS**

- A. ASTM A615 - Reinforcing Bars
- B. ACI 315 - Manual of Standard Practice For Detailing Reinforced Concrete Structures
- C. ACI 318 - Building Code Requirements For Reinforced Concrete
- D. AWS D1.4 – Structural Welding Code – Reinforcing Steel

**1.03 SUBMITTALS**

- A. Submit shop drawings to the Architect for approval in accordance with the requirements of Division 01. No material shall be fabricated until such drawings have been approved.
- B. List and mark bars, showing sizes, lengths, location, bending numbers and ASTM designation.
- C. Show location, type and quantities of bolsters, spacers, chairs support bars and bar dowels.

**1.04 TESTS**

- A. Any concrete reinforcing field welded on the site shall be inspected by the Special Inspector as required by Section 01 45 23. Welding procedures are to be approved by Architect/Engineer prior to completing work.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. Reinforcing steel shall be shop fabricated to conform to the approved shop drawings. All bars shall be free from mill scale, excessive rust or other coating which would reduce or destroy the bond with the concrete.
- B. After fabrication, all bars shall be bundled before delivery to the job. Each bundle shall be identified by attaching metal tags bearing the bars marks.
- C. Reinforcing steel, after delivery to the job, shall be stored clear of the ground and protected from damage and rusting.



## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. All reinforcing steel shall be from domestic mills. No foreign or imported steel will be permitted. All materials shall bear manufacturers standard rolled-on identification grade markings.
- B. Reinforcing bars shall be deformed bars conforming to ASTM A-615, Grade 60 for straight bars and Grade 60 for bent bars, with identification marks rolled in the bars. Furnish all tiles, spacers, chairs, bolsters and similar accessories required for assembling, placing and supporting the reinforcing. Reinforcing shall be clean and free from loose rust, scale and other coatings that will reduce bond.

### **2.02 DETAILING**

- A. Reinforcing steel shall be detailed in accordance with the above mentioned ACI "Building Code" and Manual of Standard Practice", unless specifically shown otherwise. The number, type and spacing of supports and other accessories shall be as recommended in the ACI "Manual of Standard Practices".

### **2.03 FABRICATION**

- A. Shop fabricate reinforcing bars to conform to required shapes and dimension, with fabrication tolerances complying with ACI 315. In case of fabricating errors, do not rebind or straighten reinforcement in a manner that will injure or weaken the material.
- B. Bend all bars cold.
- C. Do not use bars with kinks or bends not shown on the drawings or on the approved shop drawings.
- D. Do not bend or straighten steel in a manner that will injure the material.

## **PART 3 - EXECUTION**

### **3.01 PLACING REINFORCING STEEL**

- A. All reinforcing steel shall be placed strictly in accordance with the approved shop drawings. Accessories shall be furnished in sufficient quantity for proper location of all reinforcement in position shown on the drawings. Accessories shall be sufficient to hold bars securely in position in spite of construction traffic and to insure against displacement during placement of concrete.
- B. Reinforcing bars shall be protected by the thickness of concrete indicated on the drawings. Where not otherwise shown, this thickness shall be as follows:
  - 1. Concrete Cast Against and Permanently Exposed to Earth:
    - a. All sizes: 3"
  - 2. Concrete Exposed to Earth or Weather:
    - a. #5 bar or smaller: 1-1/2"
    - b. #6 bar or larger: 2"
- C. Reinforcing steel shall be inspected in the forms and approved by the Special Inspector before the concrete is poured.

D. Splicing:

1. Splicing of bars, bar spacings and concrete cover should conform to "Building Code Requirements for Reinforced Concrete (ACI 318)", published by the American Concrete Institute of recommended practices in "Splicing Reinforcing Bars" by the CRSI.
2. Use "L" dowels to carry all horizontal reinforcing in walls and footings around corners. Diameter of dowels to be equal to the diameter of the reinforcing bars being extended.
3. Splices in bond beam reinforcing shall be 2'-6" minimum.
4. Splices shall be Class "C" lap splices minimum unless indicated otherwise.
5. Splicing by welding of reinforcing bars should be performed in accordance with AWS D1.4 – Structural Welding Code – Reinforcing Steel, published by the American Welding Society. Welding to be performed by a certified welder. Architect reserves the right to approve or reject proposed splice locations.
6. Splicing with dowel bar substitution and splicing system shall be performed in strict accordance with the manufacturer's instructions.

- E. Obstructions - In the event conduits, piping, inserts, sleeves or any other items interfere with placing reinforcement and indicated on the drawings, or as otherwise required, immediately consult the Architect and obtain approval of new procedure before placing concrete.

**3.02 INSPECTION OF STEEL IN PLACE**

- A. The Special Inspector will inspect the reinforcing steel in place prior to the pouring of the concrete for each section. (Contractor is responsible to coordinate.) Contractor shall also contact the Building Official for any inspections required.
- B. Do not pour concrete until the Special Inspector has reviewed the reinforcing steel. Notify the Special Inspector sufficiently in advance of the scheduled time for pouring of the concrete to allow the inspection to be made and corrections completed, where required. Correction shall be made by the Contractor at his expense.
- C. Exposed reinforcing steel, indicating the bars are not properly located, after the concrete has been placed will be sufficient cause for the rejection, removal and replacement of the concrete section.

**END OF SECTION**

**SECTION 03 24 00 - FIBROUS REINFORCING****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install all Fiber Reinforcing in Concrete as shown on the drawings and specified herein.
- C. Related Work Specified Elsewhere:
  - 1. Cast-In-Place Concrete - Section 03 30 00

**1.02 REFERENCE STANDARDS**

- A. ASTM C 94 - Ready-Mixed Concrete.
- B. ASTM C 1116 - Fiber-Reinforced Concrete and Shotcrete.

**1.03 SUBMITTALS**

- A. Comply with Section 01 33 00- Submittals.
- B. Product Data: Submit manufacturer's product data, including application rate and mixing instructions.
- C. Test Reports: Submit recent manufacturer's test reports from testing performed by and independent accredited laboratory indicating compliance of fibers with specified requirements.
- D. Manufacturer's Quality Assurance: Submit manufacturer's certification that fibers comply with ASTM C 11176, Type III and other specified requirements and are suitable for intended application.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. Delivery: Deliver synthetic fiber reinforcement in manufacturer's original, unopened, undamaged containers and packaging, with labels clearly identifying product name, unique identification number, code approvals, directions for use, manufacturer, and weight of fibers.
- B. Storage:
  - 1. Store synthetic fiber reinforcement in clean, dry area indoors in accordance with manufacturer's instructions.
  - 2. Keep packaging sealed until ready for use.
- C. Handling: Protect synthetic fiber reinforcement during handling to prevent contamination.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Fiber reinforcing shall be 100% pure virgin material manufactured for use as secondary reinforcement. Fibers shall be alkali resistant, anti-magnetic non-corrosive and non-absorptive. Fibers shall be capable of absorbing water 4.5% by weight to develop a chemical bond with the concrete.
- B. Conforming: ASTM C 1116

- C. Length: As recommended by manufacturer.

### **2.01 MIX DESIGN**

- A. Concrete Mix Design: As specified in Section 03 30 00 - Cast-in-Place Concrete.
- B. Concrete Materials: Evaluate concrete mix design with fibers mixed with concrete materials representative of those proposed for use.

## **PART 3 - EXECUTION**

### **3.01 BATCHING AND MIXING**

- A. Add fibers to concrete at dosage rate in accordance with manufacturer's instructions and as determined by concrete mix design.
- B. Batch and mix fibers in accordance with manufacturer's instructions and ASTM C 94.
- C. Add synthetic fiber reinforcement into concrete mixer before, during, or after batching other concrete materials.
- D. Mix concrete fibers at mixing speed for a minimum of 5 minutes or 70 revolutions.
- E. Measuring, Batching, Mixing, and Delivering concrete: As specified in Section 03 30 00 - Cast-in-Place Concrete.

### **3.02 PLACING, FINISHING AND CURING**

- A. Placing, Finishing and Curing Concrete: As specified in Section 03 30 00 Cast-in-Place Concrete.

**END OF SECTION**

**SECTION 03 30 00 - CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The conditions of the contract and the provisions of Division 01 apply to all work of this section.
- B. This section includes all labor, materials, equipment and services necessary to mix, place and cure all concrete in accordance with the drawings, schedules and this specification.
- C. Build into concrete the following materials, which are supplied under other sections of this Specification:
  - 1. Reinforcing steel.
  - 2. Fibrous Reinforcing
  - 3. Sleeves and thimbles for pipes and conduit.
  - 4. Inserts, hangers and anchors for work of all trades.
  - 5. Items of structural, miscellaneous iron or ornamental metals which occur in concrete.
- D. Related work specified elsewhere:
  - 1. Concrete Forming - Section 03 11 00
  - 2. Concrete Reinforcement - Section 03 20 00
  - 3. Fibrous Reinforcing – Section 03 24 00
  - 4. Masonry - Section 04 20 00
  - 5. Vapor Barrier – Section 07 26 00
  - 6. Joint Sealants - Section 07 92 00

**1.02 REFERENCE STANDARDS**

- A. The current issue of the following specifications, test methods and recommended practices shall govern except where superseded by particular requirements of this specification.
  - 1. Specifications for Ready-Mixed Concrete, ASTM C-94.
  - 2. Specifications for Portland Cement, ASTM C-150.
  - 3. Standard Specification for Blended Hydraulic Cements, ASTM C595.
  - 4. Standard Specification for Slag Cement, ASTM C989.
  - 5. Standard Specification for Coal Fly Ash, ASTM C618.
  - 6. Specifications for Concrete Aggregates, ASTM C-33.
  - 7. Method of Test for Slump of Portland Cement Concrete, ASTM C-143.
  - 8. Method of Sampling Fresh Concrete, ASTM C-172.
  - 9. Method of Making and Curing Concrete Compression and Flexure Test, ASTM C-31.
  - 10. Method of Test for Compressive Strength of Molded Concrete Cylinders, ASTM C-39.
  - 11. Specification for Air-Entraining Admixtures for Concrete, ASTM C-172.

**1.03 TESTS**

- A. LABORATORY- All tests shall be by the Owner's testing agency.
- B. All tests performed on concrete and concrete materials shall be inspected by the Special Inspector as as selected and paid for by the Owner.
- C. Provide the following tests:
  - 1. Slump as per ASTM C-143; at a minimum of one (1) per pour and at least one (1) every 100 cu.yd.
  - 2. Concrete Test Specimens as per ASTM C31

3. Compression as per ASTM C-39
  4. Air Contents as per ASTM C-231 (air entraining admixtures)
- D. The contractor shall secure samples and shall provide safe storage for them pending their removal to the testing laboratory. The contractor shall provide shipping containers as required for transporting cylinders to the testing laboratory.
- E. To conform to the requirements of this specification, every twenty-eight (28) day test representing each mix must be equal to or greater than the specified minimum strength without exception. If a specimen shows manifest evidence of improper sampling, molding or testing, it will be disregarded. Note, however, that the anticipated strength for all mixes is appreciably above the specified minimum strength, due to quality required by the minimum cement content specified.
- F. Slump tests shall be made from the same sample from which strength tests are made. The contractor shall provide a standard slump cone for this testing. If the measured slump falls outside the limits specified, a check test will be made immediately on another portion of the same sample. In the event of a second failure, the concrete will be considered to have failed to comply with the specification.
- G. Air content tests shall be made from the same sample from which strength tests are made. If the measured air content falls outside the limits specified, a check test will be made immediately on another portion of the same sample. in the event of a second failure, the concrete will be considered to have failed to comply with the specification.
- H. Architect may require additional testing of concrete, including cement content or chloride presence. Additional tests which comply with the specification shall be paid for by the Owner. Tests which fail to comply with the specifications will be paid for by the contractor.
- I. Two (2) copies of test results shall be forwarded directly from the testing laboratory to the Architect. (Electronic copies are acceptable.)

#### **1.04 SUBMITTALS**

- A. Submit concrete mix designs to the Architect for approval in accordance with the requirements of Division 01. Proposed mix designs to follow ACI 318 Chapter 5, and selections of mix design are to be in accordance with ACI 301.
1. Submittal shall include test data that confirms the strength of each mix per ACI 318 Chapter 5.
- B. Contractor to provide proposed control joint layout.
- C. Mix design shall state proportions of all materials used in the concrete mixture; source and gradation of aggregate; manufacturer of cement and manufacturer of all admixtures to be used.

#### **1.05 QUALITY ASSURANCE**

- A. The current issue of the following American Concrete Institute (ACI) requirements and recommended practices shall govern except where supersede by particular requirements of this specification:
1. Building Code Requirements for Reinforced Concrete ACI-318.
  2. Recommended Practice for Selecting Proportions for Concrete, ACI-301.
  3. Recommended Practice for Cold Weather Concreting, ACI-306.
  4. Specifications for Structural Concrete for Buildings, ACI-301.
- B. A pre-pour meeting is to be held to discuss slab preparation, concrete pouring procedures and slab curing procedures a minimum of one (1) week before the set pour date.

**1.06 DELIVERY STORAGE AND HANDLING**

- A. Cement shall be stored in a weatherproof building on pallets approximately 6" above the floor.
- B. Aggregates fine, medium and coarse, shall be stored separately and in such a manner as to prevent segregation of size and to avoid the inclusion of dirt and other foreign materials.

**PART 2 - PRODUCTS****2.01 CONCRETE MATERIALS**

- A. AGGREGATES: Conform to ASTM C-33.
  - 1. Coarse Aggregate Material: Strong, clean crushed granite or limestone gravel, are subject to approval as to use, other inert material having similar characteristics, free from adherent coatings and injurious amount of friable or fragile pieces, flake organic matter, or other deleterious substances, all meeting the following gradation requirements:
 

a. Footings, slabs on grade, structural slabs, foundations	1"
b. Concrete topping	3/8"
c. Columns and beams	3/4"
  - 2. Fine Aggregate Material: Clean, strong, natural are subject to approval and authorization as to use, other inert material suitable for the work to be done, having characteristics similar to natural sand, free of frozen materials, all meeting the following grading limits:
 

a. Passing No. 4 Sieve	95% to 100%
b. Passing No. 14 Sieve	45% to 80%
c. Passing No. 50 Sieve	10% to 30%
d. Passing No. 100 Sieve	2% to 10%
- B. CEMENT - Conforming to ASTM C-150, Type I and Type I/II Cements
- C. FLY ASH – Class C or F per ASTM C618
- D. SLAG – ASTM C989
- E. WATER - Clean, free from oil, acids and injurious amounts of vegetable matter, alkalis or other salt, or drinkable quality.
- F. No admixtures shall be used except with specific written approval of the Architect. CALCIUM CHLORIDE OR MATERIALS CONTAINING CHLORIDES OR NITRATES WILL NOT BE PERMITTED IN ANY CASE. USE OF SUCH MATERIALS WILL ALLOW THE ARCHITECT TO REQUIRE REMOVAL AND REPLACEMENT OF ALL CONCRETE CONTAINING OR TREATED WITH SAME AT CONTRACTOR'S COST.

**2.02 CONCRETE FINISHES**

- A. Refer to Section 3.08 for additional curing procedures for floor.
- B. Concrete Densifier: Penetrating silicate treatment that reacts with the concrete to provide insoluble calcium silicate hydrate within the concrete pores for use with "green" concrete.
  - 1. Prosoco - Consolideck® LS/CS®
  - 2. Accepted substitution per Submittals - Section 01 33 00.

- C. Concrete Sealer: Sealing compound shall be installed after concrete has properly cured. Refer to manufacturer's recommendations for timing. Pressure wash slab and let slab dry right before installing sealer.
  - 1. Prosoco SLX100 Water and Oil Repellent
  - 2. Accepted substitution per Submittals - Section 01 33 00.
  
- E. Slab Permeability Reducer: VOC free formulation specifically designed to reduce overall slab permeability combining with preexisting elements inside the mix and initiates a natural chemical reaction that disrupts the integral slab capillary system to forms a permanent barrier (capillary break) which is insoluble and irremovable. Slab permeability reducer shall be used in all concrete floors to receive finished flooring per the following: 09 65 00 Resilient Flooring; 09 65 66.1 Athletic Rubber Flooring; 09 65 66.2 Athletic Wood Flooring; 09 66 00 Terrazzo Flooring; 09 67 26 Quartz Flooring System; and 09 68 13 Carpet Tile.
  - 1. Barrier One High Performance Concrete Admixture

**2.03 CONCRETE JOINT MATERIALS**

- A. BOND BREAKER: at juncture of interior concrete slabs and adjacent walls shall be 15 lb. felt with adhesive on one side.
  - 1. Underslab vapor barrier may be used as bond breaker when applicable.
  
- B. CONTROL JOINT FORMER: Refer to structural documents for definition and spacing.
  
- C. Expansion Joint Filler: shall be an asphalt, vegetable fibres and mineral filler joint formed under heat and pressure between two asphalt felt liners conforming to ASTM D994. It shall be resistant to oil, solvents, ozone and weathering. Joint Filler shall be as manufactured by one of the following or approved equal:
  - 1. W.R. Meadows, Inc. - Sealtight Asphalt Expansion Joint Filler
  - 2. Tamms/A.C. Horn - Horn Board
  
- D. JOINT SEALANT: shall be as specified in Section 07 92 00.

**2.04 CONCRETE MIXES**

- A. All concrete used throughout this construction shall be ready-mixed concrete furnished by a well established mixing plant.
  
- B. Concrete shall be furnished in accordance with the following schedule:

Class of Concrete	Compressive Strength @ 28 days	Maximum aggregate size	Maximum water to Cement ratio	Cement Type
A	4000	1"	.44	Non-Air Entrained
B	4000	1"	.50	Non-Air Entrained
C	4000	3/4"	.44	Non-Air Entrained
D	3000	3/8"	.44	Non-Air Entrained



Class of Concrete	Compressive Strength @ 28 days	Maximum aggregate size	Maximum water to Cement ratio	Cement Type
E	4500	1"	.45	Air Entrained

C. The class of concrete to be used for various conditions shall be as follows:

1. Footing ..... Class A
2. Slab on Grade ..... Class B
3. Concrete in Bond Beams ..... Class D

D. The slump shall not exceed 5" in any case.

**PART 3 - EXECUTION**

**3.01 MIXING AND DELIVERY**

- A. Ready-Mixed concrete shall be mixed and delivered to the job site by the means and standards set forth in ASTM C-94.
- B. No water shall be added on the job unless authorized by the Architect/Engineer in writing. If added, the amount of water added shall be recorded on all copies of the delivery ticket hereinafter described. If water is added to mixed concrete on arrival at the job, an additional mixing of twenty revolutions of the drum will be required. Water can be added only up to the maximum allowable W/C.
- C. Concrete delivered in outdoor temperatures lower than 40°F, shall arrive at the site of the work having a temperature not less than 60°F, nor greater than 90°F, unless otherwise specified or permitted by the Architect/Engineer.
- D. Follow recommendations of ACI 306 for all cold weather concreting applications.
- E. With each load of concrete delivered to the job, there shall be furnished by the ready-mixed concrete producer, duplicate delivery tickets, one for the contractor and one for the Architect /Engineer. Delivery tickets shall provide the following information: (Similar to the MnDOT Certificate of Compliance)
  1. Date
  2. Name of Ready-Mixed concrete plant
  3. Contractor
  4. Job Location
  5. Type and brand of cement
  6. Class and specified cement content in bags per cubic yard of concrete.
  7. Maximum size of aggregate
  8. Water added at job, if any
  9. Truck number
  10. Time Dispatched
  11. Amount of concrete, in load, in cubic yards.
- F. For hot weather concreting as defined by ACI 305, follow ACIs 305 recommendations for maintaining proper evaporation levels.

**3.02 PLACING CONCRETE**

- A. Before placing any concrete, Architect/Engineer shall be notified in sufficient time to allow inspection of concrete reinforcing and underslab vapor barrier in place.

- B. Before placing concrete, excavation shall be dry, forms and reinforcement shall be clean, and reinforcement shall be securely tied into place. Forms shall be treated with releasing agent. Subgrade and form materials shall meet temperature requirements as stated in ACI 301.
- C. Concrete shall be transported from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent the separation of ingredients or displacement of reinforcement. It shall be deposited as nearly as possible in its final position to avoid rehandling or flowing. Deposit concrete in such a fashion that free fall of concrete will not exceed 3 feet.
- D. Concrete shall be placed before initial set has occurred and in no case after it has contained its water for more than 90 minutes.
- E. The Contractor shall provide sufficient labor to thoroughly spade, or by internal mechanical vibration, work the coarse aggregate away from the forms and avoid air pockets or voids in exposed sections, and leave solid, homogenous and smooth uniform surface after forms are removed. Concrete for slabs on fill shall be mixed and placed with as little water as possible, and shall be compacted by spading and tamping.
- F. For slabs on grade, check compaction of fill and determine proper grade. Interior slabs on grade shall have a vapor barrier installed just below the slab. Vapor barrier as specified under Section 07 26 00. (No vapor barrier shall be used under exterior slabs on grade. Moistened subgrade lightly, if dry, just before exterior slabs are cast.)

### 3.03 TOLERANCES

- A. ACI Standards shall govern concrete work except where specified differently.
- B. Allowable Tolerances -
  - 1. Variation from plumb:
    - a. 0 to 10 feet - 1/4" maximum
    - b. 20 feet or more - 3/8" maximum
  - 2. Variation in thickness - 1/4" to 1/2" standard, 5% for footings
  - 3. Variation in grade:
    - a. 0 to 10 feet - 1/4" standard, 1/8" for floors
    - b. 10 to 20 feet - 3/8" standard, 1/4" for floors
    - c. 40 feet or more - 3/4" standard, 3/8" for floors
  - 4. Variation in plan:
    - a. 0 to 20 feet - 1/2"
    - b. 40 feet or more - 3/4" standard, plus 1/2" for footings
  - 5. Variation in eccentricity - 2% for footings
  - 6. Variation in openings:
    - a. Size - plus 1/8"
    - b. Location - 1/4"

**3.04 HOT WEATHER CONCRETING**

- A. When conditions are identified as hot weather as stated in ACI 305, follow guidelines of ACI 305.

**3.05 FINISHING CONCRETE FLOORS**

- A. After slabs has been screeded to proper elevation. Screed and float to bring to the required elevation. While concrete is still green, but sufficiently hardened to bear a man's weight without deep imprint, it shall be floated to a true even plane with no coarse aggregate visible. It shall then be light steel troweled to a smooth impervious surface free from trowel marks.
- B. All exposed concrete floors shall be finished as specified above.
- C. FLOOR LEVEL STANDARD: All floors shall be subject to checking for accuracy of planes. The checking procedure shall be as follows:
1. An eight (8) foot long straight-edge with a level bubble shall be used. When this straight-edge is placed on floor, level, with one end located on an apparent high point, the following limits must be met:
    - a. Finished concrete floors without applied floor covering - there shall be no opening under the straight-edge which will allow a 3/16" thick test skim to pass.
    - b. Concrete floors which are to receive applied floor covering -- there shall be no opening under the straight- edge which will allow a 1/8" thick test skim to pass.
  2. Floors which are shown to be pitched to drain shall be checked parallel to the intended direction of flow.
- D. FLOOR FINISH STANDARD: All concrete floors shall be prepared as required to receive applied floor covering as per floor finish manufacturer's requirements. This includes, but is not limited to shrinkage cracks. If the substrate is found to be unacceptable as determined by the Architect, the contractor shall perform all directed corrections to the substrate at no cost to the Owner.
- E. Floors not complying with the above shall be corrected as directed by the Architect, at no additional cost to the Owner.

**3.06 CONSTRUCTION AND CONTROL JOINTS IN FLAT WORK**

- A. Interior floor slabs shall be separated from walls, columns or other fixed objects with a bond breaker placed between the floor slab and object. - perimeter of slab shall be sealed to the wall.
- B. Provide construction joints as shown on drawings, at the end of all pours, where placing operations are stopped for 1/2 hour or 30 minutes or more and in no case to exceed 30 feet in any direction. Load transfer bars shall run through joint.
- C. Control joints (weakened plane contraction joints) shall be formed in accordance with the structural drawings and Engineer/Architect-approved, Contractor-submitted proposed layout drawing. The concrete shall be finished in the usual manner. Place control joints as indicated on approved Contractor-provided layout. Control joints are to be cut with a soft cut saw as soon as slab can support the equipment; no delay will be permitted.
- D. Architect/Engineer may direct additional control joints to be cut in concrete slabs after approximately two (2) weeks curing time if the concrete shows evidence of cracking. Joints shall be saw cut and shall be 1/3 the depth of the slab or as directed by structural details, structural takes precedent.

1. If cracks develop in the concrete due to improper placement and installation of control joints or uncontrolled curing rates, the Contractor is responsible for removing/replacing the concrete per Architect's direction.
- E. Provide isolation joints where exterior slabs abut a wall or other fixed object. Vapor barrier may be used as isolation joint.

### **3.07 CONCRETE DENSIFYING**

- A. After final finishing, soft cut control joints. Clean concrete of any dirt, residue or debris.
- B. Using a low pressure sprayer, apply a single coat sufficient to wet the surface without producing puddles. Use a clean microfiber pad to spread product evenly and ensure uniform wetting. Avoid spreading once drying begins. Scrubbing is not necessary. If surfaces dry immediately, apply more product. Surface should remain wet for 5-10 minutes. Adjust rate of application to eliminate puddles.
- C. Allow treated surfaces to dry.
- D. Immediately apply the specified curing compound or initiate the specified curing procedure.
- E. When the curing is complete, use an automatic floor scrubber equipped with cleaning pads or brushes appropriate for removal of accumulated construction soiling and surface residues. Avoid pads or brushes which may damage the finished floor. This will further enhance the surface sheen produced by Consolideck® LS/CS®.

### **3.08 CURING**

- A. All concrete shall be protected from premature drying and freshly placed concrete shall be protected against wash by rain, flowing water, freezing, mechanical injury, etc.
- B. Concrete of walls, piers, footings, etc., shall be cured by leaving the forms in place as long as possible, 2 DAYS MINIMUM.
- C. All slabs shall be moist cured by covering with a concrete curing blanket or burlap for a period of seven (7) days. Continuously apply water to slabs as required to keep them moist for a minimum of seven (7) days. NO CURING COMPOUNDS SHALL BE APPLIED. Concrete that is not properly cured will be removed and replaced at the Contractor's cost.

### **3.09 REMOVAL OF FORMS**

- A. Forms shall be removed in such a manner as to insure the complete safety of the structure. Footing forms may be removed after 48 hours, providing the concrete is sufficiently hard to not be damaged thereby.
- B. The Contractor shall assume responsibility for all damage due to the removal of the forms. It shall be contractor's duty to consult with the Architect before the removal of any forms.

### **3.10 SEALING**

- A. Approximately thirty (30) days after concrete is place, interior concrete floors shall be sealed with one (1) application of concrete sealer as specified above. Sealer shall be applied in strict accordance with the manufacturer's instructions. Contractor shall protect adjacent construction to ensure product application is limited to concrete floor slabs.

**END OF SECTION**

**SECTION 03 48 16 - PRECAST CONCRETE SPLASHBLOCK****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and Provisions of Division 01 apply to all work of this Section.
- B. This Section includes providing all materials and labor required for the supply and placement of precast concrete splashblocks as shown on the drawings.
- C/ This Section includes providing services of a Professional Engineer licensed in the State of Minnesota to design the wall and provide the drawings, details and calculations for submittal to the Architect.
- D. Related Work Specified Elsewhere:
  - 1. Excavation & Fill - Section 31 23 00
  - 2. Erosion & Sedimentation Controls – Section 31 25 00

**1.03 SYSTEM DESCRIPTION**

- A. A pre-cast concrete standalone unit for re-directing and dissipating energy from concentrated downspout-borne roof stormwater away from building foundation to adjacent landscaped area.

**1.04 SUBMITTALS**

- A. Manufacturer's data and installation instructions for the retaining wall system shall be submitted for review.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. Contractor shall examine all materials upon delivery to assure that proper materials have been received. All broken units or units with damaged face shall be rejected and removed from the site.
- B. Deliver and handle materials in such manner as to prevent damage and according to all manufacturer's instructions. Store above ground on wood pallets or blocking. Protect from moisture & freeze-thaw conditions.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Precast Concrete: Normal weight, air entrained concrete. Air content shall be 6 percent by volume within an allowable tolerance of plus or minus 1.5 percent.
  - 1. Minimum Compressive Strength for Splash Blocks: 4000 psi
  - 2. Size: 24"L x 11-1/2"W x 3"H
- B. Bar Reinforcement: ASTM A 615, Grade 60, deformed.

**2.02 FABRICATION**

- A. Splash blocks shall be cast at the manufacturer's plant, not at the job site. Castings shall have plane smooth surfaces, true to line and face, free from defects and sharp arises. Overall dimensions for castings shall not vary more than 1/16 inch from those indicated.

**PART 3 – EXECUTION**

**3.01 INSTALLATION**

- A. Set splash blocks true to line and grade. Grade all spaces to provide solid support for splash blocks.

**END OF SECTION**

**SECTION 04 22 00 - CONCRETE UNIT MASONRY****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. Work under this Section shall include all materials, services, labor and equipment necessary to laying of concrete masonry units including
  - 1. Concrete Masonry Units (CMU);
  - 2. Mortar and Grout;
  - 3. Reinforcing Steel;
  - 4. Masonry Joint Reinforcement;
  - 5. Ties and Anchors;
  - 6. Embedded Flashing;
  - 7. Control and Expansion Joint Materials.
- C. This Contractor shall build into masonry the following materials which are furnished by other trades, and shall bed and secure same as required.
  - 1. Loose lintels and steel base plates which bear on masonry, items of miscellaneous and ornamental metal which occur in masonry.
  - 2. Flashings and reglets which occur in masonry.
  - 3. Sleeves and thimbles for piping and conduit for all trades.
  - 4. Door frames, access doors and similar items.
  - 5. Insert and hangers for special equipment.
- D. Bond beams shall be filled with concrete as specified in Section 03 30 00.
- E. Related work specified elsewhere
  - 1. Concrete Reinforcement - Section 03 20 00
  - 2. Waterproofing - Section 07 13 00
  - 3. Fluid Applied Non Permeable Membrane Air Barrier - Section 07 27 26
  - 4. Joint Sealants - Section 07 92 00
  - 5. FRP Flush Door & Frames - Section 08 17 43

**1.02 REFERENCE STANDARDS**

- A. ASTM A82/A82M Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- B. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM A641/A641M Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- D. ASTM A951/A951M Standard Specification for Masonry Joint Reinforcement.
- E. ASTM C90 Standard Specification for Loadbearing Concrete Masonry Units.
- F. ASTM C140/C140M Standard Test Method for Sampling and Testing Concrete Masonry Units.
- H. ASTM C144 - Aggregate
- I. ASTM C150/C150M Standard Specification for Portland Cement.
- J. ASTM C270 Standard Specification for Mortar for Unit Masonry.
- K. ASTM C476 Standard Specification for Grout for Unit Masonry.
- L. ASTM C1019 Standard Test Method for Sampling and Testing Grout.
- M. ASTM C1314 Standard Test Method for Compressive Strength of Masonry Prisms.
- N. ASTM C1586 Standard Guide for Quality Assurance of Mortars.
- O. ASTM C1714/C1714M Standard Specification for Preblended Dry Mortar Mix for Unit Masonry.
- P. Concrete Masonry Handbook

### 1.03 TESTS

- A. LABORATORY - All tests and special inspections shall be performed by a recognized testing laboratory approved by the Architect/Engineer.
- B. All tests performed on masonry materials shall be by the Special Inspector selected and hired by the Owner as required by Structural Notes on Sheet S1.0.
- C. Special inspector shall perform the following:
  - 1. Observe grouting operations and verify placement of steel in all vertically reinforced piers, pilasters and solid grouted walls.
  - 2. Observe grouting operations and verify placement of steel in all horizontal bond beams upon which structural floor or roof members will bear and all lintels over 6'0" wide.
  - 3. Observe mortar mixing operations and masonry placement in conformance with the approved sample wall, once per floor level for each exterior wall surface and once per floor level for each interior load bearing wall. Special inspector shall verify horizontal joint placement, wall tie placement to veneered masonry, insulation installation and flashing installation.
- D. Contractor shall cooperate with the Special Inspector in establishing a schedule for the observation of the above noted procedures.

### 1.04 SUBMITTALS

- A. Shop Drawings: Contractor shall submit shop drawings and testing data where appropriate: Shop drawings shall include control joint layout and details.
  - 1. Submit mix designs and test reports:
    - a. Preblended mortar:
      - 1) Mix design indicating types and proportions of materials according to proportion specification of ASTM C270, or
      - 2) Mix designs and mortar tests performed in accordance with the property specification of ASTM C270.
    - b. Conventional grout:
      - 1) Mix design indicating types and proportions of materials according to proportion requirements of ASTM C476, or
      - 2) Mix design and grout strength test performed in accordance with ASTM C476.
  - 2. Submit material certificates for each of the following certifying compliance:
    - a. Concrete masonry units.
    - b. Steel reinforcing bars.
    - c. Anchors, ties, fasteners, and metal accessories.
    - d. Preformed control joint gaskets.
- B. Samples for Verification: For each face design, color, and texture of the following:
  - 1. Exposed concrete masonry units.
- C. Submit samples of mortar color for selection by the Architect. Colors will be selected from manufacturer's standard line of colors. Contractor shall assume that one mortar color will be selected for integrally colored concrete block.



**1.05 DELIVERY, HANDLING AND STORAGE**

- A. Delivery, Unloading & Storage - Upon delivery of CMU to the job site, the General Contractor shall immediately have each load sampled and compared with the approved sample, and shall report any deviations immediately. All units used in the work shall conform to requirements specified herein. Any improper CMU to be culled out and immediately removed from the site. CMU shall be resorted or culled as necessary, especially when plant palletted, to avoid spotty or irregular ranges of color or texture in the finished wall. The responsibility for meeting these specifications and the approved sample rests with the General Contractor. CMU shall be carefully unloaded and neatly stacked on or near the project site, undamaged, and adequately protected at all times.
- B. Mortar materials and reinforcing accessories shall be delivered to job site in original unopened packages bearing manufacturer's labels.
- C. Store and protect mortar materials and accessories in accordance with manufacturer's recommendations.
  - 1. Maintain temperature and humidity within ranges required by manufacturer's instructions.
  - 2. Maintain cementitious materials and aggregates clean, dry and protected against dampness, freezing and foreign matter.

**1.06 PROTECTION**

- A. During erection, all walls shall be kept dry by covering at the end of each day or shut down period with canvas or vinyl tarps. Partially completed walls not being worked on shall be similarly protected at all times. Exposed masonry shall be protected at all times. Covering shall overhang at least two feet on each side of wall. Exposed masonry shall be protected against staining from these coverings or from other sources, and excess mortar shall be cleaned off as the work progresses. Particular care shall be taken to keep concrete block dry after erection in the wall.
- B. Lay no masonry without heat when temperature is (or will be) less than 35EF and below while masonry is being laid and for 48 hours after laying. When temperature is less than 35EF or anticipated it will be during the next 48 hours, all materials shall be kept in heated spaces. Heat shall be maintained continuously including nights and weekends. Enclosures must be provided to maintain the temperature above 35EF during laying and for 48 hours after laying. Heat materials when temperature is below 35EF. Sand shall be uniformly warmed to 50-60EF but use no sand at temperatures above 90EF. Mixing water shall not exceed 90EF. Masonry units shall be warmed for sufficient length of time so unit is of uniform temperature throughout entire unit, above 35EF. Remove all brick and block determined to be frozen or damaged by freezing conditions.
- C. In hot weather, protect masonry from drying out quickly. If necessary, after mortar has set, dampen walls with a fine spray.

**PART 2 - PRODUCTS****2.01 MASONRY MATERIALS**

- A. Concrete Masonry Units (CMU):
  - 1. Concrete block shall be normal weight, sand and gravel units, modular size, 8" high by 16" long, thickness as shown on drawings, load bearing ASTM C90, Grade N, F'M = 1500 PSI. No thin units will be accepted.

2. Block to be kiln cured, then air cured until age of blocks is at least 30 days. Keep blocks in storage in dry condition. Units when delivered and when laid are to have a moisture content under 40% of their absorption.
  3. Texture, dimension tolerance, appearance and test reports will be the basis for tentative approval of supplies of blocks.
  4. Units to be light in color with uniform fine texture. Broken units not to be used and chipped or otherwise defective units will not be acceptable or used where exposed. See requirements for laying of block. Exposed concrete units walls to have units uniform in size, texture and color, including bond beam, lintel fractional and header blocks.
  5. Provide all special shapes such as half blocks, corner blocks, bullnose blocks, bond beam blocks, etc. as required for a complete finished appearance.
- B. Burnished Concrete Masonry Units (BMU): shall be Autoclave block, Pre-shrunk, high pressure cured concrete block conforming to ASTM C90, Grade N, type 1. Block shall be integrally colored with the ground face of the masonry unit of uniform color, exposure and texture matching the approved sample. Block shall be factory treated with a clear water repellent guaranteed to last a minimum of ten years.
1. Color: To will be selected from manufacturer's standard line of colors. Base Brick Colors - assume one (1) color for all BMU.
  2. Provide all special shapes such as half blocks, corner blocks, bullnose blocks, bond beam blocks, etc. as required for a complete finished appearance.

## 2.02 MORTAR MATERIALS

- A. Portland Cement - Shall conform to ASTM C150, Type 1. Only one brand and kind of portland cement from one source shall be used for the work. Brands are subject to approval based on mortar color desired and obtainable by use of the various brands readily available. White cement or nonstaining cement should not normally be required.
- B. Lime - Shall be pressure hydrated nonair-entrained and conform to ASTM C207, Type S. Lime for use in exterior walls shall be soaked for at least 24 hours immediately prior to using and added as a putty to the mix.
- C. Masonry Cement - Shall conform to ASTM C91.
- D. Masonry Sand - Shall be clean, sharp, free from loam, silt, vegetable matter, salts and other injurious substances, and shall conform to ASTM C144, except that sand for mortar in 1/4" wide joints shall pass a #16 sieve. Sand is further subject to approval of the Architect/Engineer, based on mortar color desired and obtainable by use of local sands readily available, and shall be from one source.
- E. Water - Shall be potable, fresh, clean, clear and free of injurious amounts of oil, acid, alkali, salts, organic matter or other detrimental substances, and handled in clean containers.
- F. Water Repellent – Manufacturer recommended standard water repellent shall be mixed with mortar, mix per manufacturer's instructions for achieving water repellency.
- G. The autoclave expansion of the cementitious portion of the mortar materials, when mixed in proportions required under "mortar mixes", shall not exceed one-half percent when tested according to ASTM C151. The air content of any mortar required under "mortar mixes" shall not exceed five percent when tested according to ASTM C231 and/or ASTM C173.

- H. Partial premixed mortar materials will be considered for approval when each requirement of the individual materials is complied with and is so stated on the package, along with proportions and quantities. The lime soaking requirement for exterior walls will be waived in the event of such use. When masonry cement mortar is used for interior work, the five percent maximum air content requirement will be increased to eighteen percent.
- I. Color Admixture shall be added to the mortar for all brick and integrally colored concrete block. Mortar color admixture shall be manufactured from pure mineral pigments and/or synthetic Iron oxides finely milled and blended to produce uniform, consistent coloring in accordance with ASTM C979. Color admixture shall be as manufactured by one of the following or approved equal:
  - 1. Standard Brick & Supply
  - 2. Prism Pigments
  - 3. Davis Colors

### 2.03 MORTAR MIXES

- A. Measure materials for mortars by volume, in a manner whereby proportions can be controlled within two percent. Mix cementitious materials, powdered admixtures and masonry sand dry. Add lime putty for exterior mortar, when lime is not prepackaged with cement, and then water to bring to proper consistency for use. Mix materials in the approved type machine mixer of adequate capacity for 3 to 5 minutes after all materials have been introduced, until materials are evenly distributed throughout the batch and the mixture is uniform in color with a workable consistency.
- B. Use maximum water consistent with good workability and freedom from smearing the face of masonry work. Do not use mortar that has stood more than one hour after initial mixing. Mortar less than one hour old shall reasonably rettempered as necessary to maintain its workability, but used before it is one hour old or otherwise discarded. No anti-freeze ingredient or contaminate of any type will be tolerated.
- C. Mortar for Bearing Walls - Should normally be ASTM C270, Type S, Cement-Lime Mortar (1:1/2:4-1/2).
- D. Mortar for Below Grade Walls should normally be ASTM C270, Type M, Cement-Lime Mortar (1:1/4:3).
- E. Mortar for Concrete Block in Non-bearing Exterior Walls should normally be ASTM C270, Type N, Cement-Lime Mortar. (1:1:6).
- F. Mortar for Concrete Block in Non-bearing Interior Partitions shall be ASTM C270, Type N, Cement-Lime or Masonry Cement Mortar, (1:1:6) or (1:3), or Type O, Cement-Lime Mortar. (1:2:9).
- G. The proportions listed above with three figures given are portland cement, lime, damp loose sand, respectively by volume, and with two figures given are masonry cement, damp loose sand, respectively by volume. The proportions are listed only as samples for the required type mortars and shall be modified as necessary, within tolerances, to suit the particular masonry sand being used.

### 2.04 MASONRY REINFORCING ACCESSORIES

- A. Concrete block (single width) horizontal joint reinforcing shall be truss-type of 2 - #9 deformed rods conforming ASTM A82 sized for thickness of wall, with Class 1 mill galvanized coating as per ASTM A641. Reinforcing shall be one of the following or approved equal:
  - 1. Dur-O-Wall - Truss Type
  - 2. Hohmann & Barnard, Inc. - #120 Truss-Mesh
  - 3. Masonry Reinforcing Corporation - Truss Type Series 300 2-Wire System

- B. Provide special corner and partition tie truss type joint reinforcing at all corners and wall intersections.

### **2.05 FIELD APPLIED WATER REPELLANT**

- A. Clear solvent based silicone elastomer , formulated to weatherproof concrete block and other porous masonry materials. Sealer shall also protect masonry surfaces from and ease the removal of graffiti.
  - 1. Proso - Sure Clean Blok-Guard & Graffiti Control Ultra
  - 2. Accepted substitution per Submittals - Section 01 33 00.

## **PART 3 - EXECUTION**

### **3.01 MORTAR**

- A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270.
  - 1. Include water repellent for all mortar used with burnished block.
- B. Do not use anti-freeze compounds to lower freezing point of mortar.

### **3.02 INSTALLATION OF CONCRETE BLOCK**

- A. All masonry shall be laid plumb, straight and true to lines and dimensions shown on drawings. All coursing shall conform to the applicable details and dimensions. All courses shall be kept level and bonding and pattern shall be accurately formed. Units at corners and jambs shall be accurately positioned and care shall be taken to avoid over-plumbing and pounding after being set. Where adjustments must be made after the mortar has started to set, the old mortar shall be removed and replaced with fresh mortar.
- B. Where partial units of concrete block are required, they shall be cut to size and shape with a motor-driven masonry saw. Cuts shall be completely through the units rather than just scoring and breaking. Lay-out brick to eliminate brick that is less than 1/2 length. Lay out block to eliminate units less than 1/2 length as much as possible but in no case less than 4".
- C. Where fresh masonry joins masonry that is partially or totally set, the exposed surface of the set masonry shall be cleaned, roughened and lightly wetted so as to obtain the best bond possible. All loose masonry units and mortar shall be removed.
- D. Concrete Block - No joints in exposed work shall exceed 1/2" in thickness and all exposed joints shall be uniform in width. One block course and one mortar joint to measure eight (8) inches high. Concrete block shall be laid in running bond unless noted otherwise. Particular care shall be taken in exposed interior block walls to align vertical joints in alternate courses. Blocks shall be selected within the job so that no blocks are laid with chipped or broken edges or corners exposed in finished walls. All vertical cell units shall be laid with divided bed joints and where such units are laid in exterior walls, care shall be taken to avoid continuous mortar joints through the wall. Bed joints shall be placed on both sides of the unit and sufficient mortar shall be used so that excess mortar will be squeezed out of the joints as units are placed. Head joints may be buttered on both edges of unit to be placed, or one joint may be buttered on the unit to be placed.

- E. Special precautions must be taken to achieve smooth faces on the inside of the cavity space and to insure that the bottom of the cavity is clean and free of mortar droppings.
1. Use a smooth mortar bed for the exterior wythe and bevel the mortar joint away from the cavity so that a smooth upper surface inclined down toward the cavity results. Trowel flat and smooth any mortar fins on the cavity face of either width which may result.
  2. Use temporary wood, metal or fiber strips laid on the continuous wall reinforcing and carefully lift them out as the work progresses before the next layer of reinforcement is placed.
- F. Piping - Where piping or conduit is run in masonry, work with other trades to coordinate work. Cut out center ridges in blocks to create voids for pipes or conduit. Where pipes or conduit exit from wall, drill neat holes and slip over piping to provide neat unpatched wall.
- G. Bearing Walls - All bearing cross walls that abut a bearing wall shall be laced into that wall. All non-bearing cross walls that abut bearing walls shall not be laced into the bearing wall but shall be tied to the wall with fabricated joint reinforcement corner ties spaced vertically 16" o.c.
- H. When mortar has become thumbprint hard, all joints in exposed masonry shall be tooled concave with a round jointer. The jointer shall be slightly larger than the width of the mortar joint so that a complete contact is made along the edge of the units, compressing and sealing the surface. Joints in concealed work to receive air barrier per Section 07 27 26 - Fluid Applied Non-Permeable Membrane Air Barrier shall be tooled concave also. Tooling of vertical and horizontal joints to be done to form a level joint face between the joints with no mortar overlaps.
- I. Control/Expansion Joints - Block:
1. Typical non-bearing cross partitions shall have control joints created by butting block to the intersecting wall. These walls shall have metal joint reinforcement ties installed vertically 16 o.c. Cross walls shall have a straight and uniform mortar joint, 1/4" wide, where the walls abut, with mortar raked back 1/4" for caulking. Caulking shall be as specified under Section 07 92 00.
  2. Control joints in exterior walls and interior block partitions 3/8" wide shall be located as shown on drawings. Joints to run from foundation or floor to top of wall. Install premolded joint filler between block on each side of joint. Install 15 lb. felt paper, to act as a bond breaker, at the block core on one side of the joint and fill the joint solidly with mortar. Reinforcing shall not run through the joint. Caulk the joint at the inside face of block in cavity walls and the joint on each side of interior block partitions with caulking as specified in Section 07 92 00.

### 3.03 INSTALLATION OF ACCESSORIES

- A. Reinforcing Accessories:
1. Install all horizontal joint reinforcing and wall ties 16" on center vertically. Reinforcing shall be well embedded in the horizontal joints of the masonry.
  2. Provide prefabricated truss type joint reinforcing at corners and crossing walls.
  3. Install triangular wall ties at locations where new construction ties into existing construction. Wall tie anchor shall be attached to the existing construction with expansion bolts. Ties shall be spaced 16" on center vertically.

### **3.04 POINTING AND CLEANING**

- A. Lay masonry utilizing all necessary care to achieve cleanliness. Remove excess mortar from exposed exterior and interior (stone, clay, concrete and other) masonry surfaces as the work progresses and before it tenaciously adheres to the faces of the masonry. Remove mortar protrusions and smears as masonry units are laid and tooled, as scaffolds are raised and at the start of the next day's work, leaving the surface of the masonry clean and finished. Contractor may use calcimine brushes, stiff fiber brushes, other similar masonry units, burlap, rags, carpet remnants, rubber flats or other approved means.
- B. Point all holes on exposed masonry. Cut out defective mortar joints and repoint them. Remove any particles of mortar inadvertently omitted during construction with trowel, paddle, putty knife or scraper, as required, before washing down walls.
- C. Make periodic cleanup, removing debris caused by these operations. Before closing up any inaccessible spaces or shafts with masonry, removal of all rubbish and sweep out the area to be enclosed. At completion of masonry work, the Contractor shall remove all surplus material, and all rubbish, dirt, debris resulting from the work, and the masonry work shall be left clean.

### **3.05 FINAL SEALING FO BURNISHED MASONRY UNITS**

- A. After final clean down and when the walls are thoroughly dry, apply a field coat of sealer/water repellent to all exposed surfaces of BMU.
- B. Apply one (1) coat of sealer in strict accordance with manufacturer's instructions to all BMU and mortar.

### **3.06 INSPECTION**

- A. The face of the finished wall shall be free of chips, cracks, or other imperfections that would detract from the overall appearance of the wall when viewed from a right angle at a distance of twenty (20) feet under normal diffused lighting.

**END OF SECTION**

**SECTION 06 10 00 - ROUGH CARPENTRY****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install all Rough Carpentry as shown on the drawings and specified herein.
- C. The Contractor shall install the following materials which are furnished under other Sections of the specification, anchoring and securing same as required:
  - 1. Prefabricated Wood Trusses - Section 06 17 53
  - 2. Building Insulation - Section 07 21 00
  - 3. Fluid Applied Non Permeable Membrane Air Barrier - Section 07 27 26
  - 4. FRP Flush Door & Frames - Section 08 17 43
  - 5. Finish Hardware - Section 08 71 00
  - 6. Toilet Partitions - Section 10 21 13
  - 7. Toilet Accessories - Section 10 28 00
- D. This Contractor shall install miscellaneous blocking as required by other trades for the installation of their work, including but not limited to the following:
  - 1. Wood Blocking in wood stud partitions for fixtures, access doors, railings, etc.

**1.02 SUBMITTALS**

- A. Furnish Architect with certificate from the preservative or fire retardant treating plant stating size and quantity of lumber treated, type and amount of treatment.

**1.03 QUALITY ASSURANCE**

- A. All lumber shall be gradestamped by an agency certified by the Board of Review of the American Lumber Standards Committee and manufactured in accordance with Product Standard 20-70, as published by the Department of Commerce.
- B. Wall and roof sheathing shall carry the American Plywood Association (APA) - Rating Stamp which shall show the following information:
  - 1. Panel Grade
  - 2. Span Rating
  - 3. Thickness
  - 4. Exposure Durability Classification
  - 5. Mill Number
  - 6. Code Recognition of APA's as a quality assurance agency
  - 7. APA's Performance-Rated Panel Standard
- C. Siding shall be gradestamped on the backs or ends as per the Western Wood Products Association "Western Lumber Grading Rules 80" which shall show the following information:
  - 1. Certification that the lumber has been graded under the supervision of the Western Wood Products Association.
  - 2. Manufacturers identification number.
  - 3. Grade Mark

4. Species Mark
5. Moisture Content

#### **1.04 DELIVERY, STORAGE AND HANDLING**

- A. All lumber shall be delivered, piled and handled so as to protect it from damage. Lumber shall not be delivered to the site unduly long before it is required in the normal progress of the work. All lumber shall be protected and kept under cover and off the ground ( minimum 5-1/2" above the ground and 3-1/2" above any other surface) both in transit and at the job site.

### **PART 2 - PRODUCTS**

#### **2.01 LUMBER, GRADES AND SPECIES**

- A. Lumber grades shall conform to the grading rules of the manufacturer's association under whose rules the lumber is produced. Lumber shall bear the grade and trade mark of the association under whose rules it is produced, and a mark of mill identification.
- B. Lumber shall be sound, thoroughly seasoned and well manufactured. Materials shall be free of warp that cannot be corrected in the normal process of bridging or nailing. All woodwork exposed to view in finished or unfinished areas shall be dressed. Lumber shall be air dried or kiln dried to an average moisture content not exceeding 19% and shall be gradestamped with the indication of "S-Dry".
- C. Lumber shall be of the grade and species listed below:
  1. Structural Framing - No. 2 & Better, Spruce, Pine, Fir, or as shown on the drawings as follows:
    - a. Extreme Fiber Stress in Bending "Fb" - 875 psi
    - b. Tension Parallel to Grain "Ft" - 325 psi
    - c. Horizontal Shear "Fv" - 70 psi
    - d. Compression Perpendicular "Fc<sup>⊥</sup>" - 425 psi
    - e. Compression Parallel to Grain "Fc" - 1100 psi
    - f. Modulus of Elasticity "E" - 1,400,000 psi
  2. Lumber for Blocking - No. 3, Pine

#### **2.02 PRESERVATIVE TREATED LUMBER**

- A. All lumber permanently exposed to weather and all lumber for curbs, blocking, nailers, etc., in contact with concrete, masonry or roofing materials shall be preservative treated or as indicated on drawings as needing preservative treating. Preservative shall be ACQ preservative or approved equal, applied by the pressure method in a closed retort. Minimum net retention shall be not less than .25 lb. per cubic foot. Lumber shall be fabricated insofar as possible before treating. Lumber cut after treating shall have the cut surface well brushed with same preservative. Furnish Architect with certificate from treating plant stating size and quantity of lumber treated, type and amount of treatment.

#### **2.03 SHEATHING**

- A. All roof and wall sheathing shall be APA Rated Sheathing with a span rating of 32/16 or better and an Exposure 1 rating.
- B. Roof - Roof sheathing shall be 5/8", CDX plywood conforming to the above span and exposure rating. At the contractors option he may furnish 5/8" thick, oriented strand board sheathing panels with the above span and exposure rating. Oriented Strand Board Sheathing shall be Louisiana-Pacific - Inner-Seal OSB Sheathing or approved equal.



1. Refer to Structural Notes for panel index requirements.

#### **2.04 SIDING**

- A. Wood siding shall be Western Red Cedar seasoned to a moisture content not to exceed 15% and shall be grade stamped "S-Dry" or "MC 15", boards shall be in a lap siding with a 9" reveal to match existing.
- B. Trim boards and 2x accent strips shall be square cut boards of the same species and grade of sizes shown on the drawings. Trim boards shall be S4S.
- C. All surfaces of siding and trim to be finished as per Section 09 90 00. No exposed edges allowed.

#### **2.05 HARDWARE**

- A. This contractor shall furnish and install all nails, spikes, screws, bolts and other similar items of rough hardware required in the progress of his work and shall install all items of finish hardware furnished by others.
  1. Anchors for fastening to concrete, masonry and plaster board shall be as manufactured by Hilti, Rawl, Sanko or approved equal. Fasteners shall be size and type required for each particular application.
  2. For anchoring in preservative treated blocking, roofing or waterproofing fasteners shall be stainless steel or hot-dip zinc coated.

#### **2.06 MISCELLANEOUS**

- A. Ice Barrier Underlayment for roofing shall be a self-adhering membrane of rubberized asphalt, 40 mil. thick min., integrally bonded to a slip-resistant polyethylene sheeting as manufactured by one of the following or approved equal:
  1. Grace Construction Products - Ice & Water Shield
  2. Certainteed - Winterguard
  3. GAF - Weather Watch Ice & Water Barrier
  4. Tamko - Moisture Guard
  5. Carlisle - Water & Ice Protection 300HT

### **PART 3 - EXECUTION**

#### **3.01 TEMPORARY DOOR OPENINGS**

- A. Entrances shall be provided with temporary wood framed enclosures covered with asphalt-impregnated sheathing board; plywood or other means to secure and weatherize the entrances. Entrance enclosures shall be equipped with outswinging doors complete with necessary hardware, self-closing device, hasp, lock and pull handle.
- C. Remove all such temporary enclosures from the building and site when finished doors and windows are installed and glazed.

#### **3.02 INSTALLATION - GENERAL**

- A. All finished work shall be scribed and coped as required for an accurate fit and erected plumb, true square and in accordance with the drawings. Correlate location of nailers, blocking grounds and similar supports to allow proper attachment or other work. All work shall be secured in place with screws or nails as required. Countersink and fill all nail and screw heads exposed to view.

- B. This Contractor shall furnish and install all nails, spikes, screws, bolts and other similar items of rough hardware required in the progress of his work and shall install all items of finish hardware furnished by others.
- C. As finish hardware is delivered, this Contractor shall check all items against approved hardware listing and assume full responsibility for same until completion of building. He shall inspect the work of other trades which are to receive hardware and report in writing any defects found in same before installing. Installation of any hardware by this contractor shall imply his acceptance of the work of others.
- D. Metal knobs and handles shall be protected with a wrapping of tough paper or cloth until building is completed, at which time all hardware shall be checked and placed in perfect working order. All keys shall be properly marked and delivered to the building.

### 3.03 WOOD FRAMING

- A. Wood framing shall be designed and erected in accordance with the following:
  - 1. National Design Specification for Wood Construction.
  - 2. Wood Construction Date No. 1 & No. 5 of the National Forest Products Association.
  - 3. Design Specification for Metal Plate Connected Wood Trusses.
  - 4. International Building Code
- B. Connections for wood framing shall conform to the following nailing schedule or as indicated on structural drawings whichever is more stringent. Consult Architect where questions arise.:
  - 1. Top plate to stud, end nail: 2-16d
  - 2. Stud to sole plate: 4-8d toenail or 2-16d end nail
  - 3. Double studs, face nail: 16d at 24" O.C.
  - 4. Doubled top plates, face nail: 16d at 16" O.C.
  - 5. Top plates, laps and intersections, face nail: 2-16d
  - 6. Continuous header, two pieces: 16d at 16" O.C. along each edge.
  - 7. Ceiling joists to top plate, toenail: 3-8d
  - 8. Continuous header to stud, toenail: 4-8d
  - 9. Built-up corner studs: 16d at 24" O.C.
  - 10. Sole plate to foundation: 1/2" anchor bolt, 6'-0" O.C., 2 bolts per piece of wood with one bolt located within 12" of each end of each piece.

### 3.04 INSTALLATION - SHEATHING

- A. Roof Sheathing - Install APA rated roof sheathing with long dimension at right angles to framing with panels continuous over two or more spans. All end joints shall occur over framing members. Stagger end joints at each alternate course. Allow 1/8" spacing at panel ends and edges. Attach APA rated roof sheathing to framing members with 8d common nails spaced 6" on center at the edges and 12" on center at intermediate supports. Provide plywood clips at the intermediate point between panels, or at the contractors option provide solid blocking at panel edges and fasten 6" on center.

### 3.05 INSTALLATION - ROOFING UNDERLAYMENT

- A. Immediately after roof sheathing is installed, and roofing is ready to begin, install roof underlayment in strict accordance with manufacturer's instructions.
- B. Install rubberized asphalt ice barrier underlayment over entire roof.

- C. Ice Barrier shall be placed directly on the structural deck. Remove dust, dirt, loose nails and other protrusions. Cut the membrane into 10' to 15' lengths and reroll. Peel back 1 to 2 feet of release paper, align the membrane on the lower edge of the roof and place the first 1 to 2 feet. Pull the release paper under the membrane and continue to peel it from membrane.
- D. Press or roll the membrane in place to assure full adherence to the deck. End laps and side laps shall be 6" minimum. At roof eaves metal shingle support shall be in place prior to installing the ice barrier. At roof rake the metal shingle support shall be installed over the ice barrier.
- E. Valleys shall have ice barrier applied to them before it is applied to the eaves. For valley and ridge applications, peel back the release paper, center the sheet over the valley or ridge, drape and press it into place working from the center of the valley or ridge outward in each direction. At valleys apply membrane starting at the low point and work upwards.

### **3.06 INSTALLATION - SIDING**

- A. Siding shall be sealed and finished as specified in Section 09 90 00 prior to installation.
- B. Nails for applying siding shall be rust-resistant stainless steel, hot dipped galvanized or high-tensile-strength aluminum. Electro-plated galvanized or brite nails shall not be used. Nails shall be ring shank type nails long enough to penetrate 1-1/4" to 1-1/2" into a solid wood base.
- C. When air infiltration barrier and all flashings are in place install siding, level, starting with the accent strip on the bottom and working to the top as shown on drawings.
- D. Siding shall be nailed to studs spaced 12" on center at a point just above the lap along the bottom edge of the siding in accordance with the manufacturers recommendations.
- E. All butt joints shall occur at a stud/furring strip and the end of each piece of siding shall be nailed to the stud/furring. Butt joints in succeeding courses shall be randomly scattered throughout the field of the wall.
- F. Nails shall not make an unsightly pattern on the sidewall, cause splitting when driven near the edge or end of the siding or "pop" after being driven flush with the siding. All siding that splits shall be removed and replaced with new siding.

**END OF SECTION**

**SECTION 06 17 53 - PREFABRICATED WOOD TRUSSES****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install all Prefabricated Wood Trusses as shown on the drawings and specified herein.
- C. Related Work Specified Elsewhere:
  - 1. Rough Carpentry - Section 06 10 00
- D. NOTE TO BIDDERS: The erection contractor shall be responsible for furnishing and installing all erection and permanent bracing. Permanent bracing shall be the size, quantity and species required by the Truss manufacturer as shown on the approved shop drawings. Bidders shall verify this amount when bidding and include it in their price as no extras will be allowed for these items.

**1.02 REFERENCE STANDARDS**

- A. National Design Specification For Wood Construction.
- B. Design Specification For Metal Plate Connected Wood Trusses QST-88 as published by the Truss Plate Institute.
- C. ASTM A446, Grade A - Connector Plate Steel
- D. ASTM A525, coating designation G60 - Galvanizing

**1.03 SYSTEM DESCRIPTION**

- A. A prefabricated open web, metal plate connector type, wood trusses and accessories.

**1.04 SUBMITTALS**

- A. Prepare and submit shop drawings to the Architect/Engineer for approval in accordance with the requirements of Division 01. Shop drawings shall show the profile and size of each type of truss along with the Truss Manufacturer's Engineering calculations for each truss. No material shall be fabricated until such drawings have been approved. Truss drawings shall be stamped with the seal of the designing engineer.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. All prefabricated wood trusses shall be delivered, stored and handled so as to protect it from damage. Trusses shall not be delivered to the site unduly long before they are required in the normal progress of the work. All trusses shall be protected and kept under cover and off the ground ( minimum 5-1/2" above the ground and 3-1/2" above any other surface) both in transit and at the job site.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Wood trusses shall be manufactured to the standards of the Truss Plate Institute by manufacturers as follows or approved equal:
1. Grizzley Truss Fabricators, Inc.
  2. Kylmala Truss
  3. Manion Lumber and Truss
  4. Truss Works, Inc.

### 2.02 MATERIALS

- A. Wood roof trusses shall be prefabricated by an authorized wood truss producer conforming to the design load and deflection criteria contained herein and the standards of the Truss Plate Institute.
- B. Design standards shall conform with the following:
1. ANSI/TPI 1-2014: National Design Standard for Metal Plate Connected Wood Truss Construction.
  2. International Building Code.
  3. Design requirements of the State of Minnesota.
- C. Trusses shall be fabricated with wood chords and wood webs in accordance with designs prepared under the supervision of a Registered Professional Engineer in the State of Minnesota. Metal connector plates shall securely fasten each joint on both faces of truss in accordance with accepted TPI standards and procedures.
- D. Connector Plates - All connector plates shall be a minimum thickness of 0.036" and shall be manufactured from steel meeting the requirements of ASTM A446 Grade A, and shall be hot dip galvanized according to ASTM A525. Coating Designation G60.
- E. Quality Control - Lumber defects such as wane or knots occurring in the connector plate area must not affect more than ten percent of required plate area or number of effective teeth required for each truss member. Connector plates shall be applied to both faces of truss at each joint, and should provide for even contact between the plate and the wood (maximum tolerance 1/16"). All wood members shall be accurately cut and fabricated so that all members have good bearing and all completed truss units are uniform. Open joint tolerances shall be in accordance with TPI Quality Control Manual QST-88.
- F. Truss Design Standards:
1. Top Chord Live Load - 42 lbs per square foot (snow).
  2. Deflection -  $L/360$  span
  3. Dead Load -  
Top Chord Dead Load - Uniform Imposed 10 psf  
Bottom Chord Dead Load - Uniform Imposed 10 psf
  4. Special Features: Proved raised energy heal per drawings. Verify height to match existing roof.
- G. Truss Types:
1. Common Truss with 6:12 top chord pitch and flat bottom chord
  2. Mono Truss with 6:12 top chord pitch and flat bottom chord.

**2.03 TRUSS CONNECTOR CLIPS**

- A. Trusses shall be connected to the top plates with a truss connector fabricated from 16 gauge, galvanized steel connector for use with a wood top plate. Truss connectors shall be as called out on Structural Drawings or as selected by truss designer per loads as indicated.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Wood trusses shall be designed and erected in accordance with the following:
  - 1. ANSI/TPI 1-2014: National Design Standard for Metal Plate Connected Wood Truss Construction.
  - 2. BCSI - Guide to Good Practice for Installing, Restraining and Bracing of Metal Plate Connected Wood Trusses.
  - 3. DSB-89: Recommended Design Specifications for Temporary Bracing of Metal Plate Connected Wood Trusses.
- B. Rafters and wood trusses shall be connected to the structure with roof truss connector clips. Connector clip shall be nailed to the top plate per truss designer's recommendation.
- C. All trusses must be securely braced both during erection and after permanent installation in the building recommended by the Truss Plate Institute. Erection bracing shall hold trusses straight and plumb and in safe condition until decking and permanent truss bracing has been fastened forming a structurally sound roof framing system. All erection and permanent bracing shall be installed and all trusses permanently fastened before application of any loads. Permanent structural cross-bracing to ensure overall rigidity of the roof system shall be in accordance with the approved shop drawings and truss manufacturers recommendations for the building structure. See truss design drawings for any additional special bracing requirements. Materials used in bracing are to be furnished by the erection contractor in conformance with the approved shop drawings.

**END OF SECTION**

**SECTION 07 13 00 - WATERPROOFING****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, and equipment necessary to furnish and install waterproofing on new and existing construction as specified herein and shown on the drawings.
- C. Related Work Specified Elsewhere:
  - 1. Cast-in-Place Concrete - Section 03 30 00
  - 2. Concrete Unit Masonry - Section 04 22 00
  - 3. Building Insulation - Section 07 21 00
  - 4. Joint Sealants - Section 07 92 00
  - 5. Excavation & Backfilling - Section 31 23 00

**1.02 REFERENCE STANDARDS**

- A. ASTM D412 - Tensile Strength 250 psi
- B. ASTM D412 - Elongation 300% min.
- C. ASTM E96 - Water Vapor Transmission 0.1 grains per sq. ft. per hour
- D. ASTM D146 - Pliability (180<sup>0</sup> bend, 1" mandrel @ 25<sup>0</sup> F) Unaffected

**1.03 SUBMITTALS**

- A. Submit manufacturer's product data including installation instructions, use limitations and recommendations.
- B. Subcontractors approval by Manufacturer: Submit document stating manufacturer's acceptance of subcontractor as an Approved Applicator for the specified materials.
- C. Warranty: Submit a sample warranty identifying the terms and conditions stated in section 1.07.

**1.04 QUALITY ASSURANCE**

- A. Installer shall have a minimum of 3 years experience in the installation of waterproofing systems and shall be approved by the manufacturer.
- B. Products used in the waterproofing system shall be the products of a single manufacturer.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials and products in labeled packages. Store and handle in strict compliance with the manufacturer's instructions, recommendations, and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged materials from the site and dispose of in accordance with applicable regulations.
  - 1. Do not double stack pallets of membrane on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
  - 2. Protect mastic and adhesive from moisture and potential sources of ignition.

3. Protect surface condition of membrane from freezing.
- B. Sequence deliveries to avoid delays, but minimize on-site storage.

#### **1.06 PROJECT CONDITIONS**

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.
- B. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.
- C. Do not apply primer or membrane to frozen concrete. Apply material only when the temperature is between 30<sup>0</sup>F and 90<sup>0</sup>F.
- D. Do not apply primer or membrane to a damp, frosty or contaminated surface.

#### **1.07 WARRANTY**

- A. Provide a written 5 year material warranty issued by the membrane manufacturer upon completion of the work.

### **PART 2 - PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Products manufactured by W.R. Grace & Co., Mirafi, Karnak, Polyken Technologies, W.R. Meadows, Carlisle or approved equal.

#### **2.02 MATERIALS**

- A. Waterproofing for below grade walls shall be composite sheet of cross-laminated polyethylene with an under surface of rubberized asphalt compound. Sheet shall be a minimum of .060" thick and be self adhering.
- B. Waterproofing shall be a complete waterproofing system, as manufactured by one of the following or approved equal:
1. W.R. Grace & Co. - Bituthane 4000
  2. Carlisle - Miradri 860/861
  3. Polyguard Products, Inc. - Polyguard 650
  4. W.R. Meadows - Mel-Rol
  5. Carlisle - Coating & Waterrproofing
- C. Provide all primers, adhesives, tapes, sealants and other accessories required by the manufacturer for a complete watertight installation.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION OF SURFACES**

- A. Before installing any waterproofing this contractor shall inspect surfaces to receive waterproofing. Notify the Architect in writing of any defects or conditions that will prevent a satisfactory installation. Architect will cause such defects to be corrected. Starting of work shall imply the acceptance, by this contractor of the surfaces as suitable to receive his materials.



### 3.02 PREPARATION OF SURFACES

- A. Surfaces to which waterproofing is to be applied shall be prepared in strict accordance with the membrane manufacturer's instructions. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove dust, dirt, loose stone and debris. Use repair methods which are acceptable to the manufacturer of the sheet membrane waterproofing.
- B. Cast-In Places Concrete substrates:
1. Do not proceed with installation until concrete is properly cured and dried, minimum 7 days for normal structural concrete and minimum 14 days for lightweight structural concrete.
  2. Form tie holes shall be filled concrete and finished flush with surrounding surface.
  3. Repair bugholes over 2" in length and 1/4" deep and finish flush with surrounding surface.
  4. Remove scaling to sound, unaffected concrete and repair exposed area.
  5. Grind irregular construction joints to suitable flush surface.
  6. Saw cut cracks greater than 1/16" wide to 1/4" x 1/4". Clean saw cuts and expansion joints. Install backer rod into joint, fill joints and cracks with elastomeric sealant as recommended by the manufacturer, smooth sealant flush with the surrounding surface and allow to cure.
- C. Masonry substrates: Provide smooth trowel - cut mortar joints or surface shall be parged with a uniform coat of mortar. Allow the mortar/parge coat to dry before priming and installing waterproofing.

### 3.03 INSTALLATION

- A. Specific installation instructions of the manufacturer of the waterproofing membrane shall be followed for the application of these materials, submit installation instructions to the Architect prior to beginning any waterproofing installation. The following application guidelines are considered by the Architect to be the minimum acceptable installation instructions.
- B. Inside Corners - install a 1" fillet at all inside corners including the junction of the footing and foundation wall. Fillet shall be formed with a premade strip, troweled on elastomeric compound or liquid membrane.
- C. Priming - Stir primer thoroughly. Apply primer by spray or long nap roller in an even coat at a rate of 250 to 300 square feet per gallon. At 75°F allow primer to dry; 1 hour minimum, 8 hours maximum. Primer has a satisfactory cure when surface is tacky, but does not transfer when touched. If membrane is not applied within the maximum drying time, surface shall be re-primed before applying membrane.
- D. Cracks & Joints - apply membrane 6" wide over sealed cracks, joints, hairline cracks and cold joints.
- E. Corners - apply membrane 12" wide over inside and outside corners, centered on axis of the corners.
- F. Drains & Protrusions - install membrane around all projections and drains. extend membrane 6" on all sides and apply final sheet membrane over this flashing. Seal all edges and terminations with mastic.
- G. Vertical Surfaces - install membrane in lengths of 8' or less. Overlap edge seams 2-1/2". On walls higher than 8', apply in 8' sections, starting at the lowest point with the higher sections overlapping the lower section as recommended by the membrane manufacturer. Membrane shall be firmly pressed into place using heavy hand pressure, stiff broom or a suitable roller, using extra care and pressure at seams.
- H. Terminations - press terminating edge firmly with a hammer handle or equal. Apply mastic as per manufacturer's recommendations to all terminating edges. At the base of the foundation wall the membrane shall extend over the edge of the footing and terminate and the terminating edge pressed firmly against the vertical surface of the footing.

- I. Repairs - following application, inspect all membrane for tears, puncture, fishmouths, air bubbles or voids due to misalignment of seams. Remove damaged membrane. Prime exposed concrete and allow primer to dry. Apply a new section of sheet membrane to primed concrete, extending onto adhered membrane 6" in all sides. Firmly press repair section to ensure good seal and apply mastic to the terminating edges of patch.

**END OF SECTION**

**SECTION 07 21 00 - BUILDING INSULATION****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install insulation where shown or indicated on the drawings and as specified herein.
- C. Related Work Specified Elsewhere:
  - 1. Rough Carpentry - Section 06 10 00
  - 2. Waterproofing - Section 07 13 00
  - 3. Vapor Barrier - Section 07 26 00
  - 4. Fluid Applied Non-Permeable Membrane Air Barrier – Section 07 27 26

**1.02 REFERENCE STANDARDS**

- A. ASTM C665-84, Type I - Unfaced Fiberglass Insulation
- B. ASTM C578-85, Type IV - Extruded Polystyrene Insulation
- C. ASTM C518-R - Value For Insulation
- D. ASTM C 739 – Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation.
- E. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. ASTM E 119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
- G. CPSC Standard 16 CFR Parts 1209 and 1404.
- H. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials.

**1.03 SUBMITTALS**

- A. Product Data: Submit manufacturer's product data, including installation instructions.
- B. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- C. Warranty Documentation: Submit manufacturer's standard warranty.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. Deliver, materials to the job site in original unopened packages, clearly marked with product brand name and manufacturer's labels.
- B. Store under cover and protect from weather and construction activity.
- C. Protect rigid insulation from exposure to direct sunlight.
- D. Protect "skin" surface of rigid insulation from damage. Any insulation with damaged or broken skin shall not be installed.

## **PART 2 - PRODUCTS**

### **2.01 BATT INSULATION**

- A. Batt Insulation - Fiberglass batts, unfaced, friction fit, conforming to ASTM C665, Type I, minimum R-value 3.5 per inch, thickness as shown on drawings. Batt insulation shall be as manufactured by one of the following or approved equal:
1. Owens Corning - Light Density Thermal Insulation
  2. Manville - Insulating Blankets
  3. United States Gypsum Co. - Thermafiber
  4. Certainteed - Unfaced Building Insulation

### **2.02 BOARD INSULATION**

- A. Rigid Insulation - Closed cell, extruded polystyrene conforming to ASTM C578, Type IV with a minimum aged R-value of 5 per inch, thickness as shown on drawings. Rigid insulation shall be as manufactured by one of the following or approved equal:
1. Dow Chemical Co. - Styrofoam Square Edge
  2. U.C. Industries - Foamular 250
  3. Minnesota Diversified Products Inc. - Certifoam
  4. Amoco - Amof foam
- B. Underslab Insulation - Install 2 layers of closed cell, extruded polystyrene insulation conforming to ASTM C578, Type IV, minimum 25 PSI with a minimum R-Value of 5 per inch. Insulation is to be installed with staggered joints directly above vapor barrier and engineered fill in locations that require in-floor heat. Joints shall be tightly butted and insulation shall be tightly fit around all protrusions.

### **2.03 BLOWN INSULATION**

- A. Cellulose Insulation:
1. Pneumatically Blown Dry into Attics: Nu-Wool Premium Cellulose Insulation or approved equal substitution per Submittals - Section 01 33 00.
- B. Material Description:
1. Manufactured from recycled newspapers.
  2. Post-Consumer Recycled Content: 85 percent minimum.
  3. Fibers: Treated with boric acid and sodium polyborate additives to create permanent flame resistance.
  4. Fungicide Additive:
    - a. EPA registered.
    - b. Makes insulation resistant to mold growth.
  5. Additives:
    - a. Non-toxic.
    - b. Non-corrosive.
    - c. Does not irritate normal skin.
    - d. Does not give off odor during or after installation.
    - e. Does not attract vermin or insects.
    - f. Does not adversely affect other building materials.

C. Compliance:

1. UL classified R-8078.
2. CPSC Standard 16 CFR Parts 1209 and 1404.
3. ASTM C 739.
4. ASTM E 119: Firewalls U382, U369a, U369b, U360.
5. ES Report ESR-2217.

D. Test Results:

1. Settled Density:
  - a. Maximum density after long-term settling of dry installation: 1.6 lbs per cu ft.
2. Thermal Resistance:
  - a. Average thermal resistance (R-value) per inch: 3.8.
3. Flammability Characteristics:
  - a. Critical Radiant Flux: 0.12 W/cm<sup>2</sup> minimum.
  - b. Smoldering Combustion: No evidence of flaming and weight loss of 15.0 percent maximum. Nu-Wool Cellulose Insulation 07210 (07 21 00) - 4
4. Moisture Vapor Sorption:
  - a. Moisture Gain in Insulation: 15 percent maximum by weight.
5. Environmental Characteristics:
  - a. When in contact with steel, copper, aluminum, or galvanized materials: Non-corrosive.
  - b. Does not support fungal growth.
6. Surface Burning Characteristics, ASTM E 84 and UL 723: Nu-Wool Premium Cellulose Insulation.
  - a. Flame Spread Index: 15.
  - b. Smoke Developed Index: 5.

**2.04 INSULATION ACCESSORIES**

- A. Chutes for installation are to be installed at every joist bay. Chutes are to be ADO Durovent Baffle or equal.

**PART 3 - EXECUTION****3.01 INSTALLATION**A. General:

1. Do not proceed with the installation of insulation until the work which follows (and conceals the insulation) is ready to be performed.
2. Comply with manufacturer's instructions and recommendations for the particular conditions or installation in each case.

B. Batt Insulation:

1. Extend insulation full thickness as shown on the drawings, over the entire area to be insulated. Fit insulation between framing members. Cut and fit tightly around obstructions and fill voids with insulation to insure a snug fit.
2. Fill cracks and voids around window and door frames, window mullions and other voids in exterior walls with fiberglass insulation.

C. Foundation Rigid Insulation:

1. Install rigid insulation at the perimeter foundation wall from top of footings to just below grade as shown on drawings over waterproofing just prior to backfilling operations.
2. Support insulation as required until sufficient pressure of backfill will hold insulation in place without displacement.
3. Insulation shall be installed in parallel courses with end joints staggered. Joints shall be tightly butted and insulation shall be tightly fit around all protrusions.

D. Wall Rigid Insulation:

1. Insulation adhesive shall be a rubber based, solvent dispersed type adhesive compatible with the insulation and substrate. Adhesive shall not cavitate the insulation. Dow Styrofoam Brand Construction Adhesive or equal.

E. Blowing Insulation:

1. Install cellulose insulation in accordance with manufacturer's instructions at locations indicated on the Drawings.
2. Install cellulose insulation to uniform density without voids, gaps, or air pockets.
3. Install cellulose insulation to density and depth to achieve required R-values as identified on the drawings.
4. Pneumatically Blown Dry Cellulose Insulation:
  - a. Pneumatically blow cellulose insulation dry into attics and floor assemblies after mechanical, plumbing, electrical, and other utility installations have been completed.
  - b. Ensure heat-producing devices in attics have barriers constructed around them to prevent contact with cellulose insulation.
  - c. Install cellulose insulation to a density of 1.6 lbs. per cu. ft.

**3.02 PROTECTION**

- A. Protect installed cellulose insulation from damage during construction.

**END OF SECTION**

**SECTION 07 25 00 WEATHER BARRIER-RAINSCREEN****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install a complete weather barrier system with integral Rainscreen. Provide sealant, screening, fasteners, and other accessories to provide a complete weather barrier system.
- C. Related work specified elsewhere
  - 1. Section 06 10 00 - Rough Carpentry
  - 2. Section 07 21 00 - Building Insulation
  - 3. Section 07 26 13 - Above Grade Vapor Retarder
  - 4. Section 07 62 00 - Flashing and Sheet Metal
  - 5. Section 07 90 00 - Joint Sealers

**1.02 REFERENCES**

- A. ASTM C 165-00: Standard Test Method for Measuring Compressive Properties of Thermal Insulations
- B. ASTM D 4533: Standard Test Method for Trapezoidal Tear Strength of Geotextiles
- C. ASTM D 4632: Standard Test Method for Grab-Breaking Load and Elongation of Textiles
- D. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials
- E. Fed. Std. 191A Method 5874: Cold-Crack Resistance
- F. ASTM D 4716: Standard Test Method for Determining the (in-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head

**1.03 SUBMITTALS**

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit manufacturer's product data and installation instructions.
- C. Samples: Submit selection and verification samples.
- D. Closeout Submittals: Submit the following: 1. Warranty documents specified herein.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

### 1.05 DELIVERY, STORAGE AND HANDLING

- A. General: Comply with Division 1 Product Requirement Section.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

### 1.06 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.
  - 1. Warranty Period: 20 years, beginning with date of substantial completion.

## PART 2 – PRODUCTS

### 2.01 RAINSCREEN

- A. Manufacturer (Basis of Design):
  - 1. Benjamin Obdyke Incorporated.  
Contact: 400 Babylon Road, Suite A, Horsham, PA 19044; Telephone: (800) 523-5261; Fax: (215) 672-3731; E-mail: [info@benjaminobdyke.com](mailto:info@benjaminobdyke.com); website: [www.benjaminobdyke.com](http://www.benjaminobdyke.com).)
  - 2. Accepted substitution per Submittals - Section 01 33 00.
- B. Proprietary Products/Systems: Rainscreen, including the following:
  - 1. Slicker® 10 HP (Basis of Design):
    - a. Description: 10mm vertically-channeled three-dimensional matrix bonded to a water-resistive barrier in roll form and meets Canadian rainscreen codes.
    - b. Material: Polypropylene (up to 40% post-industrial recycled content)
    - c. Width: 39.37 inches (1 m)
    - d. Length: 38 1/2 feet
    - e. Thickness: 0.44 inches (10 mm)
    - f. Weight: 15 lbs/roll; 10 oz/yd<sup>2</sup>.
    - g. Matrix Design: 8 channels per 4 inches (102 mm); 2 channels per inch (25.4 mm).

### 2.02 ACCESSORIES

- A. Provide the following accessories:
  - 1. Fasteners:
    - a. Type: Blunt-tipped, ring shank stainless steel nails.
    - b. Material: Corrosion protected steel.
    - c. Manufacturer: Acceptable to manufacturer of rainscreen.
    - d. Size: Suitable for project application.



**PART 3 - EXECUTION****3.01 MANUFACTURER'S INSTRUCTIONS**

- A. Comply with the instructions and recommendations of the rainscreen manufacturer.

**3.02 EXAMINATION**

- A. Site Verification of Conditions:
  - 1. Verify that site conditions are acceptable for installation of rainscreen.
  - 2. Do not proceed with installation of rainscreen until unacceptable conditions are corrected.

**3.03 INSTALLATION**

- A. Verify installation of sidewall sheathing material Foam board.
- B. Install rainscreen/weather barrier continuous over substrate.
  - 1. Wherever siding or cladding will be applied, roll out rainscreen with channels running vertically. Cover entire wall surface wherever siding materials will be installed.
  - 2. Do not stretch rainscreen.
  - 3. Install rainscreen so that it lies flat against the wall.
  - 4. Overlapping weather barrier at vertical and 3" at horizontal seams or as recommended by manufacturer. Trim rainscreen to ensure no overlap.
  - 5. Nail or staple rainscreen every 3 square feet.
- C. Install siding or cladding system over wall surface in compliance with manufacturer's installation instructions
  - 1. Install siding even with trim.
- D. To prevent insect infiltration along bottom edge of siding, attach a 6 inch (152 mm) wide piece of screen material (1/8 inch [3.2 mm] maximum hole size) continuously along the wall, 3 inches (76 mm) above bottom edge of rainscreen. Fold up onto outer surface of installed rainscreen and fasten with a large head nail to hold in place prior to applying siding or cladding.

**3.04 PROTECTION**

- A. Protect installed work from damage due to subsequent construction activity on the site.

**END OF SECTION**

**SECTION 07 26 13 - ABOVE GRADE VAPOR RETARDER****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, and equipment necessary to furnish and install ceiling vapor barrier to complete the work in accordance with the drawings, schedules and this Specification.
- C. Related Work Specified Elsewhere:
  - 1. Rough Carpentry - Section 06 10 00
  - 2. Prefab Wood Trusses - Section 06 17 53
  - 3. Building Insulation - Section 07 21 00
  - 4. Painting - Section 09 90 00

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Vapor Barrier - shall be 6 mil polyethylene; furnish in adequate widths to minimize the number of laps required. Lap a minimum of 6" at all laps. Vapor barrier shall be black in color.
- B. Sealant Tape - shall be Minnesota Mining & Manufacturing - 3M Sheathing Tape.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. All ceilings with batt insulation shall have a vapor barrier installed over the inside face of framing members. Vapor barrier materials shall be applied in widest practical width to minimize the number of joints. Joints shall be overlapped a minimum of 6" and shall be taped with sheathing tape. At pipes and other penetrations vapor barrier shall be tightly fit around penetration and tape sealed to it. At electrical boxes vapor barrier shall be tucked around the backside of the box and sealed. Vapor barrier shall be fastened to the bearing plate at the building's exterior walls and shall completely seal off the insulation from the inside of the building.

**END OF SECTION**

**SECTION 07 26 16 - BELOW GRADE VAPOR RETARDER****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, and equipment necessary to furnish and install **under slab-on-grade** vapor barrier. Vapor barrier, seam tape, mastic, and pipe boots for installation under concrete slabs.
- C. Related Work Specified Elsewhere:
  - 1. Cast-In-Place Concrete - Section 03 30 00
  - 2. Rough Carpentry - Section 06 10 00
  - 3. Building Insulation - Section 07 21 00
  - 4. Joint Sealants - Section 07 92 00

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM E 1745-97 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
  - 2. ASTM E 154-88 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs
  - 3. ASTM E 96-95 Standard Test Methods for Water Vapor Transmission of Materials
  - 4. ASTM E 1643-98 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
- B. American Concrete Institute (ACI)
  - 1. ACI 302.1R-96 Vapor Barrier Component (plastic membrane) is not less than 10 mils thick

**1.03 SUBMITTALS**

- A. Quality Control / Assurance
  - 1. Independent laboratory test results showing compliance with ASTM & ACI Standards.
  - 2. Manufacturer's samples, literature
  - 3. Manufacturer's installation instructions for placement, seaming and pipe boot installation

**PART 2 – PRODUCTS****2.01 MATERIALS**

- A. Vapor Barrier (Performance based specification). When the specifications of different sections conflict, the contractor shall perform to the most restrictive provision.
  - 1. Vapor Barrier membrane must have the following properties:
    - a. Manufactured from prime virgin resins
    - b. Water Vapor Barrier ASTM E-1745 Meets or exceeds Class A
    - c. Permeance Rating ASTM F-1249 Less than .01 perms
    - d. Conditioning Tests ASTM E 154  
Sections--8,11,12, 13 Less than .01 perms

- e. Puncture Resistance ASTM D-1709 Minimum 2200 grams
- f. Tensile Strength ASTM D-882 Minimum 50.0 lbf/in
- g. Basis of Design: Stego Wrap 15- mil Vapor Barrier by Stego Industries LLC, 949.493.5460 or approved equal.
- h. Jobsite review required.
  - 1) Contact Stego Industries representative Kyle Clemens @ 949.584.9383 for coordination of jobsite review ASAP following award of project to General Contractor. Stego Industries will conduct a review of exposed Stego Wrap prior to concrete placement and will issue a "Jobsite Review" letter confirming the review of installation.
  - 2) Contractor shall conduct a Pre-installation Conference on-site with Construction Manager and Architect prior to installation.

## 1.02 ACCESSORIES

- A. Seam Tape
  - 1. Tape must have the following qualities:
    - a. Water Vapor Transmission Rate ASTM E 96 0.3 perms or lower
  - 2. Seam Tape
    - a. Stego Tape by STEGO INDUSTRIES LLC, San Juan Capistrano, CA (877) 464-7834  
[www.stegoindustries.com](http://www.stegoindustries.com)
- B. Vapor Proofing Mastic
  - 1. Mastic must have the following qualities:
    - a. Water Vapor Transmission Rate ASTM E 96 0.3 perms or lower
  - 2. Mastic
    - a. Stego Mastic by STEGO INDUSTRIES LLC, San Juan Capistrano, CA (877) 464-7834  
[www.stegoindustries.com](http://www.stegoindustries.com)
- C. Pipe Boots
  - 1. Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.

## 2.03 APPROVED MANUFACTURERS

- A. Insulation Solutions, Inc. – Viper II 15 mil
- B. Raven Industries – Vapor Block 15
- C. Stego Industries – Stego Wrap 15 mil

## PART 3 – EXECUTION

### 3.01 PREPARATION

- A. Ensure that subsoil is approved by architect or geotechnical firm.
  - 1. Level and tamp or roll aggregate, sand or tamped earth base.

**3.02 INSTALLATION**

- A. Install Vapor Barrier/Retarder:
1. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98.
    - a. Unroll Vapor Barrier/Retarder with the longest dimension parallel with the direction of the pour.
    - b. Lap Vapor Barrier/Retarder over footings and seal to foundation walls. Vapor Barrier to be installed a minimum of 3" up the vertical face of all walls - seal to the wall.
    - c. Overlap joints 6 inches and seal with manufacturer's tape.
    - d. Seal all penetrations (including pipes) per manufacturer's instructions.
    - e. No penetration of the Vapor Barrier/Retarder is allowed except for reinforcing steel and permanent utilities.
    - f. Repair damaged areas by cutting patches of Vapor Barrier/Retarder, overlapping damaged area 6 inches and taping all four sides with tape.

**END OF SECTION**

**SECTION 07 27 26 - FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR IMPERMEABLE****PART 1 — GENERAL****1.01 RELATED DOCUMENTS**

- A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

**1.02 SUMMARY**

- A. The work of this section includes, but is not limited to, the following:
  - 1. Materials and installation methods for fluid applied air and vapor barrier membrane system located in the non-accessible part of the wall.
  - 2. Materials and installation methods to bridge and seal air leakage pathways in roof and foundation junctions, window and door openings, control and expansion joints, piping and other penetrations through the wall assembly.
- B. Related Sections: Other specification sections that directly relate to the works of this section include, but are not limited to, the following:
  - 1. Concrete Unit Masonry - Section 04 22 00
  - 2. Rough Carpentry - Section 06 10 00
  - 3. Building Insulation - Section 07 21 00
  - 4. Above Grade Vapor Retarder - Section 07 26 13
  - 5. Below Grade Waterproofing - Section 07 26 16
  - 6. Flashing and Sheet Metal - Section 07 62 00
  - 7. Joint Sealers - Section 07 92 00

**1.03 PERFORMANCE REQUIREMENTS**

- A. Provide an air and vapor barrier system to perform as a continuous barrier to air infiltration/exfiltration and water vapor transmission and to act as a liquid water drainage plane flashed to discharge any incidental condensation or water penetration.

**1.04 REFERENCES**

- A. The following standards and publications are applicable to the extent referenced in the text. The most recent version of these standards is implied unless otherwise stated.
- B. American Society for Testing and Materials (ASTM)
  - 1. C 836 Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
  - 2. D 412 Standard Test Methods for Rubber Properties in Tension
  - 3. D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
  - 4. D 1644 Test Methods for Non-volatile Content of Varnishes
  - 5. D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
  - 6. D 4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
  - 7. D 3767 Standard Practice for Rubber - Measurements of Dimensions
  - 8. E 96 Test Methods for Water Vapor Transmission of Materials
  - 9. E 283 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
  - 10. E2178 Standard Test Method for Air Permeance of Building Materials

11. E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

**1.05 SUBMITTALS**

- A. Product Data: Submit manufacturer's product data, installation instructions, use limitations and substrate preparation recommendations.
- B. Shop drawings showing locations and extent of air and vapor barrier system including details for terminations flashings, penetrations, window and door openings and treatment of substrate joints and cracks.
- C. Written documentation demonstrating installer's qualifications under the "Quality Assurance" article including reference projects of a similar scope.
- D. Samples: Submit representative samples of the following for approval:
  - 1. Fluid applied air barrier membrane
  - 2. Transition Membrane
  - 3. Through Wall Flashing
- E. Warranty: Submit a sample warranty identifying the terms and conditions stated in Section 1.09.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer: Air and vapor barrier systems shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of waterproofing and air barrier products. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five years.
- B. Installer: The installer shall demonstrate qualifications to perform the work of this Section by submitting the following:
  - 1. List of at least three (3) projects contracted within the past five (5) years of similar scope and complexity to this project carried out by the firm and site supervisor.
  - 2. Installer must show evidence of adequate equipment and trained field personnel to successfully complete the project in a timely manner.
- C. Materials: Fluid applied air and vapor barrier material shall be two part synthetic rubber based systems free of solvents, isocyanates and bitumen. For each type of material required for the work of this section, provide primary materials that are the products of one manufacturer.
- D. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include but not be limited to the following:
  - 1. Review of submittals.
  - 2. Review of surface preparation, minimum curing period and installation procedures.
  - 3. Review of special details and flashings.
  - 4. Sequence of construction, responsibilities and schedule for subsequent operations.
  - 5. Review of mock-up requirements.
  - 6. Review of inspection, testing, protection and repair procedures.
- E. Mock-up:
  - 1. Prior to installation of the air and vapor barrier system a field-constructed mock-up shall be provided under the provisions of Section 01 33 00 Submittals to verify details and tie-ins and to demonstrate the required quality of materials and installation.

2. Allow 24 hours for inspection and testing of mock-up before proceeding with air and vapor barrier work.
  3. Mock-up may remain as part of the work.
- F. Inspection and Testing: Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed air and vapor barrier membrane until it has been inspected, tested and approved.

### 1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.
- B. Do not double-stack pallets of fluid applied membrane components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
- C. Protect fluid-applied membrane components from freezing and extreme heat.
- D. Sequence deliveries to avoid delays, but minimize on-site storage.

### 1.08 PROJECT CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive the air and vapor barrier membrane.

### 1.09 WARRANTY

- A. Submit manufacturer's warranty that air and vapor barrier and accessories are free of defects at time of delivery and are manufactured to meet manufacturer's published physical properties and material specifications.

## PART 2 – PRODUCTS

### 2.01 GENERAL

- A. For each type of material required for the work of this section, provide primary materials that are the products of one manufacturer.

### 2.02 FLUID APPLIED MEMBRANES

- A. Description: a self-curing, synthetic rubber based material free of solvents, isocyanates and bitumen.
- B. Performance Requirements:

Property	Test Method	Typical Value
Color		Green
Cured Film Thickness	ASTM D 3767 Method A	1.5 mm (0.060 in.) nominal
Solids Content	ASTM D 1644	100%
Air Permeance at 75Pa (0.3 in. water) Differential Pressure	ASTM E 2178	<0.001 L/(s.m <sup>2</sup> ) (<0.0002 cfm/ft <sup>2</sup> )
Assembly Air Permeance at 75Pa (0.3 in. water) Differential Pressure	ASTM E 2357	<0.004 L/s*m <sup>2</sup> (<0.0008 cfm/ft <sup>2</sup> )



Water Vapor Permeance	ASTM E 96, Method BW	Less than 4.6 ng/Pa.s.m <sup>2</sup> (0.08 perms)
Pull Adhesion to Concrete Block (CMU)	ASTM D 4541-02	0.24 N/mm <sup>2</sup> (35 psi)
Pull Adhesion to Glass Faced Wall Board	ASTM D 4541-02	0.12 N/mm <sup>2</sup> (18 psi)
Peel Adhesion to Concrete	ASTM D 903 Modified <sup>1</sup>	880 N/m (5 lb./in.)
Elongation	ASTM D 412	500% minimum
Pliability, 180° Bend over 25 mm (1 in.) Mandrel at -30°C (-23°F)	ASTM D 1970	Unaffected
Low Temperature Flexibility and Crack Bridging 3.2mm (1/8in.) crack cycling at -26°C (-15°F)	ASTM C836	Pass
Extensibility over 6.4mm (1/4in.) crack after heat aging	ASTM C836	Pass

Footnote:

1. The membrane is applied to concrete and allowed to cure. Peel adhesion of the membrane is measured at a rate of 50 mm (2 in.) per minute with a peel angle of 90° at room temperature.

- C. **Acceptable Materials:** The following systems are deemed acceptable when installed as a complete products system with manufacturer approved accessories similar to basis of design.
1. Perm-A-Barrier<sup>®</sup> Liquid from Grace Construction Products, 62 Whittemore Avenue, Cambridge, MA.
  2. Air-Shield LSR from W.R. Meadows
  3. TK-2103 Vapor Impermeable Waterborne Liquid Air Barrier, as manufactured by TK Products, Division of Sierra Corporation.

**2.03 FLUID-APPLIED, VAPOR-IMPERMEABLE MEMBRANE AIR BARRIER**

- A. **Basis of Design** - Subject to compliance with requirements, provide the following or approved equal:
1. Two-part, self-curing, rubber-based material free of solvents, isocyanates and bitumen; Perm-A-Barrier, as manufactured by Grace Construction Products, 62 Whittemore Avenue, Cambridge, MA.
- B. **Physical and Performance Properties** - Provide products with the following minimum properties:
1. Membrane Air Permeance: Not to exceed 0.0002 cfm/sq.ft. of surface area (at specified thickness) at 1.57-lbf/sq.ft. pressure difference (0.002 L/s x sq.m of surface area at 75-Pa) when applied to CFM wall; when tested per ASTM E2178.
  2. Membrane Vapor Permeance: Less than .08 perms (4.6 ng/Pa x s x sq.m); when tested per ASTM E96, Method BW.
  3. Assembly Performance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.0008 cfm/sq.ft. of surface area under a pressure differential of 0.3 in. water (1.57 pounds per square foot)(0.004 L/s x sq.m of surface area at 75-Pa); when tested in accordance with ASTM E2356.
  4. UV Exposure Limit: Not more than 60 calendar days; per ASTM D412 and ASTM E96-Method

**2.04 AUXILIARY MATERIALS**

- A. **General** - Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. **Liquid Membrane for Details and Terminations** - Provide Bituthene Liquid Membrane as manufactured by Grace Construction Products, 62 Whittemore Avenue, Cambridge, MA.

- C. Wall Primer (for Use with Through Wall Flashing and Tapes Applied to Substrate) - Liquid waterborne primer recommended for substrate by manufacturer of air barrier material.
1. Flash Point: No flash to boiling point
  2. Solvent Type: Water
  3. VOC Content: Not to exceed 10 g/l
  4. Application Temperature: -4°C (25°F) and above
  5. Freezing Point (as packaged): -7°C (21°F)
- D. Joint Reinforcing Strip - Vapor barrier manufacturer=s approved tape.
- E. Substrate Patching Membrane - Manufacturer=s standard trowel-grade substrate filler.
1. Product: Bituthene Liquid Membrane, manufactured by Grace Construction Products
- F. Sprayed Polyurethane Foam Sealant - 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu.ft. (24 to 32 kg/cu.m) density; flame spread index of 25 or less according to ASTM E162; with primer and non-corrosive substrate cleaner recommended by foam sealant manufacturer.
- G. Joint Sealant - ASTM C920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O.

## 2.05 TRANSITION MEMBRANE

- A. Description: 0.9 mm (36 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (4 mil) of cross-laminated, high-density polyethylene film to provide a min. 0.1 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed.
- B. Performance Requirements:
1. Water Vapor Transmission: ASTM E 96, Method B: 2.9 ng/m<sup>2</sup>sPa (0.05 perms) max.
  2. Air Permeance at 75Pa (0.3 in. water) pressure difference: 0.0006 L/(s.m<sup>2</sup>) (0.00012 cfm/ft<sup>2</sup>) max.
  3. Puncture Resistance: ASTM E 154: 178 N (40 lbs.) min.
  4. Lap Adhesion at -4°C (25°F), ASTM D 1876: 880 N/m (5.0 lbs./in.) of width min.
  5. Low Temperature Flexibility, ASTM D 1970: Unaffected to -43°C (-45°F).
  6. Tensile Strength, ASTM D 412, Die C Modified: min. 2.7 MPa (400 psi)
  7. Elongation, Ultimate Failure of Rubberized Asphalt, ASTM D 412 Die C: min. 200%
- C. Acceptable Materials:  
Perm-A-Barrier Detail Membrane manufactured by Grace Construction Products.

## 2.06 FLEXIBLE MEMBRANE WALL FLASHING

- A. Description: 0.8 mm (32 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed.

- B. Performance Requirements:
1. Water Vapor Transmission, ASTM E 96, Method B: 2.9 ng/m<sup>2</sup>sPa (0.05 perms) max.
  2. Water Absorption, ASTM D 570: max. 0.1% by weight
  3. Puncture Resistance, ASTM E 154: 356 N (80 lbs.) min.
  4. Tear Resistance
    - a. Initiation ASTM D 1004: min. 58 N (13.0 lbs.) M.D.
    - b. Propagation ASTM D 1938: min. 40 N (9.0 lbs.) M.D.
  5. Lap Adhesion at -4°C (25°F), ASTM D 1876: 880 N/m (5.0 lbs./in.) of width
  6. Low Temperature Flexibility, ASTM D 1970: Unaffected to -43°C (-45°F)
  7. Tensile Strength, ASTM D 412, Die C Modified: min. 5.5 MPa (800 psi)
  8. Elongation, Ultimate Failure of Rubberized Asphalt, ASTM D412, Die C: min. 200%
- C. Acceptable Materials:  
Perm-A-Barrier Wall Flashing manufactured by Grace Construction Products.

## 2.07 AIR & VAPOR BARRIER ACCESSORIES

- A. Description: Water-based primer which imparts an aggressive, high tack finish on the treated substrate
1. Flash Point: No flash to boiling point
  2. Solvent Type: Water
  3. VOC Content: Not to exceed 10 g/l
  4. Application Temperature: -4°C (25°F) and above
  5. Freezing point (as packaged): -7°C (21°F)  
Product: Perm-A-Barrier WB Primer manufactured by Grace Construction Products.
- B. Description: Two part, elastomeric, trowel grade material designed for use with self-adhered membranes and tapes. 10 g/l max. VOC Content.  
Product: Bituthene<sup>®</sup> Liquid Membrane manufactured by Grace Construction Products.
- C. Optional Primers:
1. Description: High tack water based primer. 10 g/l max. VOC content.  
Product: Perm-A-Barrier Liquid Part B manufactured by Grace Construction Products.
  2. Description: High tack low VOC solvent based primer. <200 g/l max. VOC content.  
Product: Bituthene Primer B2 LVC manufactured by Grace Construction Products.
  3. Description: High tack solvent based primer. 440 g/l max. VOC content.  
Product: Bituthene Primer B2 manufactured by Grace Construction Products.

## PART 3 – EXECUTION

### 3.01 EXAMINATION

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

### 3.02 PREPARATION

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied waterproofing.

## FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR IMPERMEABLE

- B. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all board joints with 50 - 75mm (2-3 in.) wide, reinforced self-adhesive tape or fiberglass mesh style wallboard tape. Gaps greater than 6mm (1/4 in.) should be filled with mastic or caulk, allowing sufficient time to fully cure before application of the tape and fluid applied membrane.
- C. Masonry Substrates: Apply air and vapor barrier over concrete block and brick with smooth flush mortar joints. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
- D. Related Materials: Treat construction joints and install flashing as recommended by manufacturer.

**3.03 INSTALLATION**

- A. Refer to manufacturer's literature for recommendations on installation.
- B. Only adhesives and sealants recommended by the barrier manufacturer shall be used in contact with this material.
- C. Application of Fluid Applied Membrane
  1. Spray or trowel apply a continuous uniform film at min. 60 mils (1.5 mm or .060 in.) dry film thickness using multiple, overlapping passes.
  2. When spraying use a cross-hatching technique (alternating horizontal and vertical passes) to ensure even thickness and coverage.
  3. When spraying use high pressure, multi-component, airless spray equipment approved by material manufacturer.
  4. Carry membrane into any openings a minimum of 50mm (2 in.).
  5. Seal all brick-ties and other penetrations as work progresses.
- D. Application of Transition Membrane
  1. After allowing the Fluid Applied Membrane to cure to tack-free, apply transition membrane with a minimum overlap of 75mm (3 in.) onto each surface at all beams, columns and joints as indicated in detail drawings.
  2. Tie in to window and door frames, spandrel panels, roof and floor intersections and changes in substrate.
  3. Use pre-cut, easily handled lengths for each location.
  4. Remove silicone-coated release paper and position membrane flashing carefully before placing it against the surface.
  5. When properly positioned, place against surface by pressing firmly into place by hand roller.
  6. Overlap adjacent pieces 50 mm (2 in.) and roll all seams with a hand roller.
  7. Seal top edge of flashing with termination mastic.
  8. When transition flashing is pre-installed prior to application of Fluid Applied Membrane, apply transition flashing as above. Spray or trowel a continuous uniform film of Fluid Membrane at min. 60 mils (1.5 mm or .060 in.) dry film thickness using multiple, overlapping passes, with a minimum overlap of 75 mm (3 in.) onto transition flashing. For sill condition, spray or trowel Fluid Membrane onto pre-installed sill flashing and onto horizontal section of sill.
- E. Application of Flexible Membrane Wall Flashing
  1. Precut pieces of flashing to easily handled lengths for each location.
  2. Remove silicone-coated release paper and position flashing carefully before placing it against the surface.
  3. When properly positioned, place against surface by pressing firmly into place by hand roller. Fully adhere flashing to substrate to prevent water from migrating under flashing.
  4. Overlap adjacent pieces 50 mm (2 in.) and roll all seams with a hand roller.

5. Trim bottom edge 13 mm (1/2 in.) back from exposed face of the wall. Flashing shall not be permanently exposed to sunlight.
6. At heads, sills and all flashing terminations, turn up ends a minimum of 50 mm (2 in.) and make careful folds to form an end dam, with the seams sealed.
7. Seal top edge of flashing with termination mastic.
8. Do not allow the rubberized asphalt surface of the flashing membrane to come in contact with poly-sulfide sealants, creosote, uncured coal tar products or EPDM.

#### **1.06 PROTECTION AND CLEANING**

- A. Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed work using procedures as recommended by manufacturer.
- B. Perm-A-Barrier Liquid is not suitable for permanent exposure and should be protected from the effects of sunlight.
- C. Schedule work to ensure that the Perm-A-Barrier Liquid system is covered as soon as possible after installation. Protect Perm-A-Barrier Liquid system from damage during subsequent operations. If the Perm-A-Barrier Liquid system cannot be covered within 60 days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

**END OF SECTION**

**SECTION 07 31 13 - ASPHALT SHINGLES****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install Asphalt Shingles and underlayment as shown on the drawings and specified herein.
- C. This Section includes all of the labor, materials, equipment and services necessary to furnish and install EPDM roofing, flashing and trim for the installation of a complete roofing system where EPDM is required by the drawings.
- D. Related work specified elsewhere:
  - 1. Rough Carpentry - Section 06 10 00

**1.02 REFERENCE STANDARDS**

- A. ASTM D3018 Type I
- B. ASTM D3161 Type I
- C. ASTM D3462
- D. UL Class A

**1.03 SYSTEM DESCRIPTION**

- A. Provide a Class A rated asphalt shingle roofing system complete with underlayment and ice & water barrier.

**1.04 SUBMITTALS**

- A. Submit color samples of actual shingle material for selection by the Architect. Colors will be selected from the manufacturer's standard line of colors. One color will be used throughout the project to match existing roof.

**1.05 WARRANTY**

- A. Shingle manufacturer shall provide the Owner with a Thirty-year warranty on the shingles that they will remain weather tight and color fast for this length of time under normal weather conditions.

**1.06 EXTRA MATERIALS**

- A. This contractor shall leave one bundle of extra shingle on the for the Owners use in future patching.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Shingles shall be self-sealing fiberglass, architectural design. Shingles shall be GAF Timberline HD or Malarkey, Highlander CS.
- B. Provide GAF Timbertex hip and ridge shingles for hips and ridges or similar product of other approved systems.

## 2.02 ACCESSORY MATERIALS

- A. Underlayment and ice shield shall be furnished and installed under Section 06 10 00.
- B. Bituminous plastic cement shall be as recommended by the shingle manufacturer and shall conform to Fed. Spec. SS-C-153C, Type 1, Class A and Type 1, Class B. Tube supplied plastic cement not permitted.
- C. Fasteners shall be hot galvanized or aluminum 11 or 12 gauge barbed shank, 3/8 inch head, sharp-pointed conventional nails, of sufficient length to penetrate the roof sheathing.
- D. Valley flashing shall be 24-ga galvanized steel.
- E. Roof Vents: GAF Master Flow SSB960A or approved equal.

## PART 3 - EXECUTION

### 3.01 INSTALLATION - SHINGLES

- A. Do not install any shingles before reviewing the application of the underlayment and acceptance responsibility for a watertight application.
- B. Install roofing system in strict accordance with manufacturer's directions.
- C. Use shingles with the tabs cut off as a starter strip or shingle manufacturer starter strip. Offset first starter shingle 6 inches so joints do not lay under the joints of the first course of shingles. Starter strip shingles shall overhang the eaves and rake by 1/2 inch. Fasten starter strip using same spacing as for shingles, and locate fasteners about 3 inches up from the bottom edge. Avoid fastening where cut-outs will occur on the first course of shingles.
- D. Chalk Lines:
  - 1. Snap chalk lines to guide application and maintain level lines parallel with the eaves and ridge.
  - 2. At hip roofs strike vertical chalk line, apply shingles left and right as described below.
- E. Trimming shingles: at hips cut off even with hips.
- F. Install shingles in parallel courses with succeeding courses offset from the preceding course as recommended by the manufacturer.
- G. Fasteners shall be installed along the fastening line printed on the shingles. Fasteners shall be placed 1" from each end of shingle and as required by the manufacturer for the field of the shingle.
- H. Fully mastic the valley flashing to the 30# asphalt felt, which is over a layer of ice and water barrier, centering the flashing on the valley.
- I. Snap chalk lines at 3" from center of valley. Chalk lines are to be parallel with the center of the valley. Cut the shingles to match the parallel chalk lines and fully mastic the shingles to the valley flashing and adjacent felts a minimum of 3" for the entire length of the valley.
- J. Flashing and shingle tins shall be installed as shown on drawings and within manufacturer's installation instructions.

**3.02 INSTALLATION - VENT PIPES & MECHANICAL STACKS**

- A. Install shingles up to vent pipe and cut hole in next shingle to go over pipe. Set the shingle in Bituminous Plastic Cement.
- B. Place a metal flashing flange, 18 inches square with hole centered horizontally and 8 inches minimum from the top side, over the shingle and vent pipe, set in Bituminous Plastic Cement.
- C. Mould Bituminous Plastic Cement around base of vent pipe and onto metal flange.
- D. The remainder of shingles are then cut around pipe and all set in Bituminous Plastic Cement.

**END OF SECTION**



**SECTION 07 62 00 - SHEET METAL****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install all sheet metal work in accordance with the drawings and this specification. Furnish all labor and materials to complete all sheet metal work indicated or required for a complete installation of all work under this contract. All items furnished shall be supplied with all devices required for properly and permanently securing them in their appropriate location. Items identified on the drawings or listed in this specification as sheet metal are indicated only as a guide to the Contractor, but this shall in no way relieve the Contractor of the responsibility to include all items required. The Contractor is cautioned to thoroughly examine all drawings for all items of work required under this contract.
- C. Related Work Specified Elsewhere:
  - 1. Concrete Unit Masonry - Section 04 22 00
  - 2. Rough Carpentry - Section 06 10 00
  - 3. Building Insulation - Section 07 21 00
  - 4. Weather Barrier-Rainscreen - Section 07 25 00
  - 5. Fascia & Soffit - Section 07 71 20
  - 6. Joint Sealants - Section 07 92 00

**1.02 REFERENCE STANDARDS**

- A. ASTM E111 - Galvanized Metal Modulus of Elasticity
- B. ASTM 370 - Metal Minimum Yield
- C. ASTM E228 - Metal Thermal Expansion
- D. ASTM D522 - Coating 2T Bend
- E. ASTM D2244 - Coating Color Stability
- F. ASTM D659 - Coating Chalking

**1.03 SUBMITTALS**

- A. Prepare and submit shop drawings to Architect for approval in accordance with the General Conditions. Shop drawings shall show layout, joining profiles and anchorage.
- B. Submit color samples, on metal, of all finished metal items exposed to view for selection by the Architect. Colors shall be standard manufacturers Kynar 500 colors.
- C. Submit Certificates of Production from the metal coating fabricator stating that the paint coating system used on the metal fabricated for this project is 70% Kynar 500.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. Material shall be delivered to the site formed and ready for installation. Finished surfaces shall be covered with a strippable film protective coating which shall be removed immediately after installation.
- B. Delivery of material shall be made only after suitable facilities for its storage and protection are available on the site.

### **1.05 WARRANTY**

- A. Material supplier shall furnish a written 20 year non-prorated warranty covering face, chalking and film integrity. Warranty shall include labor and materials through the 20th year.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Manufacturers shall be one of the following or approved equal:
  - 1. Berridge Manufacturing Company
  - 2. Peterson Aluminum Corp.
  - 3. Metal Sales Manufacturing Corp.
  - 4. Vincent Metals
  - 5. AEP Span
  - 6. Copper Sales, Inc.
  - 7. McElroy Metal, Inc.

### **2.02 MATERIALS - EXPOSED METALS**

- A. Coping and other metals exposed to view shall be 24 gauge hot dipped galvanized steel, G-90 commercial quality, extra smooth primed and finished one side with 70% Kynar 500 Based Fluoropolymer Coating 1.0 +/- 0.1 mil total dryfilm thickness. A wash coat of .3 - .4 mil dryfilm thickness shall be applied to the reverse side. Metal sheet stock shall be as manufactured by one of the following or approved equal:
  - 1. Peterson Aluminum Corp. PAC- CLAD;
  - 2. Vincent Metals - Colorklad
  - 3. AEP Span - Sheet Stock
  - 4. Copper Sales, Inc. - UNA-CLAD
  - 5. McElroy Metal, Inc. - Flat Stock

### **2.03 FABRICATION - GENERAL**

- A. Form all work true to detail with clean, straight sharply defined profiles as shown on the drawings. Profiles shall match exactly at connections. Corners shall be mitered and intersecting pieces shall be closely fitted. All exposed edges shall be beaded or returned for strength and appearance.
- B. Provide all necessary ribs, cleats and reinforcements to make all sections rigid and substantial. These items shall be of the same material as the exposed metal. Make proper allowances for expansion.

### **2.04 ACCESSORIES**

- A. Provide touch-up paint and color matched nails and rivets as required for this installation.
- B. Mastic for sealing joints, etc. shall be asphaltic bituminous type mastic or as recommended by the metal manufacturer.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION - EXPOSED METAL**

- A. Install sheet metal coping and other metal exposed to view as shown on drawings using recognized sheet metal practices as per the Sheet Metal and Air Conditioning Contractors National Association, Inc. - Architectural Sheet Metal Manual.

- B. Bottom edge of all coping shall be held in place with a continuous keeper strip.
- C. Joints in coping shall be set in mastic and butted to allow for expansion. Joint shall be covered with a 6" wide cleat.
- D. Joints in flashing shall be lapped a minimum of 3".
- E. After metal coping, downspouts or flashing is in place, remove strippable film protection.

**END OF SECTION**

**SECTION 07 71 20 – GUTTERS, DOWNSPOUTS, FASCIA & SOFFITS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install all steel gutters and downspouts, steel fascia, and aluminum soffits as shown on the drawings and specified herein.
- C. Related Work Specified Elsewhere:
  - 1. Rough Carpentry - Section 06 10 00
  - 2. Asphalt Shingles - Section 07 31 13

**1.02 SUBMITTALS**

- A. Prepare and submit shop drawings to the Architect for approval in accordance with the requirements of Division 01. Shop drawings shall show connections to various substrates and roofing systems associated with this project. Shop drawings shall show profiles and connections of all members.
- B. Submit color chart of manufacturer's standard color line for selection by the Architect.

**1.03 WARRANTY**

- A. Material supplier shall furnish a written 35 year non-prorated warranty covering face, chalking and film integrity. Warranty shall include labor and materials through the 35th year. Warranty shall also include a 50-year hail protection warranty.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Plans and specifications have been developed based on EMCO Building Products. Other manufacturers of similar equal systems shall submit for approval as per Instructions to Bidders.

**2.02 MATERIALS**

- A. Gutters shall be manufactured from 5" x 24 ga. galvanized steel, K-style, in 10-foot lengths. Gutters shall have an EMCO Preserve finish.
- B. Fascia shall be of the same size, material and finish as the gutters and downspouts.
- C. Provide manufacturer's standard support brackets, keeper brackets and interior straps, etc., for a complete installation.
- D. Downspouts shall be open face style sized by the manufacturer as required for this installation. Downspout shall have the same EMCO Preserve finish as the gutter. Downspouts shall terminate at the bottom with a section that projects out from the wall at a 45° angle.
- E. Manufacturer shall furnish all accessories required for a complete installation including end caps, mitered corners, transition sleeves, and anchoring brackets.

- F. Soffits shall be aluminum 16" center vent made from 3105 and H-24 hardness with a minimum calculated value of 6.6 square inches per lineal foot ventilated area. Finish shall be EMCO Preserve aluminum with a dry film thickness of 0.80 – 1.30 mils. Soffit to be .019". Color shall match gutters, downspouts and fascia.
- G. Color: To be selected from manufacturer's standards to match existing building.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION OF SURFACES**

- A. This contractor shall thoroughly examine the surfaces to materials will be applied and report any unsatisfactory surfaces to the Architect in writing. Unsatisfactory surfaces shall be corrected by the General Contractor prior to the start of any work in this section. Starting of any work by this contractor shall imply his acceptance of the surfaces as acceptable to receive these materials.

#### **3.02 INSTALLATION**

- A. Gutters, downspouts, fascia and soffits shall be installed in strict accordance with the manufacturer's instructions.
- B. Support Bracket Installation - Locate low and high points of gutter installation and chalk a guide line to allow a maximum 1/4" per 40' slope. Install support brackets at 30" on center aligned with the chalk line. Take care to avoid locating bracket directly over downspout outlet locations. Attach brackets as recommended by manufacturer for this installation.
- C. Gutter Installation - Install gutter sections from left to right (roof side) into support brackets. Insert each telescoping section into the pervious section for a distance of 1" seal and fasten with sealant and fasteners as furnished by the manufacturer. Nail rear upper portion of gutter with 1-1/2" nails through prepunched elongated holes at 12" on center.
- D. Inside Strap/Snap-over Fascia Installation - Position snap-over fascia on gutter assembly by hooking the fascia's lower hemmed edge onto the support brackets retainer. Insert inside straps at 30" on center alternating with support brackets with hook portion of strap positioned to lock snap-over fascia into place. Strap to be hooked into slotted holes at leading edge of gutter and riveted at its rear side. In no case shall strap be nailed, screwed or otherwise fastened which would restrain thermal movement of product.
- E. Expansion Joints - At 40'-0" intervals, install manufacturer's standard elastomeric expansion joint assembly. At snap-over fascia joints, insert concealed splice plate and allow 3/8" gap between adjoining sections.
- F. Miter Corners - Install manufacturer's welded miter units at locations shown on the drawings. Gutter corners shall be prepunched, notched and telescoping to match gutter. Fascia corners shall be finished after fabrication, grinding and touch-up painting shall not be allowed.
- G. End Caps/Terminations - Install manufacturer's end caps at all end terminations.
- H. Outlets - Locate all outlet locations and field cut hole in a neat workmanlike manner. Hole shall be located a distance of 1" from backside of gutter. Insert manufacturer's stainless steel outlet, fasten in place with 4 rivets (one being located on each flange) and seal. Field cut snap-over fascia in a neat workmanlike manner to accommodate downspouts.
- I. Downspouts - Install downspouts at locations shown on drawings using straps furnished by manufacturer.

- J. Apply bituminous protective backing on surfaces in contact with dissimilar metals.
- K. Seal all joints watertight.
- L. Soffits: Install in strict accordance with manufacturer's instructions. Soffits shall be level and all trim shall be neatly trimmed and mitered.
- M. Upon completion, all work shall be cleaned.

**END OF SECTION**

**SECTION 07 92 00 JOINT SEALANTS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. Furnish all labor, material, equipment, scaffolding and appliances required to complete all caulking, joint sealants and related work as specified herein and as shown on the drawings.
- C. Caulking and sealants specified under this Section shall be installed at the intersection of all dissimilar materials not mechanically or adhesively attached to each other, at the expansion and contraction joints of similar or dissimilar materials, and where it is necessary to provide a smooth transition between materials of differing shapes. The following list of areas to be caulked or sealed is intended as a general guide to this Contractor and does not relieve the contractor of providing caulking to all areas shown on the drawings and that fit the above definition:
  - 1. Non-sag Urethane:
    - a. Around the frames of Doors, Windows & Louvers - each exposed side.
    - b. Vertical concrete and masonry control and expansion joints.
    - c. Under door thresholds - at the inside and outside edge of the threshold.
    - d. Flashing reglet terminations.
    - e. All other Joints noted on Drawings as "Caulk" or "Sealant".
    - f. All joints which meet the definition of paragraph "c" above.
    - g. Joints in ceramic tile and other hard surface materials.
  - 2. Interior Silicone:
    - a. Along Backsplash of Counters & Edges of Casework at Walls.
    - b. Along the Edges of Plumbing Fixtures at Walls.
    - c. Along the edges, or as seating for Toilet Accessories.
    - d. As a seating for sinks and other items mounted into countertops.
    - e. Where HM door frame meets hard surface flooring.
  - 3. Self Leveling Horizontal Urethane:
    - a. Horizontal and sloped expansion and control joints in interior concrete floors.

**1.02 REFERENCES**

- A. AAMA 803.3 - Specification for Narrow Joint Seam Sealers.
- B. AAMA 808.3 - Specification for Exterior Perimeter Sealing Compound.
- C. ASTM C 510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
- D. ASTM C 639 - Test Method for Rheological (Flow) Properties of Elastomeric Sealants.
- E. ASTM C 717 - Terminology of Building Seals and Sealants.
- F. ASTM C 719 - Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement (Hockman Cycle).

- G. ASTM C 794 - Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
- H. ASTM C 920 - Specification for Elastomeric Joint Sealants.
- I. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
- J. ASTM C 1248 - Test Method for Staining of Porous Substrate by Joint Sealants.
- K. ASTM D 2203 - Standard Test Method for Staining from Sealants.
- L. Federal Specification TT-S-00227E - Sealing Compound, Elastomeric Type, Multi-Component (for Caulking, Sealing, and Glazing in Buildings and Other Structures).
- M. Federal Specification TT-S-00230C - Sealing Component, Elastomeric Type, Single Component (for Caulking, Sealing, & Glazing in Buildings and Other Structures).
- N. SWRI Sealant Manual and Related SWRI Publications.

### **1.03 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods including joint design, surface preparation, and application instructions.
  - 4. Submit manufacturer's test reports indicating test results of adhesion and/or compatibility testing of samples of substrates which either come in contact with or are in close proximity to sealants.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

### **1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications:
  - 1. Manufacturer's Certification: Submit manufacturer's certification that materials are suitable for intended application.
- B. Installer Qualifications:
  - 1. Company specializing in performing work of this section with minimum five (5) years documented experience, minimum three successfully completed project of similar scope and complexity and approved manufacturer.
  - 2. Designate one individual as project foreman who shall be on site at all times during installation.
- C. Perform work in accordance with the following:
  - 1. Building Joints: ASTM C 1193.



- D. Laboratory Pre-Construction Testing:
1. Test sealants, joint accessories, and joint substrates in accordance with the following, before starting work of this section:
    - a. Obtain samples of joint substrate products specified in other sections.
    - b. Adhesion: ASTM C 794 and ASTM C 719; determine surface preparation and required primer.
    - c. Compatibility: ASTM C 1087; determine materials forming joints and adjacent materials do not adversely affect sealant materials and do not affect sealant color.
    - d. Staining: ASTM D 2203, ASTM C 510, or ASTM C 1248; determine sealants will not stain joint substrates.
  2. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.
- E. Field Pre-Construction Testing:
1. Test each elastomeric sealant and joint substrate in accordance with the following, before beginning work of this section:
    - a. Install sealants in field samples using joint preparation methods determined by laboratory pre-construction testing.
    - b. Remove existing sealant, clean joint, and install new sealant using manufacturer's recommended joint preparation methods.
    - c. Install field-test joints in inconspicuous location as approved by Architect.
    - d. Test Method: Manufacturer's standard field adhesion test to verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
    - e. When test indicates sealant adhesion failure, modify joint preparation, primer, or both and retest until joint passes sealant adhesion test.

### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:
1. Product name.
  2. Manufacturer.
  3. Sealant color.
  4. Sealant batch or lot number.
  5. Sealant use-before date.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
1. Store materials in a clean, dry area indoors in accordance with manufacturer's instructions.
  2. Store sealants within temperature range in accordance with manufacturer's instructions.
  3. Keep containers sealed until ready for use.
  4. Do not use materials after manufacturer's use-before date.

### 1.06 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
1. Do not apply sealants to surfaces that are wet, damp, or contain frost.
  2. Do not apply sealants when air or surface temperature is below 40 degrees F (7 degrees C).
  3. Do not apply sealants when air or surface temperature is above 100 degrees F (37.7 degrees C).

### 1.07 SCHEDULING

- A. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
- B. Ensure sealants are cured before covering with other materials.

### 1.08 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Ten years from date of Substantial Completion.
- C. Special warranties specified exclude deterioration or failure of elastomeric joint sealants from the following:
  - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
  - 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

### 2.01 URETHANE SEALANTS

- A. Non-sag Urethane - Caulking compound shall be one- or two-part polyurethane caulking compound that meets or exceeds the requirements of Fed. Spec. TT-S-00230C. Compound shall be as recommended by the manufacturer for use without a paint finish and shall form a tough elastic film on the surface, but remain plastic underneath. It shall contain no ingredients which will stain masonry or corrode metals. Color of compound shall be as selected by the Architect. At the contractors option he may use two-part caulking compound of the same materials as those specified herein. Caulking compound shall be one of the following or approved equal:
  - 1. Sika Chemical Co. - Sika-Flex 1a or 2c NS
  - 2. Sonneborn - Sonolastic NP1 or NP2
  - 3. Tremco - Dymonic or Dymeric
  - 4. Pecora - Dynatrol II
  - 5. Requests for substitutions will be considered in accordance with provisions of Submittals - Section 01 33 00.
- B. Compliances:
  - 1. ASTM C 920, Type M, Grade NS, Class 50, Use NT, M, G, A and O.
  - 2. Federal Specification TT-S-001 543B.
  - 3. Federal Specification TT-S-00230C.

- C. Properties: after 21 days at 70 degrees F and 50 percent relative humidity.
  - 1. Dynamic Movement Capability, ASTM C 719: +/- 50 percent.
- D. Color: As selected by Architect from manufacturer's standards.

## 2.02 SILICONE SEALANTS

- A. Interior Silicone - Silicone sealant for joints along backsplash on counters, shelves, cabinets and plumbing fixtures shall be one of the following or approved equal:
  - 1. Tremco – Tremcill 200
  - 2. Pecora – 898 Sanitary Silicone
  - 3. Dow Corning - 786 Mildew Resistant
- B. Compliances:
  - 1. ASTM C 920, Type S, Grade NS, Class 50, Use NT, M, G, A and O.
  - 2. Federal Specification TT-S-001 543B.
  - 3. Federal Specification TT-S-00230C.
- C. Properties: after 21 days at 70 degrees F and 50 percent relative humidity.
  - 1. Dynamic Movement Capability, ASTM C 719: +/- 50 percent.
- D. Color: As selected by Architect.

## 2.03 SELF LEVELING URETHANE SEALANTS

- A. Self Leveling Horizontal Urethane - Self Leveling caulking compound shall be self leveling or slope grade one- or two-component Polyurethane Sealant for expansion and contraction joints in concrete floors, walks, paving and decks both interior and exterior, and joints in hard surface floor finish materials such as quarry tile, ceramic tile and terrazzo. Horizontal grade urethane shall remain flexible to -40<sup>o</sup>, shall be abrasion resistant and resist deterioration caused by weather, stress, movement, traffic, water, oils, and road chemicals. Self Leveling caulking shall be suitable for continuous water immersion. Self Leveling Caulking shall be as manufactured by one of the following or approved equal:
  - 1. Sonneborn - SL 2 Sealant
  - 2. Pecora - Urexpand NR-300
  - 3. Tremco - THC-900/901
  - 4. Sika Chemical Co. - Sikaflex 2c SL
- B. Compliances:
  - 1. ASTM C 920, Type S, Grade P, Class 35, Uses T, M, A, O and I.
- C. Properties:
  - 1. Dynamic Movement Capability, ASTM C 719: +/- 50 percent.
- D. Color: Gray.

## 2.04 CAULKING ACCESSORIES

- A. Joint Cleaner: Non- corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

- B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- C. Joint Backing
  - 1. Material: Non-gassing polyethylene foam rod – similar to Titan Foam as manufactured by Backer Rod Manufacturing, Inc.
  - 2. EIFS and Porous Surface Applications: Non-gassing polyethylene, non-gassing polyolefin or flexible polyurethane foam rod.
  - 3. Width: 25 to 50 percent greater than width of joint to extend continuous pressure against joint walls.
  - 4. Material shall expand and contract with bead movement without pushing sealant out of joint during compression cycle.
  - 5. Do not use solid rubber backup materials, unless tested for compatibility with sealants and approved by Architect.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- E. Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify substrate surfaces and joint openings are ready to receive work.
  - 1. Verify joint surfaces are clean and dry.
  - 2. Ensure concrete surfaces are fully cured.
- B. Do not begin surface preparation or application until unacceptable conditions have been corrected.

#### **3.02 SURFACE PREPARATION**

- A. Prepare joints in accordance with manufacturer's instructions and ASTM C 1193.
- B. Ensure joint thickness is as indicated on the drawings.
- C. Remove dirt, dust, oil, grease, rust, loose materials, contaminants, and existing sealants from surfaces that contact sealants.
- D. Clean surfaces within 1 to 2 hours before applying sealants.
- E. Protect elements surrounding the work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

#### **3.03 WEATHER SEALING APPLICATION**

- A. Apply sealants in accordance with ASTM C 1193 manufacturer's instructions at locations indicated on the drawings.
- B. Ensure surfaces to receive sealants are clean, sound, dry, and free of frost.
- C. Use appropriate primer, backer rod, and bond breaker tape.
- D. Priming:

1. Apply primer, if required, in accordance with manufacturer's instructions.
  2. Perform trial applications to check adhesion of sealants to specific materials to be used.
  3. Do not apply primer to glass surfaces.
  4. Allow primer to dry before applying sealant.
- E. Masking:
1. Apply masking tape to surfaces as required to ensure a neat application of sealants and to protect adjoining surfaces.
  2. Do not allow masking tape to touch clean surfaces to which sealants are to adhere.
  3. Remove masking tape immediately after tooling and before sealants begin to cure.
- F. Install backer rod in joint to allow for appropriate depth of sealants and to prevent 3-sided adhesion.
- G. Install bond breaker tape when joint depth is too shallow to allow backer rod.
- H. Apply sealant depth of 1/8 inch minimum to 3/8 inch maximum over crown of backer rod – adjust for joint width based on manufacturer's recommendation.
- I. Apply sealants in a continuous operation, horizontally in 1 direction and vertically from bottom to top of joint opening. Apply positive pressure adequate to properly fill and seal joint width.
- J. Tool or strike sealants with appropriate tool applying light pressure to spread sealants against back-up material and joint surfaces to ensure void-free application. Do not use soap or detergent solutions for tooling.
- K. Tool sealants at sill in glazing so precipitation and cleaning solutions will not pool.
- L. Joining Silicone and Polyurethane Sealants:
1. Install polyurethane sealants first.
  2. Join silicone sealant to polyurethane in accordance with manufacturer's instructions.

### **3.04 CLEANING**

- A. Remove excess sealants from glass, metal, and plastic surfaces while still uncured.
- B. Remove excess sealants from porous surfaces after initial cure or set-up.

### **3.05 PROTECTION**

- A. Protect sealants in joints from damage until fully cured.

**END OF SECTION**

**SECTION 08 17 43 FRP FLUSH DOORS & FRAMES****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material, equipment and services necessary to furnish and install all insulated fiberglass reinforced polyester (FRP) flush doors with FRP frames and related items for exterior applications to complete the work indicated on the drawings and described in the specifications.
- C. Related Work Specified Elsewhere:
  - 1. Precast Concrete - Section 03 41 00
  - 2. Concrete Unit Masonry - Section 04 22 00
  - 3. Rough Carpentry - Section 06 10 00
  - 4. Building Insulation - 07 21 00
  - 5. Joint Sealants - Section 07 92 00
  - 5. Finish Hardware - Section 08 71 00

**1.02 REFERENCE STANDARDS**

- A. AAMA 920-11 – Specification for Operating Cycle Performance of Side-Hinged Exterior Door Systems.
- B. AAMA 1304 - Voluntary Specification for Forced-Entry Resistance of Side-Hinged Door Systems.
- C. ASTM C 1363-97 – Thermal Test Method for the Thermal Performance of Building Assemblies.
- D. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics
- E. ASTM D 1761-06 – Standard Test Methods for Mechanical Fasteners in Wood.
- F. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.
- G. ASTM E 84-11 – Standard Method of Test for Surface Burning Characteristics of Building Materials.
- H. ASTM E 283-04 – Test Method for Determining Rate of Airflow Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
- I. ASTM E 330-02 – Test Method for Structural Performance of Exterior Windows, Curtain Walls, Doors by Uniform Static Air Pressure Difference.
- J. ASTM E 331-00 – Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- K. ASTM E 1886-05 – Test Method for Performance of Exterior Windows, Curtain Wall, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differential.
- L. ASTM E 1996-06 – Test Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes.

### 1.03 PERFORMANCE REQUIREMENTS

- A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
- B. Thermal Performance: Per ASTM C 1363-97, R-value 7.42.
- C. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.
- D. Air Infiltration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.09 cfm/ft<sup>2</sup>.
- E. Water Penetration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 331. Door shall not have water leakage.
- F. Uniform Load Structural: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 330: Plus or minus 270 psf.
- G. Forced Entry Resistance, per AAMA 1304, Pass with No Entry.
- H. Air Pressure Cycling, Doors and Frames, ASTM E 1886, Design Pressure Plus or Minus 100 psf, Pass with no rips, tears, or penetrations.
- I. Cycle Test, AAMA 920-11, 2,000,000 Cycles.
- J. Screw Pullout, ASTM D 1761-06, Minimum 924 pounds.

### 1.04 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittals.
- B. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.
- C. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, and finish.
- D. Samples:
  - 1. Door: Submit manufacturer's sample of door showing face sheets, core, framing, and finish.
  - 2. Color: Submit manufacturer's samples of standard colors of doors and frames.
- E. Test Reports: Submit test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.
- G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.
- H. Warranty: Submit manufacturer's warranty as identified here in.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications:
  - 1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 10 years successful experience.
  - 2. Door and frame components from same manufacturer.
  - 3. Evidence of a compliant documented quality management system.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.
- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finish from damage during handling and installation.

**1.07 WARRANTY**

- A. Warrant doors, frames, and factory hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.
- B. Warranty Period: Ten years starting on date of shipment. In addition, a limited lifetime (while the door is in its specified application in its original installation) warranty covering: failure due to corrosion

**PART 2 PRODUCTS****2.01 MANUFACTURER**

- A. Special-Lite, Inc., PO Box 6, Decatur, Michigan 49045. Toll Free (800) 821-6531. Phone (269) 423-7068. Fax (800) 423-7610. Web Site [www.special-lite.com](http://www.special-lite.com). E-Mail [info@special-lite.com](mailto:info@special-lite.com).
- B. Accepted substitution per Submittals - Section 01 33 00.

**2.02 FRP FLUSH DOORS**

- A. Model: AF-100 Pultruded FRP Door.
- B. Door Opening Size as indicated on the Drawings.
- C. Construction:
  - 1. Door Thickness: 1-3/4 inches.
  - 2. Construction: Doors shall be FRP, pultruded as one monolithic panel, with integral stiles.
  - 3. Reinforcement: Solid FRP shapes to be chemically welded at factory. All structural members shall utilize a chemically resistant UV stabilized resin system.
  - 4. Stile Edge: Seamless 9/16" thick solid FRP.
  - 5. Top Rail: 6" pultruded tube profile designed to fit flush and be chemically welded inside the door.
  - 6. Bottom Rail: Pultruded FRP inverted U channel designed to fit flush and be chemically welded inside the door, allowing doors to be field trimmed. Closed bottom rail to be supplied as an option.



- D. Face Sheet:
  - 1. Material: Pultruded FRP, 0.125-inch thickness.
  - 2. Texture: Smooth.
  - 3. Fiberglass Content: Minimum 47% by weight.
  - 4. Color to be custom color as selected by the Architect.
- E. Core:
  - 1. Material: Polyurethane foam.
  - 2. Density: Minimum of 6 pounds per cubic foot.
  - 3. Per ASTM E 84 flame spread and smoke developed: Class B.
- F. Cutouts:
  - 1. None required.
- G. Hardware:
  - 1. Pre-machine doors in accordance with templates from specified hardware manufacturers and hardware schedule.

### **2.03 MATERIALS**

- A. Components: Door and frame components from same manufacturer.
- B. Fasteners:
  - 1. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
  - 2. Compatibility: Compatible with items to be fastened.

### **2.04 FABRICATION**

- A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the Drawings.
- B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.
- C. Assembly:
  - 1. Complete cutting, fitting, forming, drilling, and chemically welding of FRP before assembly.
- D. Fit:
  - 1. Maintain continuity of line and accurate relation of planes and angles.
  - 2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

### **2.05 FRP FRAMING SYSTEMS**

- A. Framing:
  - 1. Size and Type: As indicated on the Drawings.
  - 2. Materials: ¼" thick solid pultruded FRP profiles having no corrosive components or reinforcement.
  - 3. Width: 2" face.
  - 4. Depth: 5 ¾".
  - 5. Assembly: One piece chemically welded at factory.
  - 6. Door Stop: 5/8" x 2 ¼".
  - 7. Corner Construction: Mitered with 4" x 4" x 3/8" pultruded FRP angle reinforcement with interlocking pultruded FRP brackets.
  - 8. Reinforcing: ¼" pultruded FRP chemically welded at all hinge, strike and closer locations.

9. Transom and Sidelites: Shall be same material as perimeter frame with removable stop for: 1" glass by others.
10. Anchors: Furnished with type as required based on assembly requirements.
11. Fasteners for reinforcing: 18-8 Stainless Steel.

## **2.06 HARDWARE**

- A. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
- B. Hardware Schedule: As specified in Section 08 71 00.

## **2.07 FINISH**

- A. Finish For Doors and Frames: Primer with a finished color coat.
  1. Painted Finish: Two-part aliphatic polyurethane, low VOC, Industrial Coating.
  2. Thickness: 5 mils
  3. Sheen: Gloss
  4. Impact Resistance per ASTM D 2794: 140 in lbs.
  5. Provide standard finish touch-up kit.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

### **3.02 PREPARATION**

- A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

### **3.03 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Anchor frames securely in place.
- D. Set thresholds in bed of mastic and backseal.
- E. Install exterior doors to be weathertight in closed position.
- F. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- G. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

### **3.04 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

**3.05 ADJUSTING**

- A. Adjust doors, hinges, and locksets for smooth operation without binding.

**3.06 CLEANING**

- A. Clean doors promptly after installation in accordance with manufacturer's instructions using a mild detergent and water.

**3.07 PROTECTION**

- A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

**END OF SECTION**

**SECTION 08 31 13 - ACCESS DOORS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section include all materials, equipment and services necessary to furnish access doors as shown on drawings and specified herein.
- C. Materials furnished under this Section shall be installed under Section 04 20 00 Masonry for Access Doors in concrete block walls.

**1.02 SYSTEM DESCRIPTION**

- A. Lockable, Fire resistive access doors for walls, ceilings and pipe chases.

**1.03 SUBMITTALS**

- A. Prepare and submit shop drawings to the Architect for approval in accordance with the requirements of Division 01. For manufacturer's standard items requiring no special modifications or fabrication manufacturer's literature, appropriately marked, will be accepted in lieu of shop drawings. No material shall be ordered until such drawings have been approved.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Access doors shall be as manufactured by one of the following or approved equal:
  - 1. J.L. Industries, 4450 W. 78th St. Circle, Bloomington, Mn. 55435; (612) 835-6850
  - 2. Larsen's Manufacturing Co., 7421 Commerce Lane N.E., Minneapolis, Mn. 55432, (612) 571-1181.
  - 3. Nystrom, Inc., 1701 Madison Street N.E.; Minneapolis, Mn. 55413, 800-547-2635.

**2.02 NON-RATED FLUSH ACCESS DOORS**

- A. Access doors for masonry walls shall be as follows:
  - 1. Frame - 16 gauge steel.
  - 2. Door - 14 gauge steel.
  - 3. Finish - Stainless Steel.
  - 4. Hinge - Concealed spring hinge to allow 175 degree opening.
  - 5. Latch - Cylinder lock with 2 keys.
- B. Access doors shall be as manufactured by one of the following or approved equal:
  - 1. J.L. Industries - Model TM
  - 2. Larsen's, Inc. - Model L-MPSS
  - 3. Nystrom, Inc. - NT

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

- A. Install access doors in locations shown on drawings in strict accordance with manufacturer's instructions.

**END OF SECTION**

**SECTION 08 71 00 - FINISH HARDWARE****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section shall include all material as shown or called for on the drawings and as specified herein, delivered to the job site.
- C. Where hardware is to be applied to material of other trades requiring special mortising, tapping, reinforcing or similar work, the supplier shall furnish templates or said hardware in sufficient time so that these materials may be fabricated and installed in the normal progress of the work.
- D. Material specified under this Section shall be installed under Section 06 10 00 (Rough Carpentry). This supplier shall furnish complete and detailed instructions regarding installation and adjustment of all items specified herein.
- E. Related work specified elsewhere:
  - 1. Joint Sealants - Section 07 92 00
  - 2. FRP Flush Door & Frames - Section 08 17 43

**1.02 SUBMITTALS**

- A. Prepare and submit shop drawings to the Architect for approval in accordance with the requirements of Division 01. Submit a complete schedule of all hardware indicating identical hardware group numbers as listed herein. Architect's approval of schedule is limited to approval of products and does not relieve hardware contractor of responsibility to furnish hardware in all quantities required in accordance with the plans and specifications and to suit the function of each door.
- B. Submit color samples for finish on aluminum weatherstripping to the Architect for selection.

**1.03 QUALITY ASSURANCE**

- A. Comply with applicable Fire and Building Codes and Underwriter's Laboratories, Inc., Building Materials List.
- B. While Hardware Schedule is intended to cover all doors and other movable parts of the building and establish a type and standard of quality, examine plans and specifications and furnish proper hardware for all openings whether listed or not. If there are any omissions in hardware groups call them to the attention of the Architect prior to bid opening for instructions; otherwise list will be considered complete. No extras will be allowed for omissions, changes, or corrections necessary to facilitate proper installation.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. All items shall be properly and carefully packed to guard against damage in transit. Each set shall be packed separately and shall be clearly marked to show its contents and the door opening in the building for which it is intended.
- B. Store material in dry, protected areas.

### 1.05 GUARANTEE

- A. Per General Conditions, guarantee all hardware work for two (2) years. Closers for ten (10) years.
- B. The guarantees for above noted items shall be in writing by an accredited representative of the manufacturer and shall be delivered to the Architect for checking and transmittal to the Owner. Guarantees shall include a statement that accredited representatives have checked installation and have found it correct. Period of guarantee shall begin from the date of substantial completion.
- C. Hardware proving to be defective as to materials or construction within its above mentioned guarantee period shall be replaced at the hardware supplier's expense including labor for removal and reinstallation.
- D. The hardware supplier shall deliver to the Architect for transmittal to Owner three (3) sets of wrenches and/or other tools necessary for the maintenance of finish hardware, including locks, door closers, etc.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Continuous Hinges - Stanley, Hager, McKinney, Ives
- B. Exit Devices - Von Duprin, Precision, Sargent
- C. Door Closers - LCN, Norton, Stanley, Sargent
- D. Door Stops & Holders - Glynn Johnson (GJ), Ives, Hager
- E. Thresholds - Reese, Pemko, National Guard Products
- F. Weatherstripping - Reese, Pemko, National Guard Products
- G. Electric Strike - Hes, Von Duprin
- H. Overhead Rain Drip - Reese, Pemko, National Guard Products

### 2.02 CONTINUOUS HINGES

- A. Continuous hinge for the Aluminum Entrance door shall be aluminum heavy duty type full mortise continuous hinge (verify mounting condition) provide EPT cut out as applicable, as manufactured by one of the following or approved equal:
  - 1. Stanley – Full Mortise Lifespan Continuous Architectural Hinges 661HD
  - 2. Hager Hinge Company – Roton
  - 3. McKinney – 14HD Series
  - 4. Ives - 700CS

### 2.03 EXIT DEVICES

- A. All Exit Devices shall be shall be the product of one manufacturer. Functions shall be as noted on the schedule. Exit devices shall be as manufactured by one of the following or approved equal:
  - 1. Von Duprin - 99 Series
  - 2. Stanley Precision - Apex 2000 Series
  - 3. Sargent - 80 Series

- B. Furnish exit device types and functions as specified in the hardware schedule.
- C. Lever handles supplied with exit devices shall match the design specified for locks and latches.

#### **2.04 DOOR CLOSERS**

- A. Closers shall be of rack and pinion construction with rack and pinion of heat treated steel and with cast hydraulic iron case. Closing the doors shall be controlled by two independent valves. Closers shall have fully adjustable back check by means of third valve. All closers shall be complete with spring power adjustment.
- B. All closers to be surface applied complete with a rectangular cover.
- C. Closers shall be as manufactured by one of the following or approved equal:
  - 1. LCN – 4040XP
  - 2. Norton – 7500BF
  - 3. Sargent – 281
  - 4. Stanley – QDC100
- D. This Contractor is responsible for correct sizing and mounting application of closers as recommended by manufacturer.

#### **2.05 ELECTRIC STRIKE**

- A. HES - 9600
- B. Von Duprin - 6300

#### **2.06 DOOR STOPS**

- A. Overhead door stops shall be heavy duty, surface mounted style as manufactured by one of the following or approved equal:
  - 1. Glynn-Johnson - 90 Series
  - 2. Rixon - #9ADJ
  - 3. Hager - 7000 Series
- B. Furnish wall stops in all locations requiring stops as noted in the hardware schedule unless there is casework or other obstructions that will prevent the use of wall stops, floor stops shall be used in these locations.

#### **2.07 THRESHOLD**

- A. Thresholds shall be aluminum thermally broken as manufactured by one of the following or approved equal:
  - 1. Reese - S479A
  - 2. Pemko - 254X5AFG
  - 3. National Guard Products - 8429

#### **2.08 WEATHERSTRIPPING**

- A. Weatherstripping for single exterior doors shall be clear aluminum hardware compatible polyurethane insert as follows:



1. Reese - 755C
  2. Pemko - 2891APK
  3. National Guard Products - 700NA
- B. Sill sweep for exterior doors shall be EPDM Sponge/Neoprene in an aluminum keeper as follows:
1. Reese - 323
  2. Pemko - 315N
  3. National Guard Products - 200NA
- C. Finish on aluminum keepers for weatherstripping shall be as selected by the Architect.

## **2.09 KICK PLATES**

- A. Kick Plates shall be .050" stainless steel with a US 32D. Kick plates shall be 10" high and sized 2" less than the width of the door, 1" less than the width of pairs. Provide a kick plate for every door, regardless of door hardware groups. Kick plates shall be as manufactured by one of the following or approved equal:
1. Hiawatha - Stainless Steel Kick Plates
  2. Ives - 8400 Stainless Steel
  3. Burns - Stainless Steel Kick Plates

## **2.10 OVERHEAD RAIN DRIP**

- A. Anodized aluminum rain drip extending approximately 2-1/2" from the door frame; width to extend 2" beyond door edge each side.
1. Reese – RZ01C
  2. Pemko – 346C
  3. National Guard – 16A

## **2.11 SMOKE GASKETS**

- A. Smoke seals for labeled doors shall be Polyprene compound, self-adhering type; as manufactured by one of the following or approved equal:
1. Reese - 797
  2. Pemko - PK55
  3. National Guard Products - 2525

## **2.12 KEYING**

- A. System – All locks and cylinders shall be keyed to the existing City Grand Master Key System.
- B. Quantity – Provide two (2) Grand Master Keys, two (2) Master Keys for each Master Key set, and two (2) Change Keys for each lock or cylinder.
- C. Meeting – The hardware supplier shall prepare a preliminary keying schedule, and then meet with the Owner, if required, to review the proposed key schedule and make any changes required in order to accommodate the Owner's requirements.
- D. Delivery of Keys – Master Keys and grand master Keys shall be sent to the Owner via Registered Mail, or otherwise as required by the Owner, to the individual and address that the Owner specifies at the keying meeting.

**2.13 FINISHES**

- A. Unless otherwise noted, all finishes shall be as follows:

Hinges, exterior	US 32D
Hinges, interior	US 26D
Locksets	US 26D
Door Closers	Aluminum
Door Stops	US 26D
Thresholds	Aluminum
Weatherstripping	Aluminum
Miscellaneous	US 26D

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Hardware shall be installed as per manufacturer's instructions.
- B. Furnish hardware with all necessary screws, bolts or other fastenings of suitable size and type to anchor hardware in position for heavy use and long life. Fastenings shall be furnished where necessary with expansion shields, bolts, toggle bolts, anchors according to the material to which it is applied and as recommended by manufacturer subject to approval by Architect.

**3.02 SCHEDULES**

- A. Install hardware as per following schedule:

GROUP 1 – Doors 114, 115  
 Continuous Hinges  
 Exit Device - VonDuprin LD XP 99 NL  
 Electric Strike  
 Closer  
 Overhead Stop  
 Weatherstripping  
 Sill Sweep  
 Threshold  
 Overhead Rain Drip  
 Kick Plate  
 Cylinder  
 Card Reader (by Owner)  
 Power Supply

**END OF SECTION**

**SECTION 09 20 00 - GYPSUM DRYWALL****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provision of Division 01 apply to all work of this section.
- B. The work required under this Section shall include all labor, materials, services and equipment necessary to furnish and install all gypsum drywall, accessories and to do all drywall taping and finishing. All work shall be in accordance with the drawings and as specified herein.
- C. Related Materials Specified Elsewhere:
  - 1. Rough Carpentry - Section 06 10 00
  - 2. Building Insulation - Section 07 21 00
  - 3. Joint Sealants - Section 07 92 00
  - 4. Metal Doors & Frames - Section 08 11 00
  - 5. FRP Flush Door & Frames - Section 08 17 43
  - 6. Painting - Section 09 90 00

**1.02 REFERENCE STANDARDS**

- A. ASTM C36 Type X      Gypsum Wallboard
- B. ASTM C475            Joint Compound
- C. ASTM C1047          Accessories
- D. ASTM C645            Steel Studs
- E. ASTM C525            Galvanized Coating
- F. ASTM C1002          Screws
- G. ASTM C79 Type X    Exterior Gypsum Sheathing

**1.03 DELIVERY STORAGE AND HANDLING**

- A. All materials shall be delivered to the site in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the job site.
- B. Gypsum wallboard shall be stored on edge, long dimension.

**1.04 SCHEDULING**

- A. Gypsum wall board shall not be installed or finished until temperatures within the building can be maintained within the 55 degree to 70 degree range. Adequate ventilation shall be provided to carry off excess moisture.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Gypsum drywall, accessories and framing systems shall be by United States Gypsum, Gold Bond, Georgia Pacific or approved equal.

## 2.02 GYPSUM DRYWALL

- A. Gypsum Drywall - 5/8" or as shown on drawings gypsum wallboard, type X designation, with tapered edge and fiberglass facers demonstrating abuse, moisture and mold resistance. Gypsum Drywall shall be as manufactured by one of the following or approved equal:
1. United States Gypsum - Sheetrock® Brand Glass-Mat Panels Mold Tough® VHI
  2. National Gypsum - Gold Bond® - eXP® Interior Extreme® IR Gypsum Panel
  3. Georgia Pacific - DensArmor Plus® Impact - Resistant Interior Panel

## 2.03 ACCESSORIES

- A. Drywall Screws - Type "S" self drilling screws as follows:
1. 1-1/8" long for fastening wallboard to studs, 3" for double layer attachment.
- B. Corner Bead - 1-1/4" x 1-1/4" galvanized steel with perforated flanges, conforming to ASTM C1047.
- C. Casing Bead - Galvanized steel for 5/8" wallboard or as required, type that requires joint treatment, conforming to ASTM C1047. Casing bead shall be part of the total drywall system as manufactured by one of the following or equal:
1. Gold Bond - No. 100 casing bead
  2. United States Gypsum - 200 Series, No. 200-A-J
- D. Control Joint - Control joint shall be a vinyl extrusion conforming to ASTM C1047 or roll formed zinc. Control joint shall be as manufactured by one of the following or approved equal:
1. Gold Bond - E-Z Strip Expansion Joint
  2. United States Gypsum - Sheetrock Zinc Control Joint No. 093
- E. Acoustical Sealant - one part, butyl, non-drying, non-hardening, non-migrating, permanently flexible acoustical sealant. Sealant shall be as manufactured by one of the following or approved equal:
1. Ohio Sealants Inc. - Sound Sealant Rubber Base
  2. Pecora - Acoustical Sealant
  3. Tremco -Acoustical Sealant

## 2.04 TAPING & FINISHING MATERIALS

- A. Joint Tape - Center creased for folding with edges of each side buffed for better bonding. Tape shall be mold and moisture resistant.
- B. Joint Compound - Pre-mixed, vinyl based, all purpose compound.

## PART 3 - EXECUTION

### 3.01 EXAMINATION OF SURFACES

- A. This Contractor shall thoroughly examine all surfaces which are to receive his materials and report any defects in same to the Architect in writing. The Architect will cause defects to be corrected. Starting of any work will imply acceptance, by this Contractor, of the surfaces as suitable to receive his materials.
- B. All work shall be accomplished with mechanics thoroughly skilled in the application of the specified materials and workmanship shall be the very best of which they are capable. Any directions furnished by the manufacturer regarding the installation of his materials shall be faithfully followed.

- C. Maintain a uniform room temperature between 55 degrees F. and 70 degrees F. in cold weather during application and until completely dry or occupied. Provide adequate ventilation.
- D. All gypsum drywall surfaces shall be taped, sanded and left in a condition suitable for a painters finish.

### 3.02 INSTALLATION - WALLBOARD PARTITIONS

- A. Gypsum wallboard shall be cut by scoring and breaking, or by sawing, working from the face side. Where board meets projecting surfaces, it shall be scribed neatly.
- B. Gypsum boards of maximum practical length shall be used so that an absolute minimum number of joints occur. Boards shall be brought into contact with each other but not be forced into place.
- C. Wallboard joints at openings shall be located so that no end joint will align with edges of opening. End joints shall be staggered, and joints on opposite sides of a partition shall not occur on the same stud. Wallboard joints shall not occur within 12" of the corners of door frames.
- D. Wallboard shall be installed with its long dimension parallel to studs. Butt joints shall be located over center of studs. Joints on opposite sides of partitions shall not occur on the same stud. End joints shall be staggered. Wallboard shall be attached to studs with 1- 1/8" self-drilling drywalls screws, spaced 12" on center in the field of the board; 8" on center at butt joints, and not less than 3/8" from edges.
- E. Corner beads shall be installed at all outside corners. Casing beads shall be installed where wallboard surface butts against other material.
- F. Gypsum wallboard installer shall cut and fit wallboard around all ductwork that passes through wallboard.
- G. Install acoustical sealant in locations as follows:
  - 1. Bottom of Partitions - Apply a round bead of sealant at each side stud track before setting gypsum board. Set gypsum board into sealant to form complete contact with adjacent materials.
  - 2. Top and Sides of Partitions Abutting Existing Construction or Non-acoustical New Construction - After gypsum board is installed apply acoustical sealant to provide full contact with adjacent existing surfaces at each side of the partition.
  - 3. Cut Outs - Backs of electrical boxes, pipes, ducts, and other equipment penetrating the wall surface shall be buttered with sealant and perimeter edges of all items sealed with sealant.
- H. Install acoustical insulation in partitions as shown on the drawings. Extend insulation full thickness over the entire area to be insulated. Fit insulation between framing members. Cut and fit tightly around obstructions and fill voids with insulation to insure a snug fit. Fill cracks and voids around outlet boxes and other built-in wall accessories.

### 3.03 CONTROL JOINTS

- A. Gypsum panel surfaces shall be isolated with control joints or other means where:
  - 1. Partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
  - 2. Ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration.
  - 3. Construction changes within the plane of partition or ceiling.
  - 4. Partition or furring run exceeds thirty feet.
  - 5. Ceiling dimensions exceed fifty feet in either direction with perimeter relief, thirty feet without relief.

6. Exterior soffits exceed thirty feet in either direction.
  7. Where wings of "L", "U" and "T" shaped ceiling areas are joined.
  8. Where expansion or control joints occur in the exterior wall.
- B. Where gypsum board systems abut dissimilar materials, gypsum board shall be isolated by installing a casing bead within a 1/4" of the dissimilar material and sealing the joint with either acoustical sealant as specified above for sound insulated partitions or caulking as specified under Section 07 92 00.
- C. Ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners. Window openings shall be treated similar to doors with joint extending to the floor as well as the ceiling. Control joints in gypsum board to gypsum board configurations shall be formed using expansion joint formers as specified above. Joints shall be caulked with sound sealant or caulking as specified in Section 07 92 00 as appropriate to the condition.
- D. Control joints in fire rated construction shall be formed with double studs and expansion joint former and backed with safing insulation as specified under Section 07 84 00.

### **3.04 JOINT AND CORNER FINISHING**

- A. Joint compound shall be thoroughly mixed in accordance with manufacturer's printed instructions.
- B. Uniform thin layer, approximately 4" wide, shall be applied over joint. Center tape over joints and embed in the compound leaving sufficient compound under tape to provide bond. Apply first layer of compound to screw head dimples.
- C. After compound is thoroughly dry, tape shall be covered with layer of compound spread over tape approximately 3" on each side of tape and feathered out at the edges. Apply second layer of compound to screw head dimples. Apply first layer of compound to corner beads.
- D. After compound is thoroughly dry, apply final layer of compound over tape slightly crowned over joint and edges feathered out approximately 3" beyond preceding coat. Apply final layer of compound to screw head dimples. Apply final layer to corner beads, feathered out on both sides approximately 9" from exposed metal nose. Apply smooth feathered layer at casing beads.
- E. Sand, where necessary, following application of each layer of compound. Take care not to roughen paper surface of wallboard. All wallboard and treated areas shall be smooth and ready for decoration.

**END OF SECTION**

**SECTION 09 90 00 PAINTING****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provision of Division 01 apply to all work of this Section.
- B. The work to be done under this Section includes all materials, labor, equipment, and services necessary to, and reasonable applicable to, providing and applying all paints, varnishes, coatings or other related materials specifically called for in this specification or in the drawings.
- C. The purpose of this painting specification is to clearly indicate the surfaces to be painted or coated, the types and qualities of paints or coatings to be applied and the amount of material to be applied for each coat.
- D. No finish work is required by this Contractor on the following items; however, he shall be required to protect same from damage as specified herein:
  - 1. Finish hardware items, except those primed.
  - 2. Items of brass, bronze, chrome plating, stainless steel.
  - 3. All other finish materials not requiring a painter's finish, as resilient flooring, acoustical materials, casework etc.

**1.02 SUBMITTALS**

- A. This Contractor shall submit for Architect approval a list of all materials with identifying numbers of codes he proposes to use on this project. This list is to be submitted at least 10 days prior to the application of any paint or coating. Architect approval is required before delivery of any paint or coating to project site. This will in no way take precedence over paragraph on substitutions, 1.03.
- B. At the time contractor furnishes material listing to Architect, he shall also submit color chip samples of all products he intends to use on this project.
- C. As requested by the Architect, submit duplicate samples of all painted, varnished, stained, or other specified finishes for approval before starting any work.
- D. Architect will furnish this contractor a set of color chips and a schedule locating all color placement, from samples furnished by contractor.

**1.03 SUBSTITUTIONS**

- A. The materials or products specified herein and indicated on drawings or finish schedules by trade name shall be provided as detailed.
- B. This contractor shall submit his bid based on specified materials of approved manufacturer listed in Paragraph 2.01.
- C. Equal quality products of other manufacturers will be considered for approval if the request is submitted within 30 days after painting contract award. This written request must include all necessary supporting information and data for Architect to determine equal quality characteristics. Submit through general contractor for Architect approval.
- D. After Architect approval of material, there shall be no substitutions.

#### **1.04 DELIVERY STORAGE AND HANDLING**

- A. All materials shall be delivered to the building in the original containers, with labels intact and seals unbroken. No materials other than those specified shall be delivered to the building. All material shall be used strictly in accordance with manufacturer's directions.
- B. Storage of Painting Materials:
  - 1. General contractors will assign a lockable area or room for storing all this contractor's supplies and equipment.
  - 2. All job site tinting, mixing, and thinning required or approved by Architect must be done in this area.
  - 3. This contractor must use adequate means and take all precautions to prevent fire, explosions and other damage caused by his materials and equipment.
  - 4. This contractor must use adequate means and take all precautions to protect floors and other surfaces of this area from damage.
  - 5. All rags and paint or solvent must be stored in closed metal containers at all times.

### **PART 2 - PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Except as otherwise specified or detailed herein, or specifically approved by the Architect in writing, the paints or coatings used on this project are to be equal quality and type products of the following manufacturers:
  - 1. PPG Industries, Inc (Pittsburgh Paints)
  - 2. Pratt-Lambert Inc.
  - 3. Benjamin Moore & Co.
  - 4. Diamond Vogel Paints
  - 5. Sherwin Williams
- B. The finish schedule will list for specifying purposes, the factory number and brand name of Sherwin Williams.
- C. Only top quality materials are to be used on this project. Where a question of quality occurs, the painting contractor will submit an affidavit from the material manufacturer stating the quality range of the project to be used, as compared to other quality products made by that manufacturer.
- D. All materials not specified but required for successful application of any specified paint or coating must be of the brand and type recommended by the approved paint or coating manufacturer. The approved manufacturer's complete coating system will be used on this project, with no substitutions. When materials of manufacturer are specified and these have been discontinued by the manufacturer - only substitutions as recommended by that approved paint or coatings manufacturer will be acceptable to the Architect.
- E. Surface preparation cleaners and degreasers shall be as manufactured by Great Lakes Laboratories, Inc.; 12780 Wayne Road, Livonia, Mi 48150, (313) 525-8300.



**2.02 SCHEDULE OF FINISHES**

## A. Heating Units and Piping

1 Coat	SW DTM Primer/Finish	B66W1
2 Coats	SW DTM Acrylic Semi-Gloss	B66-211 Series

B. **Interior** Gypsum Board (Paint)

1 Coat	SW Promar 200 Primer	B28W8200
2 Coats	SW Promar 200 Eg Shel	B20W600 Series

C. **Interior** Gypsum Board (Epoxy for use in Toilet Rooms)

1 Coat	SW Promar 200 Primer	B28W8200
2 Coats	SW Pro Industrial Hi-Bild Water Based Epoxy	B71 Series

D. **Exterior** Siding (paint and paint one (1) coat all six sides and all cut edges); one (1) coat after install

1 Coat	SW Exterior Oil Base Wood Primer	Y24W 8020
2 Coats	SW A-100 Exterior LatexPaint	A82-100 Series

## E. Existing Previously Painted Plaster and Drywall (Prepare existing surfaces as specified in Article 3.02 below)

2 Coats	SW Promar 200 Eg Shel	B20W600 Series
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F. **Interior** Existing Previously Painted Masonry and Concrete (Prepare existing surfaces as specified in Article 3.02 below)

2 Coats	SW Promar 200 Eg Shel	B20W600 Series
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**2.03 SURFACE PREPARATION PRODUCTS**

## A. General Cleaning Solution: Great Lakes Laboratories, Inc. - No Rinse Repaint Cleaner

1. One-step Cleaning of: Aluminum, Vinyl, Steel, Wood Siding, Decking, Bar Joists, Block Walls, Interior Walls, Woodwork, Galvanized Steel.
2. Solvent replacement for cleaning metal surfaces before painting.

## B. Heavy Duty Cleaning Solution: Great Lakes Laboratories, Inc. - Extra Muscle Repaint Cleaner

1. Removing chalk from painted siding.
2. Solvent replacement used in place of trichlor, lacquer thinner, mineral spirits, and other solvents for cleaning metal surfaces.
3. Paint and stain remover, concentrate will soften and remove many water-borne paints and stains.

## C. Degreasing: Great Lakes Laboratories, Inc. - All Purpose Repaint Degreaser

1. Cleaning and degreasing metal, offers short term rust inhibition.
2. Non-emulsifying feature will float oily contaminants to the surface of collected solutions. The oil can be skimmed off and the cleaning solution can be reused or sewerred.

- D. Cleaning & Etching: Great Lakes Laboratories, Inc. - Clean & Etch
  - 1. For one-step cleaning and etching of concrete, steel and galvanized.
  - 2. Derusts steel and iron and removes corrosion from aluminum.
  - 3. Prepares galvanized surfaces for application of paint.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION OF SURFACES**

- A. Before starting any work, this Contractor shall examine all surfaces which are to receive his materials and report all defects found in same to the Architect in writing. The starting of any work by this Contractor will imply his acceptance of the surfaces as suitable for the application of his materials.
- B. An exception to "A" above will be allowed if this contractor wishes to perform a test application to a questionable surface. If the surface fails to hold paint material, Architect shall be notified in writing and no additional material applied until defective surfaces have been corrected.

#### **3.02 PREPARATION OF SURFACES**

##### **A. ALL SURFACES**

- 1. All surfaces to which paint is applied shall be clean and dry. No painting will be permitted in dusty rooms, and, if required by the Architect, the painter shall sprinkle floors to lay the dust. No painting or varnishing shall be done on interior work unless the temperature is above 60°F.
- 2. All surfaces must be free of foreign matter before applying any paint or coating. Removal of foreign matter from painting surfaces left by other trades shall be the responsibility of the General Contractor.

##### **B. NEW UNPAINTED METALS**

- 1. All bare metal surfaces (unprimed from the fabricator) shall be thoroughly washed with Great Lakes Laboratories, Inc. - All Purpose Prepaint Degreaser and wiped clean with rags before priming.
- 2. Before painting, all metal surfaces shall be thoroughly cleaned of all dirt, oil, rust, scale and other foreign materials by the use of sandpaper, steel scrappers, or wire brushes as necessary.
- 3. Metal door frames are to have countersunk screws filled and sanded smooth before prime coat or under coat is applied.
- 4. Galvanized steel surface requiring painting must be cleaned with Great Lakes Laboratories, Inc. - Clean and Etch to remove all traces of grease or oil before priming as per specifications.

##### **C. NEW PLASTER OR DRYWALL**

- 1. Surfaces to be coated must be dry and clean free of dirt, oil and grease. Cracks, gouges, or other surface imperfections shall be repaired by spackling or puttying, depending on the surface. Allow spackling to dry thoroughly before spot priming.
- 2. Remove oil or grease with Extra Muscle Prepaint Cleaner. Remove dirt and grime with No Rinse Prepaint Cleaner.

3. If surface to be coated is slick or shiny, use medium sandpaper, or liquid deglossing compound to remove the shine. Wipe thoroughly with clean rags to be sure the surface is clean.
4. Plaster surfaces shall be allowed to dry for at least thirty (30) days prior to painting.

**D. NEW INTERIOR WOOD SURFACES TO BE PAINTED**

1. Surfaces to be coated must be dry and clean free of dirt, oil and grease. Cracks, gouges, or other surface imperfections shall be repaired by spackling or puttying, depending on the surface. Allow spackling to dry thoroughly before spot priming.
2. Remove any sap on the surface with Extra Muscle Prepaint Cleaner or All Purpose Prepaint Degreaser. Knots and resinous areas shall be spot primed with a pigmented shellac prior to the application of the primer.
3. Open grain wood shall be filled with a Paste Wood Filler as recommended by the paint manufacturer.
4. For redwood, cedar or other tanin containing woods, do not use water base primers.

**E. PREVIOUSLY PAINTED MASONRY OR CONCRETE**

1. All surfaces must be free of dirt, grease, form oil or wax, all loose or chalky deposits, parting membrane, and efflorescence. Point up cracks, voids or other surface fissures.
2. All glossy areas shall be dulled with sand paper or surface conditioner to facilitate adhesion of paint.
3. Non-moving breaks or defects in masonry or concrete surfaces shall be repaired. Cracks or breaks shall be repaired with a water-mixed grouting as a filler. The crack shall be thoroughly wet before applying the filler to prevent dry masonry from absorbing the water in the filler.
4. Deep, moving cracks in masonry or concrete surfaces shall be partially filled with grout, followed by an application of an elastic caulking compound. Do not overlap caulking onto the surface edges of the crack.
5. Efflorescence must be removed, the cause repaired or corrected and the surface treated before painting can begin. Remove efflorescence by either scraping, chipping or sandblasting.
6. If existing paint is chalky, soft or powdery, but in good condition, surface should be washed thoroughly and primed with PPG Speedhide Masonry Surface Sealer-Oil 6-8.

**3.03 PROTECTION**

- A. Lay drop cloths in all areas where painting is being done to protect floors and other work from damage. Remove all electric outlet plates, fixture canopies, surface hardware and other similar items before painting is begun and replace same after completion. Where it becomes necessary, in order to execute the work under this section, to remove the protective coverings placed by other trades, this Contractor shall replace same afterward in a proper manner. Any work of other trades, damaged in executing the work under this section, shall be replaced or restored to the original condition at this Contractor's expense.

### 3.04 WORKMANSHIP

- A. Paint or coatings are to be applied under conditions conducive to good results. It is necessary for this contractor to honor the individual requirements of each material used, as to digestion time, pot life, application temperature limits, humidity limits where applicable, and manufacturer's directions.
- B. If this contractor finds that problems are arising in connection with the application of the paint to a surface so as to prevent him from doing a good workmanlike job, painting on that area should be stopped immediately. The supplier of the paint should then be contacted to see what can be done to rectify the conditions.

Plaster, mortar, concrete block, concrete or any other masonry related surface shall not be painted if its moisture content exceed 12%. If moisture content is between 8% and 12%, prime with Alkali Resistant Primer in place of specified primer.

- C. All pipes, insulated pipes, ductwork and equipment in exposed areas shall be painted.
- D. All doors to be painted must have at least two coats of finish paint after doors have been fitted. Doors shall be removed from frame during application.
- E. Where open cabinets and shelves occur, room finish on walls shall not be omitted except in back of permanent cabinets with closed backs.
- F. The contractor must furnish all required ladders, stages, scaffolds, etc., and they must be in safe condition, having adequate strength to support maximum work load.
- G. Scaffolds, ladders, etc., must not be left up where they would interfere with other workmen, when not in daily use.

### 3.05 APPLICATION

- A. Final coat of paint or coating must have visual evidence of solid hiding and uniform appearance.
- B. There shall be no visible evidence of runs, sags, curtains or other evidence of poor application.
- C. All coats shall be thoroughly dry before applying succeeding coats, unless specifically exempted by material manufacturer.
- D. Make edges of paint or coating adjoining other materials or colors, sharp and clean, with no overlapping.
- E. When paint or coating is brush applied, proper skill must be used to avoid all signs of lapping and excess paint from edge of roller. When cutting in with a brush is required, these areas must be of same texture, color and hiding as adjacent areas, to assure good appearance.
- F. When paint or coating is applied by spray, it must be done before the installation of fixtures hardware, flooring and other finish items unless thoroughly protected. It shall be applied only by skilled painters, to assure a uniform finish with no evidence of poor or improper application.
- G. Block filler when applied to concrete or lightweight block must retain no block surface texture, only pattern from brush or roller and shall have no pinholes.
- H. Exposed piping, conduit, wire mold, ductwork, hangers and related or similar materials shall be painted the color and texture of the wall or ceiling adjacent. The purpose is to visually hide the exposed material. Then adjacent surfaces are unpainted, match the general color. Exception: where special pipe color coding is specified.

- I. Each coat of paint or coating shall be of visible difference from preceding coat.
- J. Each coat of paint or a coating shall be inspected by architect or his representative before next coat is applied. Only after inspection and approval will credit be given for that coat.
- K. Each coat of paint to be applied uniformly with proper spreading rate listed by the approved paint manufacturer.
- L. Spot painting to correct soiled or damaged paint surfaces will be allowed only when touch-up spot is blended into surrounding finish and is invisible to normal viewing. Otherwise, re-coat entire section to corners or visible stopping point.
- M. Contractor shall note that this project calls for complete painting of all work requiring paint on interior of building and as called for in the Room Finish Schedule. In areas where patching of walls are indicated, paint the complete wall from corner to corner or visible stopping point. Colors of paint shall match existing in that area.

### **3.06 MECHANICAL AND ELECTRICAL INSTALLATIONS**

- A. All exposed radiators, radiator covers or enclosures, exposed heating pipes or similar items subjected to excessive heat, shall be painted with two coats of heat resistant paint or radiator paint unless factory finished. Where color must match adjacent surfaces and a wall paint is specified for use on radiators or piping, only a flat oil paint or eggshell enamel shall be used and coats shall be as thin as possible to minimize blistering and flaking. Heat shall not be turned on full until the finish is thoroughly hardened.
- B. All exposed pipe covering and mechanical insulations shall be given two coats of interior paint to match adjacent surfaces. Add to each coat a fungicidal agent which will render the fabric mildew-proof, but not adversely affect the color, texture or durability of the paint.
- C. All other exposed Mechanical or Electrical ducts, pipes, conduits, or equipment shall be primed and painted two coats of paint. In finished spaces, the color shall be neutral gray or color selected by the Architect.

### **3.07 CLEANING-UP**

- A. Upon completion of his work this contractor shall clean off all paint where it has spilled, splashed or splattered on floors, walls, woodwork, fixtures, glass, hardware, etc., and leave the entire building in perfect condition thoroughly cleaned and ready to use.
- B. This contractor must leave premises clean and free from all rubbish and accumulated material left from his work.

**END OF SECTION**

**SECTION 10 21 13 - TOILET COMPARTMENTS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all materials, equipment and services necessary to furnish and install toilet compartments and accessories for a complete installation as shown on plans and as specified herein.
- C. Material specified under this Section shall be installed under Section 06 10 00 Rough Carpentry. This supplier shall furnish complete and detailed instructions regarding installation and adjustment of all items specified herein.

**1.02 SYSTEM DESCRIPTION**

- A. Provide floor mounted overhead braced, solid polymer toilet partitions.

**1.03 SUBMITTALS**

- A. Prepare and submit shop drawings to Construction Manager for approval in accordance with the requirements of Division 01. Shop drawings shall include placing plans and detailed drawing of each item. No material shall be fabricated until such drawings have been accepted.
- B. Colors shall be selected from the manufacturer's full range of colors: Grey, Tan, Folkstone Grey, White, Black, Burgundy, Blue, Green, Brown, Black Speckle and Light Blue. One (1) color may be selected.
- C. Color and hardware samples shall be submitted for approval to the Architect upon request.

**1.04 WARRANTY**

- A. Toilet Partition shall be Warranted for a minimum of fifteen (15) years from the date of Substantial Completion against breakage, corrosion, and delamination. If materials are found defective during that period for the reasons listed above, the materials will be replaced free of charge. No credits or allowances will be issued for any labor or expenses relating to the replacement of components covered under the warranty plan. All such expenses are to be born by the buyer.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Toilet compartments to be supplied by:
  - 1. Global Partitions
  - 2. Hindy Hiders by Scranton Products

**2.02 MATERIALS**

- A. Doors, panels, and pilasters to be 1" thick with homogeneous color throughout, constructed from high density polyethylene (HDPE) resins which are waterproof, non-absorbent, and have a self-lubricating surface that resists markings from pens, pencils, and other writing instruments.

**2.03 CONSTRUCTION**

- A. Doors, panels, and pilasters shall be 1" thick with uniformly machined edges.

- B. Doors and panels shall be 55" high and mounted at 14" above the finished floor. Door shall be mounted to the pilasters with an integral hinge or a "bank-vault" type die-cast aluminum alloy wraparound hinge.
- C. Pilasters shall be 81-112" high finished height. Pilasters shall include a mounting system comprised of a one piece 304 stainless steel with #4 finish 3" high shoe with an integral plate in the bottom. The shoe shall be mounted to the floor utilizing concrete anchors supplied by Global Partitions. The concrete anchors shall be driven through the plate affixing it to the concrete floor. The concrete anchors shall have 2700lbs of holding strength when used in 5000psi concrete flooring. The pilaster height shall be adjusted by utilizing the machine thread bolt supplied which is placed into a metal insert installed in the bottom of the pilaster at the manufacturing facility.
- D. Pilasters are overhead braced with an extruded anti-grip aluminum headrail.

## **2.04 HARDWARE**

- A. Door hardware shall be as noted:
  - 1. Continuous stainless steel hinge. Slide latch, strike/keeper and hinges are through bolted onto doors and pilasters using stainless steel, vandal-resistant through bolts.
- B. Panel and pilaster brackets shall be as noted:
  - 1. Continuous heavy duty stainless steel wall brackets are pre-drilled. Wall brackets are mounted with stainless steel, vandal-resistant screws. The attachment of brackets to the adjacent wall construction shall be accomplished with 2 1/2" stainless steel vandal resistant screws and plastic anchors.
- C. Pilaster shoes shall be of a one piece design and integral to the mounting system and formed from #304 stainless steel 3" high with a #4 satin finish. Pilaster shoes are anchored to the pilaster with #10 stainless steel, vandal-resistant screws.
- D. Headrail shall be made of heavy-duty anodized extruded aluminum (6063-T5 alloy). Headrail is anti-grip and attaches to the top of the pilaster with stainless steel, tamper-resistant screws. Headrail is attached to the adjacent wall construction with a headrail bracket.
- E. Headrail brackets shall be made from a die cast aluminum alloy and shall be attached to the adjacent wall construction with 2 1/2" stainless steel, tamper-resistant screws and plastic anchors.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Examine areas to receive toilet compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that may affect installation of compartments. Report any discrepancies to the architect.
- B. Take complete and accurate measurements of complete toilet compartment locations.
- C. Start of work constitutes acceptance of job.

### **3.02 INSTALLATION**

- A. A. Install compartments in a rigid, straight, plumb and level manner, with steel laid out as shown on the shop drawings and manufacturer's installation instructions.
- B. All doors and panels to be mounted at 14" above the finished floor.

- C. Clearance at vertical edges of door shall be uniform top to bottom.
- D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- E. Finished surfaces shall be cleaned after installation and be left free of all imperfections.

**END OF SECTION**



**SECTION 10 28 00 - TOILET ACCESSORIES****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install all toilet accessories where shown on drawings, and/or specified herein.
- C. Materials furnished under this Section shall be installed under Section 06 10 00 Rough Carpentry.

**1.02 SUBMITTALS**

- A. Prepare and submit shop drawings to Architect for approval in accordance with the requirements of Division 01. For stock items requiring no modification or special fabrication to suit the requirements of this particular project, manufacturer's literature and installation instructions will be accepted in lieu of shop drawings. No material shall be ordered until such drawings have been approved by the Architect.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Products manufactured by Bobrick Co. have been chosen to establish a level of quality for this project. Manufacturers that offer products which may comply with the requirements of this contract include, but are not limited to, the following:
  - 1. Bobrick
  - 2. Bradley Co.
  - 3. McKinney Parker
  - 4. Gamco
  - 5. ASI

**2.02 GRAB BARS**

- A. Grab bars shall be 1-1/2" diameter, 18 gauge, type 304 stainless steel with satin finish. Grab bars shall have a snap flange concealed mounting system and peened gripping surface.
- B. Grab bars shall be Bobrick Series B-6806.99 of size shown on drawings.
- C. Grab bars shall meet requirements of the State of Minnesota. Mount bars as shown on the drawings.

**2.03 MIRRORS**

- A. Frameless stainless steel mirror shall be 18-8-Type 304, 20-gauge stainless steel polished to a No. 8 mirror finish.
- B. Mirror shall have 1/4" return concealing 1/4" tempered masonite backing. Screw to wall with tamper-resistant mounting screws.
- C. Mirror shall be Bobrick B-1556; size as shown on drawing.

#### **2.04 BABY CHANGING STATION**

- A. Baby changing station shall be horizontal to accommodate infants and toddlers. Constructed of 18-gauge stainless steel exterior finish with high-density polyethylene with Microban antimicrobial interior. Design of unit shall be surface mounted. Bed shall be secured to back plate with a concealed, full-length steel-on-steel hinge.
- B. Baby changing station shall be Koala Bear Care Corp. KB110-SSWM Horizontal Wall Mounted or approved equal.

#### **2.05 TOILET PAPER HOLDER**

- A. Toilet Paper Holder to be supplied by the Owner and installed by the Contractor; one per toilet stall.

#### **2.06 SOAP DISPENSER**

- A. Surface-mounted soap dispenser shall be type-316 stainless steel with satin finish. Corrosion-resistant valve shall dispense commercially marketed all-purpose hand soaps. Valve shall be operable with one hand and with less than 5 pounds of force (22.5 N) to comply with barrier-free accessibility guidelines (including ADAAG in U.S.A.). Container body and back plate shall be epoxy-sealed to prevent warping and leakage. Soap dispenser shall have concealed, vandal-resistant mounting. Locked, hinged stainless steel lid for top filling shall require special key to open Capacity shall be 40-fl oz (1.2-L).
- B. Soap Dispenser shall be:
  - 1. Bobrick 818615
  - 2. Accepted substitution per Submittals - Section 01 33 00.

#### **2.07 SANITARY NAPKIN DISPOSAL**

- A. Provide anchors, bolts, expansion and toggle bolts and straps of the types shown or as required for Partition-mounted sanitary napkin disposal shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Unit shall mount in partition and serve two toilet compartments. Flanges shall be drawn, one-piece, seamless construction. Each self-closing door shall be drawn, one-piece, seamless construction; secured to flange with a full-length stainless steel piano-hinge; and equipped with two stainless steel cable door-swing limiters, a finger-pull recess at top for easy opening, and an international graphic symbol identifying sanitary napkin disposal. Doors shall pull down with less than 5 pounds of force (22.2 N) to comply with barrier-free accessibility guidelines (including ADAAG in U.S.A.). Unit shall be furnished with a removable, leak-proof, molded polyethylene receptacle that is serviced from either side of unit. Receptacle shall have a capacity of 0.7-gal. (2.7-L). Unit is furnished with a hanging sight-barrier, secured to flange with two stainless steel piano-hinges, which swings out of the way when waste is deposited in receptacle and when removing receptacle from unit for servicing.
- B. Sanitary Napkin Disposal shall be:
  - 1. Bobrick 8B-4354
  - 2. Accepted substitution per Submittals - Section 01 33 00.

#### **2.08 FASTENERS**

- A. Provide anchors, bolts, expansion and toggle bolts and straps of the types shown or as required for fastening work in place. All exposed fasteners shall be vandal resistant style.
- B. Unless otherwise specified, provide fastenings of the same material, color and finish as the metal to which it applied.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Specific instructions, furnished by the manufacturer, regarding assembly, installation, protection, etc. of accessories shall be faithfully followed.
- B. Holes required for mounting accessories shall not be larger than that necessary to insert the required anchoring devices. ALL HOLES SHALL BE DRILLED.
- C. Accessories shall be installed plumb, and level, undamaged, and free of tool marks. Accessories bearing evidence of damage, tool marks, or rough handling shall not be installed.

**END OF SECTION**

**SECTION 22 05 01 - GENERAL PLUMBING REQUIREMENTS****PART 1 - GENERAL****1.01 WORK INCLUDED**

- A. The work described under Section 23 05 01, General Mechanical Requirements - HVAC, shall apply to this Section as applicable to Division 22 work.

**1.02 RELATED SECTIONS & REFERENCES**

- A. Refer to requirements of Section 23 05 01, General Mechanical Requirements - HVAC, as they apply to Division 22 work.
- B. The following reference standards shall apply to all Division 22 work:
  - 1. Energy Policy Act of 1992
  - 2. NEMA
  - 3. UL
  - 4. ANSI
  - 5. ASTM
  - 6. NFPA
  - 7. MF-1
  - 8. AGA
  - 9. ASSE
  - 10. PDI
  - 11. CISPI
  - 12. ADA
  - 13. NSF
  - 14. Minnesota State Plumbing Code
  - 15. Local Code

**PART 2 - PRODUCTS (Not Applicable)****PART 3 - EXECUTION****3.01 GENERAL**

- A. Refer to requirements of Section 23 05 01, General Mechanical Requirements - HVAC, as they apply to Division 22 work.

**END OF SECTION**

**SECTION 22 05 23 - GENERAL DUTY VALVES FOR PLUMBING****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 05 01 - General Plumbing Requirements
- B. 22 05 53 - Identification for Plumbing Piping and Equipment
- C. 22 11 16 - Domestic Water Piping

**1.02 DESCRIPTION OF WORK**

- A. Furnish and install valves as indicated on drawings and/or specified in this Section.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of valves, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Valve Types: Provide valves of same type by same manufacturer.

**1.04 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings, including installation instructions for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valve schedule showing manufacturer's figure number, size, location and valve features for each required valve.
- B. Maintenance Data: Submit maintenance data and spare parts lists for each type of valve. Include this data, product data and shop drawings in maintenance manual.

**PART 2 - PRODUCTS****2.01 VALVES**

- A. Ball Valves - Apollo, Hammond, Milwaukee, Nibco, Watts Regulator
- B. Check Valves - Apollo, Milwaukee, Gruvlok, Hammond, Watts Regulator
- C. Drain Valves - Apollo, Chicago Faucet, Hammond, Nibco, Watts Regulator

**2.02 DRAIN VALVES**

- A. Class 125: Bronze body, screw-in bonnet, rising stem, composition disc, 3/4" hose outlet.

**2.03 BALL VALVES**

- A. All Sizes: 150 psi SWP, 600 psi WOG, bronze body, standard port, bronze trim, 2-piece construction, TFE seats and seals.

**2.04 CHECK VALVES**

- A. 2" and Smaller: Class 125, bronze body, horizontal swing, regrinding type, Y-pattern, renewable disc, silent operating.
- B. 2-1/2" and Larger: Class 125, iron body, bolted bonnet, horizontal swing, renewable seat and disc, flanged ends, silent operating.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION**

- A. **General:** Except as otherwise indicated, comply with the following requirements:
1. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
  2. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward from horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.
- B. **Insulation:** Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.
- C. **Selection of Valve Ends (Pipe Connections):** Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections:
1. **Tube Size 2" and Smaller:** Soldered-joint valves.
  2. **Pipe Size 2" and Smaller:** One of the following, at Installer's option: threaded valves, butt-welding valves, socket-welding valves, flanged valves, flangeless valves, single flanged valves.
  3. **Pipe Size 2-1/2" and Larger:** One of the following, at Installer's option: butt-welding valves, socket-welding valves, flanged valves, wafer valves, single flanged valves, hub-and-spigot valves, mechanical joint end valves.
- D. **Valve System:** Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of os&y valves.
- E. **Non-Metallic Disc:** Limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.
- F. **Renewable Seats:** Select and install valves with renewable seats, except where otherwise indicated.
- G. **Installation of Check Valves:**
1. **Swing Check Valves:** Install in horizontal position with hinge pin horizontally perpendicular to center line of pipe. Install for proper direction of flow.
- H. **Installation of Pressure Regulating Valves:** Install pressure regulating valves where indicated. Provide inlet and outlet shutoff valves and throttling valve bypass. Provide pressure gauge on valve outlet.

#### **3.02 ADJUSTING & CLEANING**

- A. **Valve Adjustment:** After piping systems have been tested and put into service, but before final testing, adjusting and balancing, inspect each valve for possible leaks. Adjust or replace packing to stop leaks, replace valve if leak persists.
- B. **Cleaning:** Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

**END OF SECTION**

**SECTION 22 05 29 - HANGERS & SUPPORTS FOR PLUMBING PIPING & EQUIPMENT****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 05 01 - General Plumbing Requirements
- B. 22 07 00 - Plumbing Insulation
- C. 22 11 16 - Domestic Water Piping

**1.02 DESCRIPTION OF WORK**

- A. Furnish and install hangers and supports required by this Section as indicated on drawings and/or specified in this Section.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of supports and anchors, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

**1.04 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings, including installation instructions for each type of support and anchor.
- B. Maintenance Data: Submit maintenance data and parts lists for each type of support and anchor. Include this data, product data and shop drawings in maintenance manual.

**PART 2 - PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

- A. Hangers: B-Line, Anvil, Carpenter and Patterson
- B. Powder-Drive Fasteners: Hilti
- C. Seals: Thunderline
- D. Saddles and Shields: Anvil, Pipe Shields

**2.02 HORIZONTAL-PIPING HANGERS & SUPPORTS**

- A. Except as otherwise indicated, provide factory-fabricated horizontal-piping hangers and supports complying with MSS SP-58, selected by Installer to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

**2.03 HANGER-ROD ATTACHMENTS**

- A. Except as otherwise indicated, provide factory-fabricated hanger-rod attachments complying with MSS SP-58, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide

copper-plated hanger-rod attachments for copper-piping systems.

#### **2.04 BUILDING ATTACHMENTS**

- A. Except as otherwise indicated, provide factory-fabricated building attachments complying with MSS SP-58, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

#### **2.05 SADDLES & SHIELDS**

- A. Except as otherwise indicated, provide saddles or shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.
  - 1. Protection Saddles: MSS Type 39; fill interior voids with segments of insulation matching adjoining insulation.
  - 2. Protection Shields: MSS Type 40; of length recommended by manufacturer to prevent crushing of insulation.
  - 3. Thermal Hanger Shields: Constructed of 360° insert of high density, 100 psi, waterproofed calcium silicate, encased in 360° sheetmetal shield. Provide assembly of same thickness as adjoining insulation.

#### **2.06 SPRING HANGERS & SUPPORTS**

- A. Except as otherwise indicated, provide factory-fabricated spring hangers and supports complying with MSS SP-58, selected by Installer to suit piping system, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select spring hangers and supports to suit pipe size and loading.

#### **2.07 MISCELLANEOUS MATERIALS**

- A. Powder-Driven Fasteners: Fasteners shall be plated in accordance with QQ-2-325-C.
- B. Seals: Where pipes pass through sleeves in walls below grade, provide a modular wall seal.
- C. Sleeves: Pipe sleeves shall be standard weight black steel, or Schedule 40 PVC plastic.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Examine areas and conditions under which supports and anchors are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### **3.02 PREPARATION**

- A. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.

#### **3.03 INSTALLATION OF BUILDING ATTACHMENTS**

- A. Install building attachments at required locations within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install



additional concentrated loads, including valves, flanges, guides, strainers, expansion joints and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

**3.04 INSTALLATION OF HANGERS & SUPPORTS**

- A. Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-69 and SP-89. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.
- B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.
- C. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.
- D. Install powder-actuated drive-pin fasteners 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. Do not use in lightweight concrete slabs or in concrete slabs less than 4" (100mm) thick.
- E. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install according to fastener manufacturer's written instructions. Do not use in lightweight concrete slabs or in concrete slabs less than 4" (100mm) thick.
- F. Provisions for Movement:
  - 1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
  - 2. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
  - 3. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 Pressure Piping Codes are not exceeded.
- G. Insulated Piping: Comply with the following installation requirements:
  - 1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
  - 2. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields. For pipe 8" and over, install wood insulation saddles.
  - 3. Saddles: Where insulation without vapor barrier is indicated, install protection saddles.
- H. Horizontal Pipe Supports, Spacing and Loading, Saddle Length:

Pipe Size	Max. Span / Feet		Min. Rod Diameter	
	copper	steel*	copper	steel
Up to 1-1/4"	6	5	3/8	3/8

Pipe Size	Max. Span / Feet		Min. Rod Diameter	
	copper	steel*	copper	steel
1-1/2" to 2"	8	10	3/8	3/8
2-1/2" to 3"	9	10	1/2	1/2
4" to 5"		12		5/8
6"		12		3/4
8" to 12"		12		7/8

\*Denotes maximum span unless 10-foot lengths of pipe are used then 10-foot span allowed.

Cut bolts, grind sharp edges and corners.

- I. Plastic pipe supported every 32".

**3.05 ADJUSTING & CLEANING**

- A. Hanger Adjustments: Adjust hangers so as to distribute loads equally on attachments.
- B. Support Adjustment: Provide grout under supports so as to bring piping and equipment to proper level and elevations.
- C. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

**END OF SECTION**

**SECTION 22 05 48 - VIBRATION & SEISMIC CONTROLS FOR PLUMBING PIPING & EQUIPMENT****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 11 16 - Domestic Water Piping
- B. 22 11 19 - Domestic Water Piping Specialties

**1.02 SCOPE OF WORK**

- A. Install vibration isolation as required by this Section and indicated on the drawings and schedules.

**1.03 QUALITY ASSURANCE**

- A. Product Qualification: Provide each type of vibration isolation unit produced by specialized manufacturer, with not less than 5 years of successful experience in production of units similar to those required for project.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Flexible Pipe Connectors: Metra Flex, Twin City Hose, MN Pipe Connectors, Flexonics

**2.02 FLEXIBLE PIPE CONNECTORS**

- A. For non-ferrous piping, provide bronze hose covered with bronze wire braid with copper tube ends or bronze flanged ends, braze-welded to hose.
- B. For ferrous piping, provide stainless steel hose covered with stainless steel wire braid with NPT steel nipples or 150 psi ANSI flanges, welded to hose.
- C. Rubber Flexible Pipe Connectors: Provide of rubber and butyl construction with integral full-face duct and butyl flanges, internally steel wire reinforced, and furnished complete with steel retaining rings. Select with temperature and pressure ratings to suit intended service.

**PART 3 - EXECUTION****3.01 APPLICATIONS**

- A. Apply types of vibration isolation materials and units indicated at locations shown or scheduled. Selection is installer's option where more than one type is indicated.
- B. Flexible Pipe Connectors: Install in piping systems at the following locations:
  - 1. Connections, 3/4" pipe size and larger, with vibration-isolation-mounted equipment.

**3.02 INSTALLATION**

- A. Except as otherwise indicated, comply with manufacturer's instructions for installation and load application to vibration isolation materials and units. Adjust to ensure that units do not exceed rated operating deflections or bottom out under loading, and are not short-circuited by other contacts or bearing points. Remove space blocks and similar devices (if any) intended for temporary protection against overloading during installation.

- B. Flexible Pipe Connectors: Install on equipment side of shutoff valves, horizontally and parallel to equipment shafts wherever possible

**END OF SECTION**

**SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING & EQUIPMENT****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 05 01 - General Plumbing Requirements
- B. 22 07 00 - Plumbing Insulation
- C. 22 11 16 - Domestic Water Piping
- D. 22 13 19 - Sanitary Waste Piping Specialties

**1.02 DESCRIPTION OF WORK**

- A. Furnish and install identification as specified.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

**1.04 SUBMITTALS**

- A. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8-1/2" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shutoff and similar special uses, by special "flags," in copies for maintenance manuals.

**PART 2 - PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

- A. Paint - Benjamin Moore, Devoe, Pratt and Lambert, Rust-O-Leum
- B. Pipe Labels - Seton, Brady

**2.02 PAINTED IDENTIFICATION MATERIALS**

- A. This Contractor shall be responsible for preparing and painting items described in this Section.

**2.03 PIPE IDENTIFICATION**

- A. Snap-On Type: Provide manufacturer's standard preprinted, semi-rigid, snap-on, color-coded pipe markers, complying with ANSI A13.1.
- B. Pressure-Sensitive Type: Provide manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, complying the ANSI A13.1.

**2.04 CEILING MARKERS**

- A. Provide marking tacks with covering for ink notation.

**2.05 VALVE TAGS**

- A. Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener.

1. Provide 2" diameter tags except as otherwise indicated.
2. Provide size and shape as specified or scheduled for each piping system.
3. Fill tag engraving with black enamel.

### **PART 3 - EXECUTION**

#### **3.01 GENERAL INSTALLATION REQUIREMENTS**

- A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

#### **3.02 PIPING SYSTEM IDENTIFICATION**

- A. Install pipe markers of one of the following types on each system indicated to receive identification and include arrows to show normal direction of flow.
1. Stenciled markers, including color-coded background band or rectangle, and contrasting lettering of black or white. Extend color band or rectangle 2" beyond ends of lettering.
  2. Stenciled markers, with lettering color complying with ANSI A13.1.
  3. Plastic pipe markers, with application system as indicated under "Materials" in this Section. Install on pipe insulation segment where required for hot non-insulated pipes.
  4. Stenciled markers, black or white for best contrast, wherever continuous color-coded painting of piping is provided.
- B. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.
1. Near each valve and control device.
  2. Near each branch, excluding short takeoffs for fixtures and terminal units; mark each pipe at branch where there could be question of flow pattern.
  3. Near locations where pipes pass through walls or floors/ceilings or enter non-accessible enclosures.
  4. At access doors, manholes and similar access points which permit view of concealed piping.
  5. Near major equipment items and other points of origination and termination.
  6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
  7. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

- C. Pipe Identification:

<u>Function</u>	<u>Stencil Working</u>
Domestic Cold Water	CW
Domestic Hot Water	HW

**3.03 VALVE IDENTIFICATION**

- A. Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shutoff valves at plumbing fixtures, HVAC terminal devices and similar rough-connections of end-use fixtures and units.
  - 1. Tagging Schedule: Comply with requirements of "Valve Tagging Schedule" at end of this Section.
- B. Mount valve schedule frames and schedules in machine rooms where indicated or, if not otherwise indicated, where directed by Architect/Engineer.
  - 1. Where more than one major machine room is shown for project, install mounted valve schedule in each major machine room, and repeat only main valves which are to be operated in conjunction with operations of more than single machine room.

**3.04 MECHANICAL EQUIPMENT IDENTIFICATION**

- A. Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:
  - 1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.

**3.05 ADJUSTING & CLEANING**

- A. Adjusting: Relocate any mechanical identification device which has become visually blocked by work of this Division or other divisions.
- B. Cleaning: Clean face of identification devices and glass frames of valve charts.

**3.06 EXTRA STOCK**

- A. Furnish minimum of 5% extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.
  - 1. Where stenciled markers are provided, clean and retain stencils after completion of stenciling and include used stencils in extra stock, along with required stock of stenciling paints and applicators.

**END OF SECTION**

**SECTION 22 07 00 - PLUMBING INSULATION****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 05 01 - General Plumbing Requirements
- B. 22 05 29 - Hangers & Supports for Plumbing Piping & Equipment
- C. 22 05 53 - Identification for Plumbing Piping & Equipment
- D. 22 11 16 - Domestic Water Piping

**1.02 DESCRIPTION OF WORK**

- A. Furnish and install insulation as indicated on drawings and schedules and by requirements of this Section.
- B. Types of mechanical insulation specified in this Section include the following:
  - 1. Piping System Insulation:
    - a. Fiberglass.

**1.03 QUALITY ASSURANCE**

- A. Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E84 (NFPA 255) method. In addition, the products, when tested, shall not drip flame particles; and flame shall not be progressive.

**1.04 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, k-value, thickness and furnished accessories for each mechanical system requiring insulation. Also furnish necessary test data certified by an independent testing laboratory.
- B. Maintenance Data: Submit maintenance data and replacement material lists for each type of mechanical insulation. Include this data and product data in maintenance manual.

**1.05 DELIVERY, STORAGE & HANDLING**

- A. Deliver insulation, coverings, cements, adhesives and coatings to site in containers with manufacturer's stamp or label, affixed showing fire hazard indexes of products.
- B. Protect insulation against dirt, water and chemical and mechanical damage. Do not install damaged or wet insulation; remove from project site.

**PART 2 - PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

- A. Armstrong World Industries, Inc.; CertainTeed Corp.; Knauf; Manville Products Corp.; Owens-Corning Fiberglass Corp.; Pittsburgh Corning Corp.; Plumberex.

**2.02 PIPING INSULATION MATERIALS**

- A. Fiberglass Piping Insulation: ASTM C547, Class 1, unless otherwise indicated.



- B. Jackets for Piping Insulation: ASTM C921, Type I, for piping with temperatures below ambient; Type II, for piping with temperatures above ambient. Type I may be used for all piping at Installer's option.
  - 1. Encase pipe and pipe fittings insulation in mechanical room and as indicated with one-piece premolded PVC jacket, fitting covers, fastened as per manufacturer's recommendations.
- C. Staples, Bands, Wires and Cement: As recommended by insulation manufacturer for applications indicated.
- D. Adhesives, Sealers and Protective Finishes: As recommended by insulation manufacturer for applications indicated.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Examine areas and conditions under which mechanical insulation is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### **3.02 PLUMBING PIPING SYSTEM INSULATION**

- A. Insulation Omitted: Omit insulation on chrome-plated exposed piping (except for handicapped fixtures), air chambers, unions, strainers, check valves, balance cocks, flow regulators, drain lines from water coolers, drainage piping located in crawl spaces or tunnels, buried piping, fire protection piping, and preinsulated equipment.
- B. Cold Piping:
  - 1. Application Requirements: Insulate the following cold plumbing piping systems:
    - a. Potable cold water piping.
    - b. Plumbing vents within 6 lineal feet of roof outlet.
  - 2. Insulate each piping system specified above with one of the following types and thicknesses of insulation:
    - a. Fiberglass: Minimum R4.
- C. Hot Piping:
  - 1. Application Requirements: Insulate the following hot plumbing piping systems:
    - a. Potable hot water piping.
  - 2. Insulate each piping system specified above with one of the following types and thicknesses of insulation:
    - a. Fiberglass: Minimum R4.

#### **3.03 INSTALLATION OF PIPING INSULATION**

- A. Install insulation products in accordance with manufacturer's written instructions and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.
- B. Install insulation on pipe systems subsequent to installation of heat tracing, painting, testing and

acceptance of tests.

- C. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other.
- D. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.
- E. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage.
- F. Cover valves, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job fabricated units (at Installer's option) except where specific form or type is indicated.
- G. Extend piping insulation without interruption through walls, floors and similar piping penetrations except where otherwise indicated.
- H. Butt pipe insulation against pipe hanger insulation inserts. For hot pipes, apply 3" wide vapor-barrier tape or band over the butt joints. For cold piping apply wet coat of vapor-barrier lap cement on butt joints and seal joints with 3" wide vapor-barrier tape or band.

#### **3.04 EXISTING INSULATION REPAIR**

- A. Repair damaged sections of existing mechanical insulation, both previously damaged or damaged during this construction period. Use insulation of same thickness as existing insulation, install new jacket lapping and sealed over existing.

#### **3.05 PROTECTION & REPLACEMENT**

- A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- B. Protection: Insulation Installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

**END OF SECTION**

**SECTION 22 11 16 - DOMESTIC WATER PIPING****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 05 01 - General Plumbing Requirements
- B. 22 05 23 - General Duty Valves for Plumbing
- C. 22 05 29 - Hangers & Supports for Plumbing Piping & Equipment
- D. 22 05 53 - Identification for Plumbing Piping & Equipment
- E. 22 07 00 - Plumbing Insulation
- F. 22 11 19 - Domestic Water Piping Specialties

**1.02 DESCRIPTION OF WORK**

- A. Furnish and install domestic water system as indicated on drawings and schedules and by requirements of this Section.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of potable water system products, of types, materials and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Firm with at least 5 years of successful installation experience on projects with potable water systems work similar to that required for project.
  - 1. To assure uniformity and compatibility of piping components in grooved piping systems, all grooved products utilized shall be supplied by a single manufacturer. Grooving tools shall be supplied from the same manufacturer as the grooved components.
- C. Plumbing Code Compliance: Comply with applicable portions of State Plumbing Code pertaining to selection and installation of plumbing materials and products.
- D. Water Purveyor Compliance: Comply with requirements of Purveyor supplying water to project, obtain required permits and inspections.

**1.04 SUBMITTALS**

- A. Record Drawings: At project closeout, submit record drawings of installed potable water systems piping and piping products.
  - 1. Grooved joint couplings and fittings shall be shown on drawings and product submittals and shall be specifically identified with the applicable Victaulic style or series number.
- B. Maintenance Data: Submit maintenance data and parts lists for potable water systems materials and products. Include this data, product data, shop drawings and record drawings in maintenance manual.

**PART 2 - PRODUCTS****2.01 MATERIALS & PRODUCTS**

- A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products

complying with State Plumbing Code where applicable. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in potable water systems. Where more than one type of materials or products are indicated, selection is Installer's option.

- B. No copper press fittings, similar to ProPress, will be allowed.

## **2.02 BASIC PIPES & PIPE FITTINGS (DOMESTIC WATER)**

### A. Interior Water Piping:

1. All Sizes: Copper tube; Type L, hard-drawn temper; wrought-copper fittings, lead-free solder joints.
2. 1/2" to 1-1/2": Cross-linked polyethylene (PEX) and appropriate fittings in locations shown on plans; ASTM F876.

## **PART 3 - EXECUTION**

### **3.01 INSPECTION**

- A. Examine areas and conditions under which potable water systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

### **3.02 INSTALLATION OF POTABLE WATER DISTRIBUTION PIPING**

- A. Install piping with 1/32" per foot (1/4%) downward slope towards drain point.
- B. Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.

### **3.03 EQUIPMENT CONNECTIONS**

- A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated but in no case smaller than required by State Plumbing Code.
- B. Mechanical Equipment Connections: Connect hot and cold water piping system to mechanical equipment as indicated and comply with equipment manufacturer's installation instructions. Provide shutoff valve and union for each connection, provide drain valve on drain connection.

### **3.04 PIPING TESTS**

- A. Domestic: Test potable water piping in accordance with Minnesota State Plumbing Code, MN Rules Part 4715.2820.

### **3.05 ADJUSTING & CLEANING**

- A. Cleaning, Flushing and Inspecting: Clean, flush and inspect potable water systems.
- B. Disinfection: Disinfect potable water system in accordance with State Plumbing Code.

**END OF SECTION**

**SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 05 01 - General Plumbing Requirements
- B. 22 05 23 - General Duty Valves for Plumbing
- C. 22 07 00 - Plumbing Insulation
- D. 22 11 16 - Domestic Water Piping
- E. 22 40 00 - Plumbing Fixtures

**1.02 DESCRIPTION OF WORK**

- A. Types of piping specialties specified in this Section include the following:
  - 1. Escutcheons.
  - 2. Strainers.

**1.03 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings, including installation instructions, and dimensioned drawings for each type of manufactured piping specialty. Include pressure drop curve or chart for each type and size of pipeline strainer. Submit schedule showing manufacturer's figure number, size, location and features for each required piping specialty.
- B. Maintenance Data: Submit maintenance data and spare parts lists for each type of manufactured piping specialty. Include this data, product data and shop drawings in maintenance manual.

**PART 2 - PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS OR PRIOR APPROVED EQUAL**

- A. Escutcheons - Bridgeport, Dearborn Brass, Grinnell
- B. Strainers - Armstrong, Keckley, Spirax Sarco, Victaulic, Watts Regulator
- C. Unions - Grinnell, Mueller

**2.02 PIPING SPECIALTIES**

- A. Provide factory-fabricated piping specialties recommended by manufacturer for use in service indicated. Provide piping specialties of types and pressure ratings indicated for each service, or if not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes as indicated, and connections, which properly mate with pipe, tube and equipment connections. Where more than one type is indicated, selection is Installer's option.

**2.03 PIPE ESCUTCHEONS**

- A. Provide pipe escutcheons as specified herein with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls or ceilings; and pipe sleeve extension, if any. Furnish pipe escutcheons with nickel or chrome finish for occupied areas, prime paint finish for unoccupied areas.
- B. Pipe Escutcheons for Moist Areas: For waterproof floors, and areas where water and condensation can

be expected to accumulate, provide cast brass or sheet brass escutcheons, solid or split hinged.

- C. Pipe Escutcheons for Dry Areas: Provide sheet steel escutcheons, solid or split hinged.

#### **2.04 LOW PRESSURE Y-TYPE PIPELINE STRAINERS**

- A. Provide strainers full line size of connecting piping, with ends matching piping system materials. Select strainers for 125 psi working pressure, with Type 304 stainless steel screens, with 3/64" perforations at 233 per sq.in. Water service 1/4" thru 2", 20 mesh. Water service 2-1/2" thru 4", 1/16 perforations. Water service 5" thru 18", 1/8" performances. Steam service 1/4" thru 2", 30 mesh. Steam service 2-1/2" thru 10", 3/64" performances. Steam service 12" thru 18", 30 mesh lined.
- B. Threaded Ends, 2" and Smaller: Cast-iron body, screwed screen retainer with centered blowdown fitted with pipe plug.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION OF PIPING SPECIALTIES**

- A. Pipe Escutcheons: Install pipe escutcheons on each pipe penetration thru floors, walls, partitions and ceilings where penetration is exposed to view; and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole, and is flush with adjoining surface.
- B. Y-Type Strainers: Install Y-type strainers full size of pipeline, in accordance with manufacturer's installation instructions. Install pipe nipple and shutoff valve in strainer blowdown connection, full size of connection, except for strainers 2" and smaller installed ahead of control valves feeding individual terminals. Where indicated, provide drain line from shutoff valve to plumbing drain, full size of blowdown connection.
1. Location Y-type strainers in supply line ahead of the following equipment and elsewhere as indicated, if integral strainer is not included in equipment:
    - a. Pumps.

**END OF SECTION**

**SECTION 22 13 16 - SANITARY WASTE & VENT PIPING****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 05 01 - General Plumbing Requirements
- B. 22 05 23 - General Duty Valves for Plumbing
- C. 22 05 29 - Hangers & Supports for Plumbing Piping & Equipment
- D. 22 13 19 - Sanitary Waste Piping Specialties
- E. 22 42 00 - Plumbing Fixtures

**1.02 DESCRIPTION OF WORK**

- A. Install soil and waste systems work as indicated on drawings and schedules and by requirements of this Section.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of soil and waste system products of types, materials and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Firm with at least 5 years of successful installation experience on projects with soil and waste system work similar to that required for project.
- C. Plumbing Code Compliance: Comply with applicable portions of State Code pertaining to plumbing materials construction and installation of products.

**1.04 SUBMITTALS**

- A. Record Drawings: At project closeout, submit record drawings of installed soil and waste systems.
- B. Maintenance Data: Submit maintenance data and parts lists for soil and waste system materials and products. Include this data and record drawings in maintenance manual.

**PART 2 - PRODUCTS****2.01 MATERIALS & PRODUCTS**

- A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in soil and waste systems. Where more than one type of materials or products is indicated, selection is Installer's option.

**2.02 BASIC PIPES & PIPE FITTINGS**

- A. Above Ground Soil, Waste and Vent Piping:
  - 1. Tube Size 8" and Smaller: Copper tube; Type DWV; cast-bronze fittings, drainage pattern, solder joint.
  - 2. Pipe Size 15" and Smaller: Cast-iron, hub-and-spigot soil pipe; service weight; cast-iron, hub-and-spigot soil pipe fittings, compression gasket joints.
  - 3. Pipe Size 15" and Smaller: Hubless cast-iron soil pipe; service weight; hubless cast-iron soil pipe

fittings, hubless joints.

4. Pipe Size 8" and Smaller: Polyvinyl chloride plastic pipe (PVC); Type DWV; PVC plastic type DWV socket-type fittings, solvent cement joints with contrasting color primer; not to exceed 35'0" vertically and/or horizontally; provide approved expansion joint in vertical runs.

**B. Underground Building Drain Piping:**

1. Pipe Size 15" and Smaller: Cast-iron, hub-and-spigot soil pipe; service weight; cast-iron, hub-and-spigot soil pipe fittings, compression gasket joints.
2. Pipe Size 15" and Smaller: Hubless cast-iron soil pipe; service weight; hubless cast-iron soil pipe fittings, hubless joints.
3. Pipe Size 8" and Smaller: Polyvinyl chloride soil and waste pipe (PVC); Schedule 40; PVC soil and waste pipe fittings, solvent cement joints with contrasting color primer, ASTM D2665, D2949 or F891.

**PART 3 - EXECUTION**

**3.01 INSPECTION**

- A. Examine substrates and conditions under which soil and waste systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

**3.02 INSTALLATION OF ABOVE GROUND PIPING**

- A. Install soil and waste piping in accordance with State Plumbing Code.

**3.03 INSTALLATION OF BUILDING DRAIN PIPING**

- A. Install underground building drains as indicated and in accordance with State Plumbing Code. Lay underground building drains beginning at low point of system, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install required gaskets in accordance with manufacturer's recommendations for use of lubricants, cements and other special installation requirements. Clean interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed. Place plugs in ends of uncompleted piping at end of day or whenever work stops.
- B. Install soil and vent piping pitched to drain at minimum slope of 1/4" per foot (2%). Where first approved by the Authority Having Jurisdiction; and where it is impractical due to the depth of street sewer, to the structural features, or to the arrangement of a building or structure to obtain a slope of 1/4" per foot (2%), the following will be permitted:
  1. Piping 4" and larger: not less than 1/8" per foot slope (1%).
- C. Install insulation over underground building drain piping not under building as per detail on drawings.

**3.04 EQUIPMENT CONNECTIONS**

- A. Piping Runouts to Fixtures: Provide soil and waste piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated; but in no case smaller than required by State Plumbing Code.
- B. Locate piping runouts as close as possible to bottom of floor slab supporting fixtures or drains.

**3.05 FIELD QUALITY CONTROL**



- A. Piping Tests: Test soil and waste systems in accordance with requirements of State Plumbing Code.

**3.06 ADJUSTING & CLEANING**

- A. Clean, flush and inspect soil and waste piping in accordance with State Plumbing Code.

**3.07 PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with construction materials and debris and to prevent damage from traffic and construction work.

**END OF SECTION**

**SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 05 01 - General Plumbing Requirements
- B. 22 05 29 - Hangers & Supports for Plumbing Piping & Equipment
- C. 22 07 00 - Plumbing Insulation
- D. 22 42 00 - Plumbing Fixtures

**1.02 DESCRIPTION OF WORK**

- A. Install soil and waste piping specialties as indicated on drawings and schedules and by requirements of this Section.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of soil and waste system products of types, materials and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Firm with at least 5 years of successful installation experience on projects with soil and waste system work similar to that required for project.
- C. Plumbing Code Compliance: Comply with applicable portions of State Code pertaining to plumbing materials construction and installation of products.

**1.04 SUBMITTALS**

- A. Record Drawings: At project closeout, submit record drawings of installed soil and waste systems.
- B. Maintenance Data: Submit maintenance data and parts lists for soil and waste system materials and products. Include this data, product data, shop drawings and record drawings in maintenance manual.

**PART 2 - PRODUCTS****2.01 MATERIALS & PRODUCTS**

- A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in soil and waste systems. Where more than one type of materials or products is indicated, selection is Installer's option.

**2.02 ACCEPTABLE MANUFACTURERS**

- A. Frostproof Vent Caps - F.M. Moore
- B. Cleanouts - Josam, J.R. Smith, MIFAB, Watts, Wade, Zurn, Hydromechanics
- C. Floor Drains - Josam, J.R. Smith, MIFAB, Watts, Wade, Zurn, Hydromechanics

**2.03 FROSTPROOF VENT CAPS**

- A. Provide frostproof vent cap with 1" air space between outside of vent pipe and inside of flashing collar

extension. Construct of galvanized iron, copper or lead-coated copper.

#### **2.04 CLEANOUTS**

- A. Provide factory-fabricated drainage piping products of size and type indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and governing regulations.
- B. Cleanout Plugs: Cast bronze or brass, threads complying with ANSI B2.1, countersunk head.
- C. Floor Cleanouts: Cast-iron body and frame; cleanout plug; adjustable round top as follows:
  - 1. Nickel-Bronze Top: Manufacturer's standard cast unit of the pattern indicated:
    - a. Pattern: Exposed rim type with recess to receive 1/8" thick resilient floor finish.
    - b. Pattern: Exposed rim type with recess to receive 1" thick terrazzo floor finish.
    - c. Pattern: Exposed finish type, standard mill finish.
    - d. Pattern: Exposed flush type, standard non-slip scored or abrasive finish.
  - 2. Cast-Iron Top: Manufacturer's standard cast unit of the pattern indicated:
    - a. Pattern: Exposed flush type, standard mill finish.
    - b. Pattern: Exposed flush type, standard non-slip scored or abrasive finish.
- D. Wall Cleanouts: Cast-iron body adaptable to pipe with cast-bronze or brass cleanout plug; stainless steel cover including screws.

#### **2.05 FLOOR DRAINS**

- A. Provide floor drains of size as indicated on drawings; and type, including features, as specified herein.
- B. Samples manufacturer and model numbers given for clarity.
- C. Bodies: Independent trap cast-iron, adjustable strainer, drainage flange with weep holes. Provide clamping device for membrane floors. Provide 16 oz. copper or EPDM liner above ground floor. Wade W-1100. Provide sediment bucket in floor-mounted receptors ("P-5" designations).

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Examine substrates and conditions under which soil and waste systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### **3.02 INSTALLATION OF FROSTPROOF CAPS**

- A. Install frostproof vent caps on each vent pipe passing through roof and elsewhere where indicated. Maintain 1" clearance between vent pipe and roof substrate.

#### **3.03 INSTALLATION OF CLEANOUTS**

- A. Install in above ground piping and building drain piping as indicated, as required by State Plumbing Code; and at each change in direction of piping greater than 45°, at minimum intervals of 50' for piping 4" and smaller and 100' for larger piping, and at base of each vertical soil or waste stack. Install floor and wall cleanout covers for concealed piping, select type to match adjacent building finish.

**3.04 INSTALLATION OF FLOOR DRAINS**

- A. Install floor drains in accordance with manufacturer's written instructions and in locations indicated.
- B. Coordinate flashing work with work of waterproofing and adjoining substrate work.
- C. Coordinate with soil and waste piping as necessary to interface floor drains with drainage piping systems.
- D. Install floor drains at low points of surface areas to be drained or as indicated. Set tops of drains flush with finished floor.
- E. Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes, where penetrated.
- F. Position drains so that they are accessible and easy to maintain.
- G. All outlets shall be installed at the bottom of the trench.

**3.05 EQUIPMENT CONNECTIONS**

- A. Piping Runouts to Fixtures: Provide soil and waste piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated; but in no case smaller than required by State Plumbing Code.
- B. Locate piping runouts as close as possible to bottom of floor slab supporting fixtures or drains.

**3.06 FIELD QUALITY CONTROL**

- A. Piping Tests: Test soil and waste systems in accordance with requirements of State Plumbing Code.

**3.07 ADJUSTING & CLEANING**

- A. Clean, flush and inspect soil and waste piping in accordance with State Plumbing Code.

**3.08 PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with construction materials and debris and to prevent damage from traffic and construction work.

**END OF SECTION**

**SECTION 22 42 00 - PLUMBING FIXTURES****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 22 05 01 - General Plumbing Requirements
- B. 22 05 23 - General Duty Valves for Plumbing
- C. 22 05 29 - Hangers & Supports for Plumbing Piping & Equipment
- D. 22 05 53 - Identification for Plumbing Piping & Equipment
- E. 22 11 16 - Domestic Water Piping
- F. 22 11 19 - Domestic Water Piping Specialties

**1.02 SCOPE OF WORK**

- A. Install plumbing fixtures as indicated on drawings and schedules and requirements of this Section.
- B. Types of plumbing fixtures specified in this Section include the following: lavatories, urinals, water closets.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of plumbing fixtures of type, style and configuration required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Plumbing Fixture Standards: Comply with applicable portions of State Plumbing Code pertaining to materials and installation of plumbing fixtures.

**1.04 SUBMITTALS**

- A. Shop Drawings: Submit manufacturer's assembly-type shop drawings indicating dimensions, roughing-in requirements, required clearances and methods of assembly of components and anchorages.
- B. Maintenance Data: Submit maintenance data and parts lists for each type of plumbing fixture and accessory; including "troubleshooting" maintenance guide. Include this data, product data and shop drawings in maintenance manual.

**1.05 DELIVERY, STORAGE & HANDLING**

- A. Deliver plumbing fixtures individually wrapped in factory-fabricated containers.
- B. Handle plumbing fixtures carefully to prevent breakage, chipping and scoring fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.

**PART 2 – PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

- A. Plumbing Fixtures: American Standard; Crane Co.; Kohler; Sloan; Zurn
- B. Plumbing Trim: American Standard; Brasscraft; Chicago Faucet; Delta Faucet; Keeney; Kohler Co.; Mifab; Moen Faucets; Speakman; Symmons; T & S Brass; Watts Drainage; Zurn
- C. Fixture Seats: American Standard; Bemis Mfg. Co.; Church Products; Kohler; Olsonite Corp.; Olsonite Seats

- D. Faucets: American Standard; Chicago Faucet; Delta; Kohler; Moen; Sloan; Speakman; T&S Brass; Zurn
- E. Trap Wraps: Brocar; Plumberex; Truebro
- F. Fixture Carriers: Jay R. Smith; Josam Mfg. Co.; Mifab; Wade; Watts Drainage; Zurn Industries, Inc.
- G. Mixing Valves: Acorn; Bradley; Lawler; Leonard; Powers; Zurn.

## 2.02 PLUMBING FIXTURES

- A. Provide factory-fabricated fixtures of type, style and material indicated. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats and valves as indicated by their published product information; either as designed and constructed, or as recommended by manufacturer, and as required for complete installation. Where more than one type is indicated, selection is Installer's option; but, all fixtures of same type must be furnished by single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

## 2.03 MATERIALS

- A. Unless otherwise specified, comply with applicable Federal Specification WW-P-541/Series sections pertaining to plumbing fixtures, fittings, trim, metals and finishes. Comply with requirements of WW-P-541/specification relative to quality of ware, glazing, enamel, composition and finish of metals, air gaps and vacuum breakers, even though some plumbing fixtures specified in this Section are not described in WW-P-541.
- B. Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, foundry sand holes, stains, decoloration or other surface imperfections on finished units are not acceptable.
- C. Where fittings, trim and accessories are exposed or semi-exposed, provide bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.
- D. Vitreous China: High quality, free from fire cracks, spots, blisters, pinholes and specks; glaze exposed surfaces, and test for crazing resistance in accordance with ASTM C554.
- E. Fiberglass: ANSI Z124, smooth surfaced, with color selected by Architect/Engineer.

## 2.04 PLUMBING FIXTURES, TRIM & ACCESSORIES

- A. Water Outlets: At locations where water is supplied, provide commercial quality faucets, valves or dispensing devices, of type and size indicated, and as required to operate as indicated. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shutdown of water supply piping systems.
  - 1. Vacuum Breakers: Provide with flush valves where required by governing regulations, including locations where water outlets are equipped for hose attachment.
- B. Mixing Valves: Provide temperature limiting mixing valve to service public-use lavatories and hand washing sinks. Temperature to be limited to 110°F by device that is ASSE 1070 approved. Valve shall have high-limit stop with automatic reset. Bronze construction with integral backflow checks.
- C. P-Traps: Include removable P-traps where drains are indicated for direct connection to drainage system.
- D. Carriers: Provide cast-iron supports for fixtures of either graphitic gray iron, ductile iron or malleable iron as indicated.

- E. Fixture Bolt Caps: Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.
- F. Escutcheons: Where fixture supplies and drains penetrate walls in exposed locations, provide chrome-plated cast-brass escutcheons with set screw.
- G. Aerators: Provide aerators of types approved by Health Department having jurisdiction.
- H. Stops shall be keyed type, 1/4 turn ball valve style. Supply one key for every four fixtures, but not less than two.
- I. Comply with additional fixture requirements contained in fixture schedule attached to this Section.
- J. Fixture Schedule: Sample manufacturer given with required options.

P-1 Wall-Hung Water Closet: American Standard " Glenwall" #3402.016 bowl and #4098.700 tank and tank cover with locking device. Vitreous china, elongated, pressure-assisted siphon jet action. Provide Olsonite #95 solid white plastic seat with open front and no cover, angle supply and stop. Mount at 17" on chair carrier.

P-2 Wall-Hung Lavatory: American Standard "Lucerne" #0355.012, 20" x 18" vitreous china lavatory with front overflow. Delta # 87T111 single-hole mount lever handle metering faucet with thermostatic mixing valve and 0.5 GPM vandal-resistant aerator. Provide angle supplies, stops, grid drain, 1-1/2" adjustable "P" trap with cleanout, waste to wall and lavatory carrier. Provide Truebro #2018 Rigid high-impact, stain resistant, rigid PVC lavatory enclosure to match lavatory provided. Provide temperature limiting device.

P-3 Wall-Hung Urinal: American Standard "Trimbrook" #6561.017, vitreous china, siphon jet and 3/4" inlet spud. Sloan "Royal" #186-1, 3/4" top spud.

## **PART 3 - EXECUTION**

### **3.01 INSPECTION**

- A. Examine roughing-in work of potable water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

### **3.02 INSTALLATION OF PLUMBING FIXTURES**

- A. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of State Plumbing Code pertaining to installation of plumbing fixtures.
- B. Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid and not subject to pull or push movement.
- C. Protect installed fixtures from damage during remainder of construction period.

### **3.03 FIELD QUALITY CONTROL**

- A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures

to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

- B. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect/Engineer. Remove cracked or dented units and replace with new units.

### **3.04 ADJUSTING & CLEANING**

- A. Clean plumbing fixtures, trim and strainers of dirt and debris upon completion of installation.
- B. Adjust water pressure at faucets, shower valves and flush valves to provide proper flow stream and specified gpm.
- C. Adjust or replace washers to prevent leaks at faucets and stops.

### **3.05 EXTRA STOCK**

- A. Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim. Furnish one device for every 10 units.

**END OF SECTION**



**SECTION 23 05 01 - GENERAL MECHANICAL REQUIREMENTS****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. This Section pertains to all work under Divisions 21, 22, 23 and 25 and applicable provisions of Division 01.
- B. The methods and materials described within this Section are basic to the entire project and shall be considered as minimum requirements for all sections unless specifically stated otherwise.

**1.02 SCOPE OF WORK**

- A. The work to be done under this specification includes the furnishing of all labor, materials, equipment and services necessary for the proper completion of all mechanical work. The omission of express reference to any parts necessary for or reasonably incidental to the complete installation shall not be construed as releasing the Contractor from furnishing such parts. All material and equipment shall be new and undamaged.

**1.03 CODES, REGULATIONS & STANDARDS**

- A. All work under this Division shall be in strict conformance with the applicable parts of the following codes, laws, rules, regulations and applicable standards of technical societies where referenced hereinafter. References to standards, codes, regulations, etc., shall mean the latest edition of such publications adopted and published at date of the invitation to submit proposals.

Americans with Disabilities Act  
American National Standard Institute (ANSI)  
National Electric Code (NEC)  
National Fire Protection Association (NFPA)  
Local Utilities Regulations  
Local Codes, Rules and Regulations  
Standards of the American Society of Testing Materials (ASTM)  
American Gas Association (AGA)  
Occupational Safety and Health Act (OSHA)  
International Building Code  
State Plumbing Code  
International Mechanical Code, Minnesota Amendments  
Wisconsin Enrolled Business Code  
State Energy Code  
Underwriters' Laboratories

**1.04 INSPECTION OF SITE**

- A. The Contractor is urged to examine the site and familiarize himself with existing conditions on the premises and surrounding area. No extras will be authorized because of the Contractor's misunderstanding as to work required in order to comply with these plans and specifications, or his lack of knowledge of conditions in connection with the work. Information received by the Contractor from telephone conversations shall not be construed as relieving the Contractor from actually visiting the site and making his own analysis of conditions.

**1.05 RECORD DOCUMENTS**

- A. Refer to the Division 01 70 00 Section: PROJECT CLOSEOUT for requirements. The following paragraphs supplement the requirements of Division 01.

- B. Mark drawings to indicate revisions to piping and ductwork, size and location both exterior and interior; including locations of coils, dampers and other control devices, filters, boxes, and similar units requiring periodic maintenance or repair; actual equipment locations, dimensioned for column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned to column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.
- C. Mark specifications to indicate approved substitutions; Change Orders; actual equipment and materials used.

#### **1.06 WORKMANSHIP**

- A. All work shall be installed and completed by workmen skilled in their trade and shall be installed in a practical and efficient workmanlike manner and in strict accordance with the best practice of the trade.

#### **1.07 MECHANICAL SUBMITTALS**

- A. Refer to the Instructions To Bidders, Conditions of the Contract (General and Supplementary) and Division 01 33 00 Section: SUBMITTALS for submittal definitions, requirements and procedures.
- B. Refer to Division 21, 22, 23 and 25 sections for submittal requirements.
- C. The approval of the submittals is general and does not relieve the Contractor from the responsibility for adherence to the specifications, nor shall it relieve him of the responsibility for any error which may exist. Dimensions and quantities are the responsibility of the Contractor.

#### **1.08 MANUFACTURER'S DIRECTIONS**

- A. Materials and equipment shall be installed in accordance with the manufacturer's directions unless specifically designated herein.

#### **1.09 ACCESSIBILITY**

- A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.
- B. Extend all grease fittings to an accessible location.

#### **1.10 ROUGH-IN**

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected. Refer to equipment specifications for rough-in requirements.

#### **1.11 MECHANICAL INSTALLATIONS**

- A. Coordinate mechanical equipment and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots and openings in other building components to allow for mechanical installations.

- D. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components as they are constructed.
- E. Sequence, coordinate and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.
- F. Coordinate the cutting and patching of building components to accommodate the installation of mechanical equipment and materials.
- G. Where mounting heights are not detailed or dimensioned, install mechanical services and overhead equipment to provide the maximum headroom possible.
- H. Install mechanical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- I. Coordinate the installation of mechanical materials and equipment above ceilings with suspension system, light fixtures and other installations.
- J. Coordinate connection of mechanical systems with exterior underground services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

#### **1.12 NAMEPLATE DATA**

- A. Provide permanent operational data nameplate on each item of power-operated mechanical equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data. Locate nameplates in an accessible location.

#### **1.13 OPERATION & MAINTENANCE DATA**

- A. Refer to the Division 01 33 00 Section: SUBMITTALS for procedures and requirements for preparation and submittal of maintenance manuals.
- B. In addition to the information required by Division 01 for maintenance data, include the following information:
  - 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests and complete nomenclature and commercial numbers of all replaceable parts.
  - 2. Manufacturer's printed operating procedures to include startup, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown and emergency instructions; and summer and winter operating instructions.
  - 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair and reassembly; aligning and adjusting instructions.
  - 4. Servicing instructions and lubrication charts and schedules.

#### **1.14 WARRANTIES**

- A. Refer to the Division 01 33 00 Section: SUBMITTALS for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.

- B. Compile and assemble the warranties specified in Divisions 21, 22, 23 and 25, into a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.
- C. Provide complete warranty information for each item to include product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses and telephone numbers and procedures for filing a claim and obtaining warranty services.

#### **1.15 CLEANING**

- A. Refer to the Division 01 11 00 Section: SUMMARY OF THE WORK for general requirements for final cleaning.
- B. Refer to Division 23 05 93 Section: TESTING, ADJUSTING AND BALANCING for requirements for cleaning filters, strainers and mechanical systems prior to final acceptance.

#### **1.16 PROJECT CLOSEOUT**

- A. Refer to the Division 01 70 00 Section: PROJECT CLOSEOUT for procedures and requirements for project closeout.

#### **1.17 EXISTING CONDITIONS & SERVICES**

- A. When encountered in work, protect, brace, support existing active services included but not restricted to sewers, gas, electric and other systems where required for proper execution of work. If existing active services are encountered that require relocation, make request in writing for determination. Do not proceed with work until written directions are received. Do not prevent or disturb operation of active services that are to remain.
- B. When encountered in work, remove, cap or plug inactive services. Notify utility companies or municipal agencies having jurisdiction; protect or remove these services as directed.
- C. Where work makes temporary shutdown of services unavoidable, shut down at night, or at such times as approved by Engineer, which will cause least interference with established operating routine. Arrange to work continuously, including overtime, if required, to make necessary connections to existing work.

#### **1.18 PERMITS, LICENSES & FEES**

- A. The Contractor shall obtain and pay for all construction permits, notices, inspection fees, licenses, etc., necessary for the performance to the work included in this contract; and he shall observe any requirements stipulated thereon.

#### **1.19 FIRE & SAFETY PRECAUTIONS**

- A. Take all necessary precautions for safety of employees and public. Comply with applicable provisions of Federal, State and Local laws, ordinances and requirements. Erect and properly maintain necessary safeguards for said protection as required by conditions and progress of job and post danger signs warning against hazards of construction. All employees shall be notified of potentially hazardous materials according to "Right to Know" statutes.

#### **1.20 REFERENCES**

AFI	Air Filter Institute
AGA	American Gas Association
AIEE	American Institute of Electrical Engineers
ANSI	American National Standards Institute

ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
AWWA	American Water Works Association
CMA	Convactor Manufacturers Association
CSD	Commodity Standards Division, US Dept. of Commerce
HPACCNA	Heating, Piping and Air Conditioning Contractors National Association
IBR	Institute of Boiler and Radiator Manufacturers
IUHA	Industrial Unit Heater Association
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NAFM	National Association of Fan Underwriters
NBFU	National Board of Fire Underwriters
NEC	National Electric Code (NFPA Pamphlet #70)
NEMA	National Electric Manufacturers Association
SBI	Steel Boiler Institute
SMACNA	Sheetmetal and Air Conditioning Contractors National Association
UL	Underwriters' Laboratories, Inc.

### 1.21 ABBREVIATIONS

a-c	alternating current	ID	inside diameter
AFF	above finish floor	in or "	inch
AFG	above finish grade	ips	intermediate-pressure
amp	ampere	ips	iron pipe size
atm	atmospheric	kw	kilowatt
boiler hp	boiler horsepower	kw/hr	kilowatt/hour
bhp	brake horsepower	lb	pound
BTU	British thermal unit	lin ft / LF	linear foot
BTUH	BTU per hour	max	maximum
C	degree Centigrade	M&E	Mechanical and Electrical
cfm	cubic feet per minute	M&ER	M&E Requirements
c.i.	cast iron	MBH	thousand BTU/hour
c-p	chrome-plated	MCF	1000 cubic feet
cu in	cubic inch	min	minimum
cu ft/CF	cubic foot	m-p	medium-pressure
cu yd	cubic yard	o.a.	outside air
db	decibel	o.c.	center to center or on center
d-c	direct current	od / OD	outside diameter
deg	degree	os&y	outside screw & yoke
dia	diameter	oz	ounce
dif	diffuser	provide	to furnish and install
edr/EDR	equivalent direction radiation	prv	pressure reducing valve
exh	exhaust	psi	pounds/square inch
F	degree Fahrenheit	PVC	Polyvinyl Chloride
FD	Fire Department	R.A.	return air
FD	floor drain	RAG	return air grille
fpm	feet per minute	reg	register
F & T	float & thermostatic	rpm	revolutions/minute
ft or '	foot	sec	second
gal	gallon	sq ft	square foot
gph	gallons per hour	sq in	square inch
gpm	gallons per minute	sp	static pressure
Hg	Mercury	swp	steam working pressure
h-p	high-pressure	std	standard
hp	horsepower	tdh	total dynamic head
hr	hour		

Hs	sensible heat gain	temp wwp	temperature water working pressure
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### **1.22 FLOOR, WALL & CEILING ESCUTCHEON PLATES**

- A. Where uncovered exposed pipes pass through walls, floors or ceilings, they shall be fitted with wall, floor or ceiling plates. Wherever projecting sleeves occur, the plates shall have a raised hood design to cover the sleeve. Plates shall be set tight against wall or floor.

### **1.23 PROTECTIVE GUARDS**

- A. Provide guards to enclose belts, pulleys, sheaves, gears and couplings of galvanized expanded or perforated sheet steel with angle frame and angle or channel mounting supports. Make guard easily removable for access.

### **1.24 CUTTING & PATCHING**

- A. Each Contractor shall perform all cutting necessary to perform his work and shall patch damaged work. However, special permission shall be obtained from the Architect before cutting structural members or finished materials. All patching shall be performed in such manner as to leave no visible trace and to return the part affected to the condition of undisturbed work. Patch with similar material as existing. Paint to match. Exterior surfaces to be watertight.
- B. Provide dust barriers as needed to prevent the spreading of dust to adjoining areas.

### **1.25 DEMOLITION**

- A. When removing existing equipment as shown and as noted, including but not limited to fin-tube radiation, plumbing fixtures, ductwork, temperature controls, electrical wiring and any other demolition work; all piping, wiring, ductwork and any other connections shall be capped off below floors, under floors, inside walls or above ceilings. The floors, walls and/or ceilings shall be patched to match the existing conditions and finishes by the Mechanical Contractor.

### **1.26 PAINTING**

- A. Unless otherwise specified, all finished painting will be done by the General Contractor. This Contractor shall provide preservation and prime coats. This Contractor shall paint all hangers, straps, braces, supports and equipment requiring same installed by him immediately after installation.

### **1.27 ACCESS DOORS**

- A. Contractor shall coordinate locations and sizes. All access doors shall be by the General Contractor.

### **1.28 CORE DRILLING WALLS/FLOORS**

- A. Contractor shall provide all holes through walls, floors and ceilings necessary for the installation of new piping. All holes shall be core drilled and of sufficient size to allow the pipe to pass through the opening.
- B. All exposed pipes passing through these openings shall be covered with escutcheon plates on both sides unless the openings are sized for a snug fit around the pipe or the openings are reduced by using grout or other cement type closing materials approved by the Engineer. The grout shall be troweled smooth on both sides of the wall and primed for painting.

### **1.29 CLEANING**

- A. Upon completion of work, all rubbish must be cleared away; all fixtures, piping, hangers and trim shall be thoroughly cleaned and ready for use. All ventilating, air conditioning and terminal heating equipment enclosures shall be cleaned with a vacuum cleaner.

**END OF SECTION**

**SECTION 23 05 13 - MOTOR REQUIREMENTS FOR HVAC EQUIPMENT****PART 1 - GENERAL****1.01 DESCRIPTION OF WORK**

- A. This Section includes the electrical requirements for all motors, starters and disconnects furnished with mechanical HVAC equipment. See the Equipment Schedule and other sections of these specifications for specific sizes and electrical characteristics.

**1.02 QUALITY ASSURANCE**

- A. Coordination with Electrical Work: Wherever possible, match elements of electrical provisions of mechanical work with similar elements of electrical work specified in Division 16 sections. Comply with applicable requirements of Division 16 sections for electrical work of this Section which is not otherwise specified.
- B. Standards: For electrical equipment and products, comply with applicable NEMA standards and refer to NEMA standards for definitions of terminology herein. Comply with National Electrical Code (NFPA 70) for workmanship and installation requirements.

**PART 2 - PRODUCTS****2.01 MOTORS**

- A. Motor Characteristics: Except where more stringent requirements are indicated and except where required item of mechanical equipment cannot be obtained with fully complying motor, comply with the following requirements for motors of mechanical work:
- B. Temperature Rating: Rated for 40°C environment with maximum 50°C temperature rise for continuous duty at full load (Class A Insulation).
- C. Starting Capability: Provide each motor capable of making starts as frequently as indicated by automatic control system, and not less than five starts per hour for manually controlled motors.
- D. Phases and Current Characteristics: Coordinate current characteristics with power specified in Division 26 sections, and with individual equipment requirements specified in other Division 23 requirements. Do not purchase motors until power characteristics available at locations of motors have been confirmed, and until rotation directions have been confirmed.
- E. Service Factor: 1.15 for polyphase motors and 1.35 for single phase motors.
- F. Motor Construction: Provide general purpose, continuous duty motors, Design "B" except "C" where required for high starting torque.
1. Frames: NEMA #56.
  2. Bearings: Ball or roller bearings with inner and outer shaft seals, regreasable except permanently sealed where motor is normally inaccessible for regular maintenance. Where belt drives and other drives produce lateral or axial thrust in motor, provide bearings designed to resist thrust loading. Refer to individual sections of Division 15 for fractional-hp light-duty motors where sleeve-type bearings are permitted.
  3. Enclosure Type: Except as otherwise indicated, provide open dripproof motors for indoor use where satisfactorily housed or remotely located during operation, and provide guarded dripproof motors where exposed to contact by employees or building occupants. Provide weather-protected Type I for



outdoor use, Type II where not housed. Refer to individual sections of Division 15 for other enclosure requirements.

4. Overload Protection: Provide built-in thermal overload protection and, where indicated, provide internal sensing device suitable for signaling and stopping motor at starter.
  5. Noise Rating: Provide "Quiet" rating on motors.
  6. Efficiency: Where motors are indicated to be "Energy Efficient," provide motors having NEMA premium efficiency as scheduled in accordance with IEEE Standard 112, test method B.
  7. Power Factor - Equal to .95
- G. Nameplate: Provide metal nameplate on each motor, indicating full identification of manufacturer, ratings, characteristics, construction, special features and similar information.

## **2.02 STARTERS, ELECTRICAL DEVICES & WIRING**

- A. See the Equipment Schedule for requirements.
- B. All electrical items shall be UL listed.

## **2.03 EQUIPMENT FABRICATION**

- A. Fabricate mechanical equipment for secure mounting of motors and other electrical items included in work. Provide either permanent alignment of motors with equipment, or adjustable mounting as applicable for belt drives, gear drives, special couplings and similar indirect coupling of equipment. Provide safe, secure, durable and removable guards for motor drives, arranged for lubrication and similar running-maintenance without removal of guards.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. Install motors on motor mounting systems in accordance with motor manufacturer's instructions, securely anchored to resist torque, drive thrusts, and other external forces inherent in mechanical work. Secure sheaves and other drive units to motor shafts with keys and Allen set screws, except motors of 1/3 hp and less may be secured with Allen set screws on flat surface on shaft. Unless otherwise indicated, set motor shafts parallel with machine shafts.
- B. All electrical work subcontracted or performed by this Contractor shall comply with Division 26 requirements.

**END OF SECTION**

**SECTION 23 05 23 - VALVES FOR HVAC PIPING****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 53 - Identification for HVAC Piping & Equipment

**1.02 SCOPE OF WORK**

- A. Install valves as required by this Section as indicated on drawings and/or specified in this section.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of valves, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Valve Types: Provide valves of same type by same manufacturer.

**1.04 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings, including installation instructions for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valve schedule showing manufacturer's figure number, size, location and valve features for each required valve.
- B. Maintenance Data: Submit maintenance data and spare parts lists for each type of valve. Include this data, product data and shop drawings in maintenance manual.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Ball Valves - Apollo, Hammond, Milwaukee, Nibco, Victaulic, Watts Regulator
- B. Check Valves - Apollo, Milwaukee, Gruvlok, Hammond, Watts Regulator
- C. Drain Valves - Apollo, Chicago Faucet, Hammond, Nibco, Watts Regulator

**2.02 DRAIN VALVES**

- A. Class 125: Bronze body, screw-in bonnet, rising stem, composition disc, 3/4" hose outlet.

**2.03 BALL VALVES**

- A. All Sizes: 150 psi SWP, 600 psi WOG, bronze body, standard port, bronze trim, 2-piece construction, TFE seats and seals. Stainless steel trim and seats if used in steam applications.

**2.04 CHECK VALVES**

- A. 2" and Smaller: Class 125, bronze body, horizontal swing, regrinding type, Y-pattern, renewable disc.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. **General:** Except as otherwise indicated, comply with the following requirements:
  - 1. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
  - 2. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward from horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.
- B. **Insulation:** Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.
- C. **Mechanical Actuators:** Install mechanical actuators with chain operators where indicated. Extend chains to about 5' above floor and hook to clips to clear aisle passage.
- D. **Selection of Valve Ends (Pipe Connections):** Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections:
  - 1. **Tube Size 2" and Smaller:** Soldered-joint valves.
  - 2. **Pipe Size 2" and Smaller:** One of the following, at Installer's option: threaded valves, butt-welding valves, socket-welding valves, flanged valves, flangeless valves, single flanged valves.
- E. **Valve System:** Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of os&y valves.
- F. **Non-Metallic Disc:** Limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.
- G. **Renewable Seats:** Select and install valves with renewable seats, except where otherwise indicated.
- H. **Fluid Control:** Except as otherwise indicated, install gate and ball valves to comply with ANSI B31.9. When balancing is indicated, install calibrated circuit setters.
- I. **Installation of Check Valves:**
  - 1. **Swing Check Valves:** Install in horizontal position with hinge pin horizontally perpendicular to center line of pipe. Install for proper direction of flow.

### **3.02 ADJUSTING & CLEANING**

- A. **Valve Adjustment:** After piping systems have been tested and put into service, but before final testing, adjusting and balancing, inspect each valve for possible leaks. Adjust or replace packing to stop leaks, replace valve if leak persists.
- B. **Cleaning:** Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

**END OF SECTION**

**SECTION 23 05 29 - HANGERS & SUPPORTS FOR HVAC PIPING & EQUIPMENT****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 21 13 - Hydronic Piping
- C. 23 31 13 - Metal Ductwork
- D. 23 34 00 - HVAC Fans

**1.02 SCOPE OF WORK**

- A. Install hangers and supports required by this Section as indicated on drawings and/or specified in this section.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of supports and anchors, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

**1.04 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings, including installation instructions for each type of support and anchor.
- B. Maintenance Data: Submit maintenance data and parts lists for each type of support and anchor. Include this data, product data and shop drawings in maintenance manual.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Expansion Anchors - Hilti
- B. Hangers - B-Line, Anvil, Carpenter and Patterson
- C. Powder Drive Fasteners - Hilti
- D. Seals - Thunderline
- E. Saddles and Shields - Anvil, Pipe Shields

**2.02 EXPANSION ANCHORS**

- A. Anchors shall be stud or shell type. Stud type shall meet ASTM A108, ASTM B633 and FF-S-325. Shell type shall meet ASTM B633.

**2.03 HORIZONTAL-PIPING HANGERS & SUPPORTS**

- A. Except as otherwise indicated, provide factory-fabricated horizontal-piping hangers and supports complying with MSS SP-58, selected by Installer to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated

hangers and supports for copper-piping systems.

#### **2.04 HANGER-ROD ATTACHMENTS**

- A. Except as otherwise indicated, provide factory-fabricated hanger-rod attachments complying with MSS SP-58, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.

#### **2.05 BUILDING ATTACHMENTS**

- A. Except as otherwise indicated, provide factory-fabricated building attachments complying with MSS SP-58, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

#### **2.06 SADDLES & SHIELDS**

- A. Except as otherwise indicated, provide saddles or shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.
  - 1. Protection Saddles: MSS Type 39; fill interior voids with segments of insulation matching adjoining insulation.
  - 2. Protection Shields: MSS Type 40; of length recommended by manufacturer to prevent crushing of insulation.
  - 3. Thermal Hanger Shields: Constructed of 360° insert of high density, 100 psi, waterproofed calcium silicate, encased in 360° sheetmetal shield. Provide assembly of same thickness as adjoining insulation.

#### **2.07 SPRING HANGERS & SUPPORTS**

- A. Except as otherwise indicated, provide factory-fabricated spring hangers and supports complying with MSS SP-58, selected by Installer to suit piping system, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select spring hangers and supports to suit pipe size and loading.

#### **2.08 MISCELLANEOUS MATERIALS**

- A. Provide products complying with NEMA Std ML 1.
- B. Powder Driven Fasteners - Fasteners shall be plated in accordance with QQ-2-325-C.
- C. Seals - Where pipes pass through sleeves in walls below grade, provide a modular wall sleeve.
- D. Sleeves - Pipe sleeves shall be standard weight black steel.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Examine areas and conditions under which supports and anchors are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

**3.02 PREPARATION**

- A. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.

**3.03 INSTALLATION OF BUILDING ATTACHMENTS**

- A. Install building attachments at required locations within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional concentrated loads, including valves, flanges, guides, strainers, expansion joints and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

**3.04 INSTALLATION OF HANGERS & SUPPORTS**

- A. Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-69 and SP-89. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.
- B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.
- C. Support fire-water piping independently of other piping.
- D. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.
- E. Install powder-actuated drive-pin fasteners 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. Do not use in lightweight concrete slabs or in concrete slabs less than 4" (100mm) thick.
- F. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install according to fastener manufacturer's written instructions. Do not use in lightweight concrete slabs or in concrete slabs less than 4" (100mm) thick.
- G. Provisions for Movement:
  - 1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
  - 2. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
  - 3. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 Pressure Piping Codes are not exceeded.
- H. Insulated Piping: Comply with the following installation requirements:
  - 1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.

2. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields. For pipe 8" and over, install wood insulation saddles.
3. Saddles: Where insulation without vapor barrier is indicated, install protection saddles.

I. Horizontal Pipe Supports, Spacing and Loading, Saddle Length:

Pipe Size	Max. Span / Feet		Min. Rod Diameter	
	copper	steel*	copper	steel
Up to 3/4"	6	6	3/8	3/8
1"	6	8	3/8	3/8
1-1/4" to 2"	8	10	3/8	3/8
2-1/2" to 3"	9	10	1/2	1/2
4" to 5"		12		5/8
6"		12		3/4
8" to 12"		12		7/8

\*Denotes maximum span unless 10-foot lengths of pipe are used then 10-foot span allowed.  
Cut bolts, grind sharp edges and corners.

- J. Plastic pipe supported every 32".

**3.05 EQUIPMENT SUPPORTS**

- A. Concrete housekeeping bases will be provided by General Contractor. Furnish to Contractor scaled layouts of all required bases, with dimensions of bases and location to column center lines. Furnish templates, anchor bolts and accessories necessary for base construction.
- B. Provide structural steel stands to support equipment not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings. Provide factory-fabricated tank saddles for tanks mounted on steel stands.

**3.06 ADJUSTING & CLEANING**

- A. Hanger Adjustments: Adjust hangers so as to distribute loads equally on attachments.
- B. Support Adjustment: Provide grout under supports so as to bring piping and equipment to proper level and elevations.
- C. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

**END OF SECTION**

**SECTION 23 05 48 - VIBRATION & SEISMIC CONTROLS FOR HVAC PIPING & EQUIPMENT****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 21 13 - Hydronic Piping
- C. 23 34 00 - HVAC Fans

**1.02 SCOPE OF WORK**

- A. Install vibration isolation as required by this Section and as indicated on the drawings and schedules and/or specified in this section.

**1.03 QUALITY ASSURANCE**

- A. Product Qualification: Provide each type of vibration isolation unit produced by specialized manufacturer, with not less than 5 years of successful experience in production of units similar to those required for project.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Flexible Pipe Connectors - Gustin-Bacon, Matra-Flex, Minnesota Flexile, Twin City Hose
- B. Vibration Isolators - Aeroflex, Isolation Technology, Kinetics Noise Control, Mason, Thybar, Vibration Isolation

**2.02 ISOLATION MATERIALS & SUPPORT UNITS**

- A. Flexible Duct Connectors: Laminated flexible sheet of cotton duct and sheet elastomer (butyl, neoprene or vinyl), reinforced with steel wire mesh where required for strength to withstand duct pressure indicated. Form connectors with full-faced flanges and accordion bellows to perform as flexible isolation unit, and of manufacturer's standard length for each size unless otherwise indicated. Equip each unit with galvanized steel retaining rings for airtight connection with ductwork.
- B. Flexible Pipe Connectors:
  - 1. For non-ferrous piping, provide bronze hose covered with bronze wire braid with copper tube ends or bronze flanged ends, braze-welded to hose.
  - 2. For ferrous piping, provide stainless steel hose covered with stainless steel wire braid with NPT steel nipples or 150 psi ANSI flanges, welded to hose.
  - 3. Rubber Flexible Pipe Connectors: Provide of rubber and butyl construction with integral full-face duct and butyl flanges, internally steel wire reinforced, and furnished complete with steel retaining rings. Select with temperature and pressure ratings to suit intended service.

**PART 3 - EXECUTION****3.01 APPLICATIONS**

- A. Apply types of vibration isolation materials and units indicated at locations shown or scheduled. Selection is installer's option where more than one type is indicated.



- B. Flexible Duct Connectors: Install at the following ductwork connections:
  - 1. Connections with vibration isolation-mounted air handling equipment.
  - 2. Connections with fixed wall louvers for air intake and exhausts.
  - 3. Where ductwork, 1.0 sq.ft. and greater, changes directions in critical locations.
  
- C. Flexible Pipe Connectors: Install in piping systems at the following locations:
  - 1. Connections, 3/4" pipe size and larger, with vibration-isolation-mounted equipment.

### **3.02 INSTALLATION**

- A. Except as otherwise indicated, comply with manufacturer's instructions for installation and load application to vibration isolation materials and units. Adjust to ensure that units do not exceed rated operating deflections or bottom out under loading, and are not short-circuited by other contacts or bearing points. Remove space blocks and similar devices (if any) intended for temporary protection against overloading during installation.
  
- B. Anchor and attach units to substrate and equipment as required for secure operation and to prevent displacement by normal forces and as indicated.
  
- C. Adjust leveling devices as required to distribute loading uniformly onto isolators. Shim units as required where leveling devices cannot be used to distribute loading properly.
  
- D. Locate isolation hangers as near overhead support structure as possible.
  
- E. Weld riser isolator units in place as required to prevent displacement from loading and operations.
  
- F. Flexible Pipe Connectors: Install on equipment side of shutoff valves, horizontally and parallel to equipment shafts wherever possible.

**END OF SECTION**

**SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING & EQUIPMENT****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 23 - Valves for HVAC Piping
- C. 23 21 13 - Hydronic Piping
- D. 23 31 13 - Metal Ductwork

**1.02 SCOPE OF WORK**

- A. Install identification as required by this Section.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

**1.04 SUBMITTALS**

- A. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8-1/2" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shutoff and similar special uses, by special "flags," in copies for maintenance manuals.
- B. Maintenance Data: Include product data and schedules in maintenance manuals.

**PART 2 - PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

- A. Paint - Benjamin Moore, Devoe, Pratt & Lambert, Rust-O-Leum
- B. Pipe Labels - Seton, Brady

**2.02 PAINTED IDENTIFICATION MATERIALS**

- A. This Contractor shall be responsible for preparing and painting items described in this section.

**2.03 PIPE IDENTIFICATION**

- A. Snap-On Type: Provide manufacturer's standard preprinted, semi-rigid, snap-on, color-coded pipe markers, complying with ANSI A13.1.
- B. Pressure-Sensitive Type: Provide manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, complying the ANSI A13.1.

**2.04 DUCT IDENTIFICATION**

- A. Provide manufacturer's standard laminated plastic, color-coded duct markers that comply with ASME A13.1.
  - 1. Green: cold air.

2. Yellow: hot air.
3. Yellow/Green: supply air.
4. Blue: exhaust, outside, return and mixed air.
5. For hazardous exhausts, use colors and designs recommended by ANSI A13.1.

B. Nomenclature: Include the following:

1. Direction of air flow.
2. Duct service (supply, return, exhaust, etc.).
3. Duct origin (from).
4. Duct destination (to).
5. Design cfm.

## 2.05 CEILING MARKERS

- A. Provide marking tacks with covering for ink notation.

## 2.06 VALVE TAGS

- A. Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener.
1. Provide 2" diameter tags except as otherwise indicated.
  2. Provide size and shape as specified or scheduled for each piping system.

## PART 3 - EXECUTION

### 3.01 GENERAL INSTALLATION REQUIREMENTS

- A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

### 3.02 DUCTWORK IDENTIFICATION

- A. Identify air supply, return, exhaust, intake and relief ductwork with duct markers; or provide stenciled signs and arrows, showing ductwork service and direction of flow, in black or white (whichever provides most contrast with ductwork color).
- B. Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures (shaft, underground or similar concealment), and at 50' spacings along exposed runs.
- C. Access Doors: Provide duct markers or stenciled signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate safety and procedural information.
- D. Concealed Doors: Where access doors are concealed above acoustical ceilings or similar concealment, plasticized tags may be installed for identification in lieu of specified signs, at Installer's option.

### 3.03 PIPING SYSTEM IDENTIFICATION

- A. Install pipe markers of one of the following types on each system indicated to receive identification and include arrows to show normal direction of flow.

1. Stenciled markers, including color-coded background band or rectangle, and contrasting lettering of black or white. Extend color band or rectangle 2" beyond ends of lettering.
  2. Stenciled markers, with lettering color complying with ANSI A13.1.
  3. Plastic pipe markers, with application system as indicated under "Materials" in this Section. Install on pipe insulation segment where required for hot non-insulated pipes.
  4. Stenciled markers, black or white for best contrast, wherever continuous color-coded painting of piping is provided.
- B. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.
1. Near each valve and control device.
  2. Near each branch, excluding short takeoffs for fixtures and terminal units; mark each pipe at branch where there could be question of flow pattern.
  3. Near locations where pipes pass through walls or floors/ceilings or enter non-accessible enclosures.
  4. At access doors, manholes and similar access points which permit view of concealed piping.
  5. Near major equipment items and other points of origination and termination.
  6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
  7. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

C. Pipe Identification:

<u>Function</u>	<u>Stencil Working</u>
Hot Water Heating Supply	HTG SUP
Hot Water Heating Return	HTG RET

### 3.04 VALVE IDENTIFICATION

- A. Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shutoff valves at plumbing fixtures, HVAC terminal devices and similar rough-in connections of end-use fixtures and units.
- B. Mount valve schedule frames and schedules in machine rooms where indicated or, if not otherwise indicated, where directed by Architect/Engineer.
  1. Where more than one major machine room is shown for project, install mounted valve schedule in each major machine room, and repeat only main valves which are to be operated in conjunction with operations of more than single machine room.

### 3.05 ADJUSTING & CLEANING

- A. Adjusting: Relocate any mechanical identification device which has become visually blocked by work

of this Division or other divisions.

- B. Cleaning: Clean face of identification devices and glass frames of valve charts.

**3.06 EXTRA STOCK**

- A. Furnish minimum of 5% extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.
1. Where stenciled markers are provided, clean and retain stencils after completion of stenciling and include used stencils in extra stock, along with required stock of stenciling paints and applicators.

**END OF SECTION**

**SECTION 23 05 93 - TESTING, ADJUSTING & BALANCING FOR HVAC****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. Extent of testing, adjusting and balancing work required by this Section is indicated on drawings and schedules, and by requirements of this Section, and is defined to include, and is limited to air terminals and air outlets, inlets, reliefs and returns, and hydronic systems. The work consists of conducting tests, preparing and submitting reports, and recommending modifications to work as required by contract documents.
- B. Component types of testing, adjusting and balancing specified in this Section includes the following as applied to mechanical equipment:
  - 1. Fans.
  - 2. Ductwork systems.
  - 3. Terminal units.

**1.02 QUALITY ASSURANCE**

- A. Tester's Qualifications: A firm certified by TABB or NEBB in those testing and balancing disciplines similar to those required for this project, who is not Installer of system to be tested and is otherwise independent of project.
- B. NEBB Compliance: Comply with the "Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems" as applicable to mechanical air and hydronic distribution systems and associated equipment and apparatus as specified by the Certified Balancing Bureau.
- C. Industry Standards: Comply with ASHRAE recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.

**1.03 SUBMITTALS**

- A. Submit certified test reports, signed by Test and Balance Supervisor who perform TAB work.
  - 1. Include identification and types of instruments used, and their most recent calibration date with submission of final test report.
- B. Maintenance Data: Include in maintenance manuals copies of certified test reports.

**1.04 JOB CONDITIONS**

- A. Do not proceed with testing, adjusting and balancing work until work has been completed and is operable. Ensure that there is no latent residual work still to be completed on the tested equipment.
- B. Do not proceed until work scheduled for testing, adjusting and balancing is clean and free from debris, dirt and discarded building materials.

**PART 2 - PRODUCTS****2.01 PATCHING MATERIALS**

- A. Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housing which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.
  - 1. At Tester's option, plastic plugs with retainers may be used to patch drilled holes in ductwork and housing.

## 2.02 TEST INSTRUMENTS

- A. Utilize test instruments and equipment for TAB work required, of type, precision and capacity as recommended in the following TAB standards:
  - 1. Balancing Bureau's Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.
- B. The Contractor shall employ manufactured enclosure type cones, capable of air volume direct readings, for all diffuser air flow measurements.

## PART 3 - EXECUTION

### 3.01 FIELD WORK

- A. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with TAB work until unsatisfactory conditions have been corrected in manner acceptable to Tester.
- B. Test, adjust and balance environmental systems and components, as indicated, in accordance with procedures outlined in applicable standards.
- C. Test, adjust and balance system during summer season for air conditioning systems and during winter season for heating systems, including at least period of operation at outside condition within 5°F (3°C) wet bulb temperature of maximum summer design condition, and within 10°F (6°C) dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring final temperatures, then take final temperature readings when seasonal operation does permit.
- D. Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes, in manner recommended by original Installer.

### 3.02 REPORTS

- A. Prepare report of test results, including instrumentation calibration reports, in format recommended by applicable standards.
- B. Prepare report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced; including, where necessary, modifications which exceed requirements of contract documents for mechanical work.

### 3.03 FINAL TESTS, INSPECTION & ACCEPTANCE

- A. Retests: If random tests elicit a measured flow deviation of 10% or more from that recorded in Certified Report listings, at 10% or more of the rechecked selections, report shall be automatically rejected. In the event report is rejected, systems shall be readjusted and tested, new data recorded, new Certified Reports submitted, and new inspection tests made, at no additional cost to the Engineer. Retainage time referred to in paragraph 3.5 of this Section shall be based on date of final acceptance of Certified Report.
- B. Marking of Settings: Following final acceptance of Certified Reports by the Engineer, settings of valves, splitters, dampers and other adjustment devices shall be permanently marked by the Contractor so that adjustment can be restored if disturbed at any time. Devices shall not be marked until after final acceptance.

**END OF SECTION**

**SECTION 23 07 13 - DUCT INSULATION****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 31 13 - Metal Ductwork

**1.02 SCOPE OF WORK**

- A. Install insulation required by this Section is indicated on drawings and schedules and by requirements of this Section.
- B. Types of mechanical insulation specified in this Section include the following:
  - 1. Ductwork System Insulation:
    - a. Fiberglass.

**1.03 QUALITY ASSURANCE**

- A. Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E84 (NFPA 255) method. In addition, the products, when tested, shall not drip flame particles; and flame shall not be progressive.

**1.04 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, k-value, thickness and furnished accessories for each mechanical system requiring insulation. Also furnish necessary test data certified by an independent testing laboratory.
- B. Maintenance Data: Submit maintenance data and replacement material lists for each type of mechanical insulation. Include this data and product data in maintenance manual.

**1.05 DELIVERY, STORAGE & HANDLING**

- A. Deliver insulation, coverings, cements, adhesives and coatings to site in containers with manufacturer's stamp or label, affixed showing fire hazard indexes of products.
- B. Protect insulation against dirt, water and chemical and mechanical damage. Do not install damaged or wet insulation; remove from project site.

**PART 2 - PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

- A. Armstrong; CertainTeed; Knauf; Johns-Manville; Owens-Corning Fiberglass Corp.; Pittsburgh Corning Corp.

**2.02 DUCTWORK INSULATION MATERIALS**

- A. Flexible Fiberglass Ductwork Insulation: Type I, Class B-6, Standard 3/4# Density.
- B. Jackets for Ductwork Insulation: ASTM C921, Type I, for ductwork with temperatures below ambient;



Type II, for ductwork with temperatures above ambient.

- C. Ductwork Insulation Accessories: Provide staples, bands, wires, tape, anchors, corner angles and similar accessories as recommended by insulation manufacturer for applications indicated.
- D. Ductwork Insulation Compounds: Provide cements, adhesives, coatings, sealers, protective finishes and similar compounds as recommended by insulation manufacturer for applications indicated.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Examine areas and conditions under which mechanical insulation is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### **3.02 DUCTWORK SYSTEM INSULATION**

- A. Insulation Omitted: Do not insulate fibrous glass ductwork or lined ductwork.
- B. Ductwork:
  - 1. Application Requirements: Insulate the following ductwork:
    - a. All ductwork located in an unheated space, including 6 feet into heated space.
  - 2. Insulate each ductwork system specified above with one of the following types and thicknesses of insulation:
    - a. Flexible Fiberglass: Minimum R5, limited to concealed space.
- C. All Other Ductwork:
  - 1. Application Requirements: Insulate the following ductwork:
    - a. Exhaust and relief ducts.
  - 2. Insulate each ductwork system specified above with one of the following types and thicknesses of insulation:
    - a. Flexible Fiberglass: Minimum R4, application limited to concealed locations.

#### **3.03 INSTALLATION OF DUCTWORK INSULATION**

- A. Install insulation products in accordance with manufacturer's written instructions and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.
- B. Install insulation materials with smooth and even surfaces.
- C. Clean and dry ductwork prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.
- D. Maintain integrity of vapor barrier on ductwork insulation and protect it to prevent puncture and other damage.
- E. Extend ductwork insulation without interruption through walls, floors and similar ductwork penetrations except where otherwise indicated.

- F. Ductwork Exposed to Weather: Protect outdoor insulation from weather by installing outdoor protective finish or jacketing as recommended by manufacturer.
- G. Corner Angles. Except for oven and hood exhaust duct insulation, install corner angles on external corners of insulation on ductwork in exposed finished spaces before covering with jacketing.

#### **3.04 EXISTING INSULATION REPAIR**

- A. Repair damaged sections of existing mechanical insulation, both previously damaged or damaged during this construction period. Use insulation of same thickness as existing insulation, install new jacket lapping and sealed over existing.

#### **3.05 PROTECTION & REPLACEMENT**

- A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- B. Protection: Insulation Installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

**END OF SECTION**

**SECTION 23 07 19 - HVAC PIPING INSULATION****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 21 13 - Hydronic Piping

**1.02 SCOPE OF WORK**

- A. Install insulation required by this Section is indicated on drawings and schedules and by requirements of this Section.
- B. Types of mechanical insulation specified in this Section include the following:
  - 1. Piping System Insulation:
    - a. Fiberglass.

**1.03 QUALITY ASSURANCE**

- A. Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E84 (NFPA 255) method. In addition, the products, when tested, shall not drip flame particles; and flame shall not be progressive.

**1.04 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, k-value, thickness and furnished accessories for each mechanical system requiring insulation. also furnish necessary test data certified by an independent testing laboratory.
- B. Maintenance Data: Submit maintenance data and replacement material lists for each type of mechanical insulation. Include this data and product data in maintenance manual.

**1.05 DELIVERY, STORAGE & HANDLING**

- A. Deliver insulation, coverings, cements, adhesives and coatings to site in containers with manufacturer's stamp or label, affixed showing fire hazard indexes of products.
- B. Protect insulation against dirt, water and chemical and mechanical damage. Do not install damaged or wet insulation; remove from project site.

**PART 2 - PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

- A. Armstrong; CertainTeed; Knauf; Manville; Owens-Corning; Schuller International.

**2.02 PIPING INSULATION MATERIALS**

- A. Fiberglass Piping Insulation: ASTM C547, Class 1, unless otherwise indicated.
- B. Jackets for Piping Insulation: ASTM C921, Type I, for piping with temperatures below ambient; Type II, for piping with temperatures above ambient. Type I may be used for all piping at Installer's option.

1. Encase pipe and pipe fittings insulation in mechanical room and as indicated with one-piece premolded PVC jacket, fitting covers, fastened as per manufacturer's recommendations.
  2. Encase exterior piping insulation with aluminum jacket with weatherproof construction.
- C. Staples, Bands, Wires and Cement: As recommended by insulation manufacturer for applications indicated.
- D. Adhesives, Sealers and Protective Finishes: As recommended by insulation manufacturer for applications indicated.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Examine areas and conditions under which mechanical insulation is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### **3.02 HVAC PIPING SYSTEM INSULATION**

- A. Insulated Omitted: Omit insulation on hot piping above or below radiation element located within heated space; on condensate piping between steam trap and union; and on unions, flanges, strainers, flexible connections and expansion joints.
- B. Hot Low Pressure Piping [to 250°F (121°C)]:
1. Application Requirements: Insulate the following hot low pressure HVAC piping systems (steam piping up to 15 psi, water piping up to 250°F (121°C):
    - a. HVAC hot water supply and return piping.
  2. Insulate each piping system specified above with one of the following types and thicknesses of insulation:
    - a. Fiberglass: R4 for pipe sizes up to and including 1"; R6 for pipe sizes 1-1/4" through 4".
- E. Insulation of Piping Exposed to Weather: Protect outdoor insulation from weather by installing outdoor protective finish or jacketing as recommended by the manufacturer.

#### **3.03 INSTALLATION OF PIPING INSULATION**

- A. Install insulation products in accordance with manufacturer's written instructions and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.
- B. Install insulation on pipe systems subsequent to installation of heat tracing, painting, testing and acceptance of tests.
- C. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other.
- D. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.
- E. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other

damage.

- F. Cover valves, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job fabricated units (at Installer's option) except where specific form or type is indicated.
- G. Extend piping insulation without interruption through walls, floors and similar piping penetrations except where otherwise indicated.
- H. Butt pipe insulation against pipe hanger insulation inserts. For hot pipes, apply 3" wide vapor-barrier tape or band over the butt joints. For cold piping apply wet coat of vapor-barrier lap cement on butt joints and seal joints with 3" wide vapor-barrier tape or band.

#### **3.04 EXISTING INSULATION REPAIR**

- A. Repair damaged sections of existing mechanical insulation, both previously damaged or damaged during this construction period. Use insulation of same thickness as existing insulation, install new jacket lapping and sealed over existing.

#### **3.05 PROTECTION & REPLACEMENT**

- A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- B. Protection: Insulation Installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

**END OF SECTION**

**SECTION 23 09 13 - ELECTRIC CONTROL SYSTEMS****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 13 - Motor Requirements for HVAC Equipment
- C. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- D. 23 09 93 - Sequence of Operations

**1.02 SCOPE OF WORK**

- A. Install electric control system work as required by this Section is indicated on drawings and schedules and by requirements of this Section.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of electric control equipment, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Firms specializing and experienced in electric control system installations for not less than 5 years.
- C. Codes and Standards:
  - 1. Electrical Standards: Provide electrical products which have been tested, listed and labeled by UL and comply with NEMA standards.
  - 2. NEMA Compliance: Comply with NEMA standards pertaining to components and devices for electric control systems.
  - 3. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" where applicable to controls and control sequences.

**1.04 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical product data for each control device furnished, indicating dimensions, capacities, performance characteristics, electrical characteristics, finishes of materials, and including installation and startup instructions.
- B. Shop Drawings: Refer to Section 23 09 93 - Sequence of Operations for shop drawing information.
- C. Shop Drawings: Submit shop drawings for each electric control system, containing the following information:
  - 1. Schematic flow diagram of system showing fans, pumps, coils, dampers, valves and control devices.
  - 2. Label each control device with setting or adjustable range of control.
  - 3. Indicate all required electrical wiring. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
  - 4. Provide details of faces of control panels, including controls, instructions and labeling.

5. Include verbal description of sequence of operation.
- D. Maintenance Data: Submit maintenance instructions and spare parts lists. Include this data, product data and shop drawings in maintenance manuals; in accordance with requirements of Division 01.

### **1.05 DELIVERY, STORAGE & HANDLING**

- A. Provide factory shipping cartons for each piece of equipment and control device. Maintain cartons while shipping, storage and handling as required to prevent equipment damage, and to eliminate dirt and moisture from equipment. Store equipment and materials inside and protect from weather.

## **PART 2 - PRODUCTS**

### **2.01 ACCEPTABLE MANUFACTURERS & INSTALLERS**

- A. Manufacturers and installers that offer products which may comply with the requirements of this contract include the following: Johnson Controls, Inc.; Siemens.

### **2.02 MATERIALS & EQUIPMENT**

- A. Provide electric control products in sizes and capacities indicated, consisting of valves, dampers, thermostats, clocks, sensors, controllers and other components as required for complete installation. Except as otherwise indicated, provide manufacturer's standard control system components as indicated by published product information; designed and constructed as recommended by manufacturer. Provide electric control systems with the following functional and construction features as indicated.
  - B. Control Valves: Provide factory-fabricated electric control valves of type, body material and pressure class indicated. Where type or body material is not indicated, provide selection as determined by manufacturer for installation requirements and pressure class, based on maximum pressure and temperature rating of piping system. Except as otherwise indicated, provide valves which mate and match material of connecting piping. Equip control valves with control valve motors and with proper shutoff ratings for each individual application.
    1. Single Seated Valves: Cage type trim providing seating and guiding surfaces for plug on "top and bottom" guided plugs.
    2. Double Seated Valves: Balanced plug type, with cage type trim providing seating and guiding surfaces on "top and bottom" guided plugs.
    3. Valve Trim and Stems: Polished stainless steel.
    4. Packing: Spring-loaded teflon, self-adjusting.
    5. Terminal Unit Control Valves: Provide control valves for control of terminal units including, but not necessarily limited to, convectors, finned-tube radiation, and fan-coil units that are of integral motor type. Provide 2-position or modulating type valves, electrically actuated by line voltage of 120V.
- C. Room Thermostats: Provide room thermostats with locking covers and with concealed or readily-accessible adjustment devices and deadband, as indicated.
  - a. Provide thermostats with red-reading glass or spiral bi-metallic thermometers.
  - b. Where indicated, provide heavy-duty "asylum type," clear plastic, or wire tamperproof guards.

1. Low-Voltage On-Off Thermostats: Comply with general requirement indicated for line-voltage thermostats. Provide thermostats of bi-metal operated mercury-switch type, with either adjustable or fixed universal anticipation heater.
  2. Low-Voltage Modulating Thermostats: Provide potentiometer type, operated by vapor-filled bellows.
- D. Electronic Sensors: Provide electronic temperature and relative humidity sensors of supersensitive resistance type, which are vibration and corrosion resistant, and of wall-mounted immersion, duct mounting, averaging or bulb type as required for application.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Examine areas and conditions under which electric control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### **3.02 INSTALLATION OF ELECTRIC CONTROL SYSTEMS**

- A. Install systems and materials in accordance with manufacturer's instructions, roughing-in drawings and details shown on drawings. Install electrical components and use electrical products complying with requirements of applicable Division 26 sections of these specifications. Mount controllers at convenient locations and heights.
- B. Control Wiring: The term "control wiring" is defined to include providing of wire, conduit and miscellaneous materials as required for mounting and connecting electric control devices.
- C. Wiring System: Install complete control wiring system for electric control systems. Conceal wiring except in mechanical rooms and areas where other conduit and piping are exposed. Provide multi-conductor instrument harness (bundle) in place of single conductors where number of conductors can be run along common path. Fasten flexible conductors bridging cabinets and doors neatly along hinge side and protect against abrasion. Tie and support conductors neatly.
- D. Number code or color code conductors, excluding those used for local individual room controls, appropriately for future identification and servicing of control system.
- E. Reset Limit Controls: Install manual-reset limit controls to be independent of power controllers; automatic duct heater resets may, at Contractor's option, be installed in interlock circuit of power controllers.
- F. Unit-Mounted Equipment: Where control devices are indicated to be unit mounted, ship electric relays, electric switches, valves, dampers, and damper motors to unit manufacturer for mounting and wiring at factory.

#### **3.03 ADJUSTING & CLEANING**

- A. Startup: Start up, test, and adjust electric control systems in presence of manufacturer's authorized representative. Demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.
- B. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.
- C. Final Adjustment: After completion of installation, adjust thermostats, control valves, motors and



similar equipment provided as work of this Section.

1. Final adjustment shall be performed by specially trained personnel in direct employ of manufacturer of primary temperature control system.

### **3.04 CLOSEOUT PROCEDURES**

- A. Owner's Instructions: Provide services of manufacturer's technical representative for one 8-hour day to instruct Owner's personnel in operation and maintenance of electric control systems.
  1. Schedule instruction with Owner, provide at least 7-day notice to Contractor and Engineer of training date.

**END OF SECTION**

**SECTION 23 09 93 - SEQUENCE OF OPERATIONS****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- C. 23 34 00 - HVAC Fans

**1.02 DESCRIPTION OF WORK**

- A. Control sequences are hereby defined as the manner and method by which automatic temperature controls function. Requirements for each type of operation are specified in this Section.
- B. Operating equipment, devices and system components required for automatic temperature control systems are specified in other Division 23 Controls and Instrumentation sections of these specifications.

**1.03 SUBMITTALS**

- A. Shop Drawings. Submit shop drawings for each system automatically controlled, containing the following information:
  - 1. Schematic flow diagram of system new and relocated air terminals, fin radiation, valves and control devices.
  - 2. Label each control device with setting or adjustable range of control.
  - 3. Indicate pneumatic piping; factory and field wiring.
  - 4. Indicate each control panel required with internal and external piping and wiring clearly indicated. Provide detail of panel face, including controls, instruments, and labeling.
  - 5. Include narrative description of sequence of operation addressing all modes of function for each control component.
- B. Maintenance Data. Include copy of shop drawings in each maintenance manual.

**PART 2 - PRODUCTS (Not Applicable)****PART 3 - EXECUTION****3.01 CONVECTORS**

- A. Dual temperature room thermostat shall modulate a normally open control valve to maintain space temperature.

**END OF SECTION**

**SECTION 23 21 13 - HYDRONIC PIPING****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 23 - Valves for HVAC Piping
- C. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- D. 23 05 53 - Identification for HVAC Piping & Equipment
- E. 23 21 19 - Hydronic Piping Specialties

**1.02 SCOPE OF WORK**

- A. Install hydronic piping systems for hot water heating as shown on drawings and as specified in this section.

**1.03 SYSTEM DESCRIPTION**

- A. The hydronic piping systems are the "water-side" of an air-and-water or all-water heating system. Hydronic piping systems specified in this Section include 2-pipe, hot water piping system. These systems are classified by ASHRAE as Low Water Temperature, Forced, Recirculating systems.
- B. 2-Pipe System: The 2-pipe system includes independent hot water supply and return piping mains in a closed loop, connecting the boilers to the terminal heat transfer units by means of primary/secondary piping loops. Circulation is accomplished by parallel, constant volume, primary pumps, and independent secondary pumps. Design flow rates and water temperatures are specified in the various equipment specifications and schedules. Control sequences and temperature reset schedules are specified in the temperature control specifications.

**1.04 SEQUENCING & SCHEDULING**

- A. Coordinate the installation of pipe sleeves for foundation wall penetrations.

**PART 2 - PRODUCTS****2.01 PIPING & TUBING MATERIALS**

- A. Refer to Part 3 Article "PIPE APPLICATIONS" for identification of where the below materials are used.
  - 1. Drawn Temper Copper Tubing: ASTM B88, Type L.
  - 2. Steel Pipe: ASTM A120, Schedule 40, seamless, black steel pipe, plane ends.
  - 3. Cross-Linked Polyethylene (PEX): ASTM F876.

**2.02 FITTINGS**

- A. Cast-Iron Threaded Fittings: ANSI B16.4, Class 125, standard pattern, for threaded joints. Threads shall conform to ANSI B1.20.1.
- B. Malleable-Iron Threaded Fittings: ANSI B16.3, Class 150, standard pattern, for threaded joints. Threads shall conform to ANSI B1.20.1.
- C. Steel Fittings: ASTM A234, seamless or welded, for welded joints.

- D. Wrought-Copper Fittings: ANSI B16.22, streamlined pattern.
- E. Cast-Iron Threaded Flanges: ANSI B16.1, Class 125; raised ground face, bolt holes spot faced.
- F. Cast-Bronze Flanges: ANSI B16.24, Class 150; raised ground face, bolt holes spot faced.
- G. Steel Flanges and Flanged Fittings: ANSI B16.5, including bolts, nuts and gaskets of the following material group, end connections and facings:
  - 1. Material Group: 1.1.
  - 2. End Connections: Butt Welding.
  - 3. Facings: Raised Face.
- H. Unions: ANSI B16.39, malleable iron, Class 150, hexagonal stock, with ball-and-socket joints, metal-to-metal bronze seating surfaces; female threaded ends. Threads shall conform to ANSI B1.20.1.
- I. Flexible Connectors: Stainless steel bellows with woven flexible bronze wire reinforcing protective jacket; minimum 150 psig working pressure, maximum 250°F operating temperature. Connectors shall have flanged or threaded end connections to match equipment connected; and shall be capable of 3/4" misalignment.

### 2.03 JOINING MATERIALS

- A. Solder Filler Metals: ASTM B32, 95-5 Tin-Antimony, for heating hot water and low pressure steam piping.
- B. Brazing Filler Metals: AWS A5.8, Classification BAg 1 (Silver).
  - 1. WARNING: Some filler metal contain compounds which produce highly toxic fumes when heated. Avoid breathing fumes. Provide adequate ventilation.
- C. Gasket Material: Thickness, material and type suitable for fluid to be handled, and design temperatures and pressures.
- D. Coupling Gaskets: Grade "EHP" EPDM gasket, -30°F to +230°F temperature rating or Grade "E" EPDM gasket, -30°F to +230°F temperature rating suitable for water service.

### 2.04 UNDERGROUND HOT WATER HEATING PIPING

- A. General: Provide underground heating piping where shown on plan.
- B. Piping and Fittings: Piping shall be crosslinked polyethylene (PEX) with appropriate fittings.

## PART 3 - EXECUTION

### 3.01 PIPE APPLICATIONS

- A. Install Type L, drawn copper tubing with wrought copper fittings and solder joints for 2" and smaller, above ground, within building.
- B. Install steel pipe with threaded joints and fittings for 2" and smaller.

### 3.02 PIPING INSTALLATIONS

- A. Locations and Arrangements: Drawings (plans, schematics and diagrams) indicate the general location and arrangement of piping systems. Locations and arrangements of piping take into consideration pipe sizing and friction loss, expansion, pump sizing and other design considerations. So far as practical, install piping as indicated.
- B. Use fittings for all changes in direction and all branch connections.
- C. Install exposed piping at right angles or parallel to building walls. Diagonal runs are not permitted unless expressly indicated.
- D. Conceal all pipe installations in walls, pipe chases, utility spaces, above ceilings, below grade or floors, unless indicated to be exposed to view.
- E. Install piping tight to slabs, beams, joists, columns, walls and other permanent elements of the building. Provide space to permit insulation applications, with 1" clearance outside the insulation. Allow sufficient space above removable ceiling panels to allow for panel removal.
- F. Locate groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- G. Install drains at low points in mains, risers and branch lines consisting of a tee fitting, 3/4" ball valve, and short 3/4" threaded nipple and cap.
- H. Install piping at a uniform grade of 1" in 40' upward in the direction of flow.
- I. Make reductions in pipe sizes using eccentric reducer fitting installed with the level side up.
- J. Install branch connections to mains using tee fittings in main with takeoff out the bottom of the main, except for upfeed risers which shall have takeoff out the top of the main line.
- K. Install unions in pipes 2" and smaller, adjacent to each valve, at final connections each piece of equipment, and elsewhere as indicated. Unions are not required on flanged devices.
- L. Install strainers on the supply side of each control valve, pressure reducing valve, pressure regulating valve, solenoid valve, inline pump and elsewhere as indicated. Install nipple and ball valve in blowdown connection of strainers 2" and larger.
- M. Anchor piping to ensure proper direction of expansion and contraction. Expansion loops and joints are indicated on the drawings.

### 3.03 PIPE JOINT CONSTRUCTION

- A. Soldered Joints: Comply with the procedures contained in the AWS "Soldering Manual."
- B. Brazed Joints: Comply with the procedures contained in the AWS "Brazing Manual."
  - 1. CAUTION: Remove stems, seats and packing of valves and accessible internal parts at piping specialties before brazing.
  - 2. Fill the pipe and fittings during brazing, with an inert gas (i.e., nitrogen or carbon dioxide) to prevent formation of scale.
  - 3. Heat joints using oxy-acetylene torch. Heat to proper and uniform temperature.
- C. Threaded Joints: Conform to ANSI B1.20.1, tapered pipe threads for field cut threads. Join pipe fittings and valves as follows:

1. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
2. Align threads at point of assembly.
3. Apply appropriate tape or thread compound to the external pipe threads (except where dry seal threading is specified).
4. Assemble joint wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.
  - a. Damaged Threads: Do not use pipe with threads which are corroded or damaged. If a weld opens during cutting or threading operations, that portion of pipe shall not be used.

### 3.04 FIELD QUALITY CONTROL

- A. Preparation for Testing: Prepare hydronic piping in accordance with ASME B31.9 and as follows:
  1. Leave joints including welds uninsulated and exposed for examination during the test.
  2. Provide temporary restraints for expansion joints which cannot sustain the reactions due to test pressure. If temporary restraints are not practical, isolate expansion joints from testing.
  3. Flush system with clean water. Clean strainers.
  4. Isolate equipment that is not to be subjected to the test pressure from the piping. If a valve is used to isolate the equipment, its closure shall be capable of sealing against the test pressure without damage to the valve. Flanged joints at which blinds are inserted to isolate equipment need not be tested.
  5. Install relief valve set at a pressure no more than 1/3 higher than the test pressure, to protect against damage by expansion of liquid or other source of overpressure during the test.
- B. Testing: Test hydronic piping as follows:
  1. Use ambient temperature water as the testing medium, except where there is a risk of damage due to freezing. Another liquid may be used if it is safe for workmen and compatible with the piping system components.
  2. Use vents installed at high points in the system to release trapped air while filling the system. Use drains installed at low points for complete removal of the liquid.
  3. Examine system to see that equipment and parts that cannot withstand test pressures are properly isolated. Examine test equipment to ensure that it is tight and that low pressure filling lines are disconnected.
  4. Subject piping system to a hydrostatic test pressure which at every point in the system is not less than 1.5 times the design pressure. The test pressure shall not exceed the maximum pressure for any vessel, pump, valve or other component in the system under test. Make a check to verify that the stress due to pressure at the bottom of vertical runs does not exceed either 90% of specified minimum yield strength, or 1.7 times the "SE" value in Appendix A of ASME B31.9, Code for Pressure Piping, Building Services Piping.
  5. After the hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints and connections for leakage. Eliminate leaks by tightening, repairing or replacing components as appropriate, and repeat hydrostatic test until there are no leaks.

**3.05 ADJUSTING & CLEANING**

- A. Clean and flush hydronic piping systems. Remove, clean and replace strainer screens. After cleaning and flushing hydronic piping system, but before balancing, remove disposable fine mesh strainers in pump suction diffusers.
- B. Mark calibrated nameplates of pump discharge valves after hydronic system balancing has been completed, to permanently indicate final balanced position.
- C. Chemical Treatment: Provide a water analysis prepared by the chemical treatment supplier to determine the type and level of chemicals required for prevention of scale and corrosion. Perform initial treatment after completion of system testing.

**3.06 COMMISSIONING**

- A. Fill system and perform initial chemical treatment.
- B. Check expansion tanks to determine that they are not air bound and that the system is completely full of water.
- C. Before operating the system, perform these steps:
  - 1. Open valves to full open position. Close coil bypass valves.
  - 2. Remove and clean strainers.
  - 3. Check pump for proper direction of correct improper wiring.
  - 4. Set automatic fill valves for required system pressure.
  - 5. Check air vents at high points of systems and determine if all are installed and operating freely (automatic type) or to bleed air completely (manual type).
  - 6. Set temperature controls so all coils are calling for full flow.
  - 7. Check operation of automatic bypass valves.
  - 8. Check and set operating temperature of boilers, chillers and cooling towers to design requirements.
  - 9. Lubricate motors and bearings.

**END OF SECTION**

**SECTION 23 21 19 - HYDRONIC PIPING SPECIALTIES****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 23 - Valves for HVAC Piping
- C. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- D. 23 05 53 - Identification for HVAC Piping & Equipment

**1.02 SCOPE OF WORK**

- A. Install hydronic piping specialties for hot water heating piping.

**1.03 SUBMITTALS**

- A. Shop drawings, including rated capacities of selected models, weights (shipping, installed and operating), furnished specialties and accessories, and installation instructions for each hydronic specialty and special duty valve specified.
- B. Maintenance data for hydronic specialties and special duty valves, for inclusion in operating and maintenance manual.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Flow Balancing and Measuring Devices: Armstrong; Bell & Gossett; Flow Design; Gerard Engineering; Griswold; Nibco; Taco; Victaulic; Watts.
- B. Air Vents (manual and automatic): Amtrol; Armstrong; Bell & Gossett; Taco.
- C. Y-Pattern Strainers: Armstrong Machine Works; Hoffman Specialty ITT; Fluid Handling Div.; Gruvlok; Metraflex Co.; Muessco; Spirax Sarco; Trane Co.; Titan FCI; Victaulic Co. of America; Watts Regulator Co.

**2.02 GENERAL DUTY VALVES**

- A. General duty valves (i.e., gate, globe, check, ball, and butterfly valves) are specified in Section 23 05 23. Special duty valves are specified below by their generic name; refer to Part 3 Article "VALVE APPLICATION" for specific uses and applications for each valve specified.

**2.03 SPECIAL DUTY VALVES**

- A. Flow Balancing and Measuring Devices 2" and Smaller: 125 psig water working pressure, 250°F maximum operating temperature, bronze body, plug valve with calibrated orifice. Provide with connections for portable differential pressure meter with integral check valves and seals. Valve shall have integral pointer and calibrated scale to register degree of valve opening threaded connections.
- B. Control Valves: Refer to Section 23 09 13 for providing control valves. Control valves shall be installed as part of this Section.

**2.04 HYDRONIC SPECIALTIES**

- A. Manual Air Vent: Bronze body and non-ferrous internal parts; 150 psig working pressure, 225°F



operating temperature; manually operated with screwdriver or thumbscrew; and having 1/8" discharge connection and 1/2" inlet connection.

- B. Automatic Air Vent: Designed to vent automatically with float principle; bronze body and non-ferrous internal parts; 150 psig working pressure, 240°F operating temperature; and having 1/4" discharge connection and 1/2" inlet connection.
- C. Y-Pattern Strainers: 125 psig working pressure, cast-iron body (ASTM A126, Class B), flanged ends for 2-1/2" and larger, threaded connections for 2" and smaller, bolted cover, perforated Type 304 stainless steel basket and bottom drain connection.

### **PART 3 - EXECUTION**

#### **3.01 VALVE APPLICATIONS**

- A. General Duty Valve Applications: The drawings indicate valve types to be used. All valves shall be accessible. Where specific valve types are not indicated, the following requirements apply:
  - 1. Shutoff Duty: Use ball valves.
  - 2. Balancing Duty: Flow balancing and measuring devices.
  - 3. Install shutoff duty valves at each branch connection to supply mains, at supply connection to each piece of equipment, and elsewhere as indicated.
  - 4. Install balancing valves at each branch connection to return mains, at return connections to each piece of equipment, elsewhere as indicated.
- B. Install flow balancing and measuring devices on the outlet of each heating or cooling element and elsewhere as required to facilitate system balancing. At Contractor's option, full port flow balancing and measuring devices may be provided.
- C. Install drain valves at low points in mains, risers, branch lines, and elsewhere as required for system drainage.
- D. Install check valves on each pump discharge and elsewhere as required to control flow direction.

#### **3.02 INSTALLATION OF PIPING SPECIALTIES**

- A. Pipe Escutcheons: Install pipe escutcheons on each pipe penetration thru floors, walls, partitions and ceilings where penetration is exposed to view; and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole, and is flush with adjoining surface.
- B. Y-Type Strainers: Install Y-type strainers full size of pipeline, in accordance with manufacturer's installation instructions. Install pipe nipple and shutoff valve in strainer blowdown connection, full size of connection, except for strainers 2" and smaller installed ahead of control valves feeding individual terminals. Where indicated, provide drain line from shutoff valve to plumbing drain, full size of blowdown connection.
  - 1. Location Y-type strainers in supply line ahead of the following equipment and elsewhere as indicated, if integral strainer is not included in equipment:
    - a. Temperature control valves.

#### **3.03 HYDRONIC SPECIALTIES INSTALLATION**

- A. Install manual air vents at high points in the system, at heat transfer coils and elsewhere as required for system air venting.
- B. Install automatic air vents at high points in the system, heat transfer coils, and elsewhere as required for system air venting.

### 3.04 ADJUSTING & CLEANING

- A. Clean and flush hydronic piping systems. Remove, clean and replace strainer screens. After cleaning and flushing hydronic piping system, but before balancing, remove disposable fine mesh strainers in pump suction diffusers.
- B. Mark calibrated nameplates of pump discharge valves after hydronic system balancing has been completed, to permanently indicate final balanced position.
- C. Chemical Treatment: Provide a water analysis prepared by the chemical treatment supplier to determine the type and level of chemicals required for prevention of scale and corrosion. Perform initial treatment after completion of system testing.

### 3.05 COMMISSIONING

- A. Fill system and perform initial chemical treatment.
- B. Check expansion tanks to determine that they are not air bound and that the system is completely full of water.
- C. Before operating the system, perform these steps:
  - 1. Open valves to full open position. Close coil bypass valves.
  - 2. Remove and clean strainers.
  - 3. Check pump for proper direction of correct improper wiring.
  - 4. Set automatic fill valves for required system pressure.
  - 5. Check air vents at high points of systems and determine if all are installed and operating freely (automatic type) or to bleed air completely (manual type).
  - 6. Set temperature controls so all coils are calling for full flow.
  - 7. Check operation of automatic bypass valves.
  - 8. Check and set operating temperature of boilers, chillers and cooling towers to design requirements.
  - 9. Lubricate motors and bearings.

**END OF SECTION**

**SECTION 23 31 13 - METAL DUCTWORK****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- C. 23 05 53 - Identification for HVAC Piping & Equipment
- D. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- E. 23 07 13 - Duct Insulation
- F. 23 33 00 - Air Duct Accessories

**1.02 SCOPE OF WORK**

- A. Install ductwork as indicated on drawings and as by specified in this section.

**1.03 SUBMITTALS**

- A. Record Drawings: At project closeout, submit record drawings of installed metal ductwork and ductwork products.
- B. Maintenance Data: Submit maintenance data and parts lists for metal ductwork materials and products. Include this data, product data, shop drawings and record drawings in maintenance manual.

**1.04 DELIVERY, STORAGE & HANDLING**

- A. Protection: Protect shop-fabricated and factory-fabricated ductwork, accessories and purchased products from damage during shipping, storage and handling. Prevent end damage and prevent dirt and moisture from entering ducts and fittings.
- B. Storage: Where possible, store ductwork inside and protect from weather. Where necessary to store outside, store above grade and enclose with waterproof wrapping.

**PART 2 - PRODUCTS****2.01 DUCTWORK MATERIALS**

- A. Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, stains and discolorations, and other imperfections, including those which would impair painting.
- B. Sheetmetal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A527, lockforming quality; with G90 zinc coating in accordance with ASTM A525; and mill phosphatized for exposed locations.

**2.02 MISCELLANEOUS DUCTWORK MATERIALS**

- A. Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.
- B. Duct Sealant: Non-hardening, non-migrating mastic or liquid elastic sealant, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork.

- C. Duct Cement: Non-hardening migrating mastic or liquid neoprene-based cement, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for cementing fitting components, or longitudinal seams in ductwork.
- D. Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.
  - 1. Except where space is indicated as "High Humidity" area, interior support materials of not less than 1/4" diameter or 3/16" thickness may be plain (not galvanized).
- E. Flexible Ducts: Either spiral-wound spring steel with flameproof vinyl sheathing, or corrugated aluminum; complying with UL 181.
  - 1. Where installed in unconditioned spaces other than return air plenums, provide 1" thick continuous flexible fiberglass sheath with vinyl vapor barrier jacket.

### 2.03 FABRICATION

- A. Shop fabricate ductwork of gages and reinforcement complying with SMACNAs "HVAC Duct Construction Standards."
- B. Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with centerline radius equal to associated duct width; and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30° for contracting tapers and 20° for expanding tapers.
- C. Fabricate ductwork with accessories installed during fabrication to the greatest extent possible.
- D. Fabricate ductwork with duct liner in each section of duct where indicated. Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining and adhesive, and fasten with mechanical fasteners.

### 2.04 FACTORY-FABRICATED LOW PRESSURE DUCTWORK

- A. At installer's option, provide factory-fabricated duct and fittings, in lieu of shop-fabricated duct and fittings.
- B. Material: Galvanized sheet steel complying with ASTM A527, lockforming quality, with ASTM A525, G90 zinc coating, mill phosphatized.
- C. Gage: 26-gage minimum for round and oval ducts and fittings, 4" through 24" diameter.
- D. Elbows: One-piece construction of 90° and 45° elbows 14" and smaller. Provide multiple gore construction for larger diameters with standing seam circumferential joint.
- E. Divided Flow Fittings: 90° tees, constructed with saddle tap spot welded and bonded to duct fitting body.
- F. Exposed Spiral Acoustical Duct: Construction, in general, shall be comprised of an airtight, outer pressure shell, a 1" fiberglass insulation layer, and a perforated metal liner that completely covers the insulation throughout the system. All size listings are based on the inner liner diameter. Perforations are not to exceed 3/32" diameter. The percentage of open area shall be 22%. The inner liners of both duct and fittings are to be adequately supported by metal spacers welded in position to maintain spacing and concentricity. An inner coupling shall be provided to align the inner liners of joining pieces to maintain good airflow conditions. This alignment may be accomplished by extending the inner liner of the fitting

for slip joint into the duct or by use of a double concentric coupling with spacers.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION OF METAL DUCTWORK**

- A. Assemble and install ductwork in accordance with recognized industry practices which will achieve airtight (3% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor.
- B. Inserts: Install concrete inserts for support of ductwork in coordination with formwork, as required to avoid delays in work.
- C. Field Fabrication: Complete fabrication of work at project as necessary to match shop-fabricated work and accommodate installation requirements.
- D. Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct useable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns and other structural and permanent enclosure elements of building. Limit clearance to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.
- E. Electrical Equipment Spaces: Do not route ductwork through transformer vaults and their electrical equipment spaces and enclosures.
- F. Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheetmetal flanges of same gage as duct. Overlap opening on 4 sides by at least 1-1/2". Fasten to duct and substrate.
  - 1. Where ducts pass through fire-rated floors, wall or partitions, provide firestopping between duct and substrate, in accordance with requirements of Division 07 Section "Firestopping."
- G. Coordination: Coordinate duct installation with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- H. Installation: Install metal ductwork in accordance with SMACNA HVAC Duct Construction Standards.

#### **3.02 INSTALLATION OF FLEXIBLE DUCTS**

- A. Maximum Length: For any duct run using flexible ductwork, do not exceed 5'0" extended length.
- B. Installation: Install in accordance with Section III of SMACNA's "HVAC Duct Construction Standards, Metal and Flexible."

#### **3.03 FIELD QUALITY CONTROL**

- A. Leakage Tests: After each duct system which is constructed for duct classes over 3" is completed, test for duct leakage in accordance with SMACNA HVAC Air Duct Leakage Test Manual. Repair leaks and repeat tests until total leakage is less than 1% of system design airflow.

### **3.04 EQUIPMENT CONNECTIONS**

- A. Connect metal ductwork to equipment as indicated, provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery. Provide access doors as indicated.

### **3.05 ADJUSTING & CLEANING**

- A. Clean ductwork internally, unit by unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration. Documentation of work performed shall comply with ASHRAE 62.1-2004, Section 7.2.4 "Ventilation System Startup."
- B. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.

**END OF SECTION**

**SECTION 23 33 00 - AIR DUCT ACCESSORIES****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- C. 23 05 53 - Identification for HVAC Piping & Equipment
- D. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- E. 23 07 13 - Duct Insulation
- F. 23 31 13 - Metal Ductwork

**1.02 SCOPE OF WORK**

- A. Install ductwork accessories as indicated on drawings and in schedules and by requirements of this Section.

**1.03 SUBMITTALS**

- A. Shop Drawings: Submit manufacturer's assembly-type shop drawings for each type of ductwork accessory showing interfacing requirements with ductwork, method of fastening or support, and methods of assembly of components.
- B. Maintenance Data: Submit manufacturer's maintenance data including parts lists for each type of duct accessory. Include this data, product data and shop drawings in maintenance manual.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Manual Dampers: Air Balance; Cesco; Greenheck; McGill; Metalaire; Nailor; Penn; Pottorff; Ruskin; Vent Products
- B. Flexible Connections: Ductmate; Durodyne; Engineered Flexible Products; Flexaust; Ventfabrics; Ward
- C. Counterbalanced Backdraft: Air Balance; Cesco; Greenheck; McGill; Metalaire; Nailor; Penn; Ruskin

**2.02 DAMPERS**

- A. Low Pressure Manual Dampers: Provide dampers of single-blade type or multiblade type, constructed in accordance with SMACNA "HVAC Duct Construction Standards."
- B. Counterbalanced Dampers: Provide dampers with parallel blades, counterbalanced and factory set to relieve at indicated static pressure. Construct blades of 6063T5 extruded aluminum, provide Zytel ball bearings. Construct frame .125" wall thickness. Provide adjustable counterbalance equal to Ruskin CBD6.

**2.03 DUCT HARDWARE**

- A. Provide duct hardware manufactured by one manufacturer for all items on project for the following:
  - 1. Quadrants Locks: Provide for each damper, quadrant lock device on one end of shaft; and end bearing plate on other end for damper lengths over 12". Provide extended quadrant locks and end extended bearing plates for externally insulated ductwork.

#### **2.04 FLEXIBLE CONNECTIONS**

- A. Provide flexible duct connections wherever ductwork connects to vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.

#### **2.05 DRIP PANS**

- A. Provide 2" drip pan in the following locations:
  - 1. Vertical Roof Penetration - Locate at bottom of duct riser to fan.
  - 2. Horizontal Sidewall Penetration - Locate as close to penetration as possible.
- B. Construction - Construct of same or greater gauge as ductwork served, seal construction watertight.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### **3.02 INSTALLATION OF DUCTWORK ACCESSORIES**

- A. Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.
- B. Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.

#### **3.03 FIELD QUALITY CONTROL**

- A. Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories as required to obtain proper operation and leakproof performance.

#### **3.04 ADJUSTING & CLEANING**

- A. Adjusting: Adjust ductwork accessories for proper settings, install fusible links in fire dampers and adjust for proper action.
- B. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

#### **3.05 EXTRA STOCK**

- A. Furnish extra fusible links to Owner, one link for every 10 installed of each temperature range; obtain receipt.

**END OF SECTION**



**SECTION 23 34 00 - HVAC FANS****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 13 - Motor Requirements for HVAC Equipment
- C. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- D. 23 05 48 - Vibration & Seismic Controls for HVAC Piping & Equipment
- E. 23 05 53 - Identification for HVAC Piping & Equipment
- F. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- G. 23 31 13 - Metal Ductwork

**1.02 SCOPE OF WORK**

- A. Install HVAC fans as shown on drawings and as specified in this section.

**1.03 SUBMITTALS**

- A. Shop drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, required clearances, components and location and size of field connections.
- B. Wiring diagrams that detail power, signal and control wiring. Differentiate between manufacturer-installed wiring and field-installed wiring.

**1.04 DELIVERY, STORAGE & HANDLING**

- A. Lift and support units with the manufacturer's designated lifting or supporting points.
- B. Disassemble and reassemble units as required for movement into the final location following manufacturer's written instructions.
- C. Deliver fan units as a factory-assembled unit to the extent allowable by shipping limitations, with protective crating and covering.

**1.05 SEQUENCING & SCHEDULING**

- A. Coordinate the installation of roof curbs, equipment supports and roof penetrations.
- B. Coordinate the size and location of structural steel support members.

**1.06 EXTRA MATERIALS**

- A. Furnish one additional complete set of belts for each belt-driven fan.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Ceiling-Mounted Ventilators: Acme; Ammerman Company, Inc.; Breidert; Broan; Carnes Company, Inc.; Cook (Loren) Co.; Greenheck Fan Corp.; ILG Industries, Inc.; Jenn Industries, Inc.; Penn Ventilator Co.; U.S. Fans.

**2.02 FANS, GENERAL**

- A. Provide fans that are factory fabricated and assembled, factory tested, and factory finished with indicated capacities and characteristics.
- B. Fans and Shafts: Statically and dynamically balanced and designed for continuous operation at the maximum rated fan speed and motor horsepower.
  - 1. Fan Shaft: Turned, ground and polished steel designed to operate at no more than 70% of the first critical speed at the top of the speed range of the fan's class.
- C. Belt Drives: Factory mounted with final alignment and belt adjustment made after installation.
  - 1. Service Factor: 1.4.
- D. Belts: Oil resistant, non-sparking, and non-static.
- E. Motors and Fan Wheel Pulleys: Adjustable pitch for use with motors through 15 HP; fixed pitch for use with motors larger than 15 HP. Select pulley so that pitch adjustment is at the middle of the adjustment range at fan design conditions.
  - 1. Belt Guards: Provide steel belt guards for motors mounted on the outside of the fan cabinet.
- F. Shaft Bearings: Provide type indicated, having a median life "Rating Life" (AFBMA L<sub>50</sub>) of 200,000, calculated in accordance with AFBMA Standard 9 for ball bearings and AFBMA Standard 11 for roller bearings.
- G. Factory Finish: The following finishes are required:
  - 1. Sheetmetal Parts: Prime coating prior to final assembly.
  - 2. Exterior Surfaces: Baked-enamel finish coat after assembly.

### 2.03 CEILING-MOUNTED VENTILATORS

- A. General Description - Centrifugal fan designed for installation in ceiling, wall or concealed inline applications.
- B. Housing - Galvanized steel lined with acoustical insulation.
- C. Fan Wheel - Centrifugal wheels directed mounted on motor shaft. Fan shrouds, motor and fan wheel shall be removable for service.
- D. Grille - Steel, louvered grille with flange on intake and thumbscrew attachment to fan housing.
- E. Electrical Requirements - Junction box for electrical connection on housing and receptacle for motor plug-in.
- F. Remote Fan Speed Control - Solid state, capable of controlling fan speed from full speed to approximately half speed.
- G. Accessories - Manufacturer's standard roof jack, wall cap and transition fittings as indicated.

### 2.04 MOTORS

- A. Torque Characteristics: Sufficient to accelerate the driven loads satisfactorily.
- B. Motor Sizes: Minimum sizes and electrical characteristics as indicated. If not indicated, large enough so that the driven load will not require the motor to operate in the service factor range.

- C. Temperature Rating: 50°C maximum temperature rise at 40°C ambient for continuous duty at full load (Class A Insulation).
- D. Service Factor: 1.15 for polyphase motors and 1.35 for single-phase motors.
- E. Motor Construction: NEMA Standard MG 1, general purpose, continuous duty, Design B. Provide permanent-split capacitor classification motors for shaft-mounted fans and capacitor start classification for belted fans.
  - 1. Bases: Adjustable.
  - 2. Bearings: The following features are required:
    - a. Ball or roller bearings with inner and outer shaft seals.
    - b. Grease lubricated.
    - c. Designed to resist thrust loading where belt drives or other drives produce lateral or axial thrust in motor.
  - 3. Enclosure Type: The following features are required:
    - a. Open dripproof motors where satisfactorily housed or remotely located during operation.
    - b. Guarded dripproof motors where exposed to contact by employees or building occupants.
  - 4. Overload Protection: Built-in, automatic reset, thermal overload protection.
  - 5. Noise Rating: Quiet.
  - 6. Nameplate: Indicate the full identification of manufacturer, ratings, characteristics, construction and special features.
  - 7. Starters, Electrical Devices and Wiring: Electrical devices and connections are specified in Division 26.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION, GENERAL**

- A. Install fans level and plumb, in accordance with manufacturer's written instructions. Support units as described below, using the vibration control devices indicated.
- B. Suspended Units - Suspend units from structural steel support frame using threaded steel rods and vibration isolation springs.

#### **3.02 CONNECTIONS**

- A. Duct installation and connections are specified in other sections. Make final duct connections with flexible connections.
- B. Electrical Connections: The following requirements apply:
  - 1. Electrical power wiring is specified in Division 26.
  - 2. Grounding: Connect unit components to ground in accordance with the National Electrical Code.

#### **3.03 ADJUSTING, CLEANING & PROTECTING**

- A. Adjust damper linkages for proper damper operation.
- B. Clean unit cabinet interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheel and cabinet.

### **3.04 COMMISSIONING**

- A. Final Checks Before Startup: Perform the following operations and checks before startup:
  - 1. Remove shipping blocking and bracing.
  - 2. Verify unit is secure on mountings and supporting devices and that connections for piping, ductwork and electrical are complete. Verify proper thermal overload protection is installed in motors, starters and disconnects.
  - 3. Perform cleaning and adjusting specified in this Section.
  - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operations. Reconnect fan drive system, align belts and install belt guards.
  - 5. Lubricate bearings, pulleys, belts and other moving parts with factory-recommended lubricants.
  - 6. Verify manual and automatic volume control and that fire and smoke dampers in connected ductwork systems are in the full-open position.
  - 7. Disable automatic temperature control operators.
- B. Starting procedures for fans:
  - 1. Energize motor; verify proper operation of motor, drive system and fan wheel. Adjust fan to indicated RPM.
    - a. Replace fan and motor pulleys as required to achieve design conditions.
  - 2. Measure and record motor electrical values for voltage and amperage.
- C. Shut unit down and reconnect automatic temperature control operators.

**END OF SECTION**

**SECTION 23 37 00 - AIR OUTLETS & INLETS****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- C. 23 31 13 - Metal Ductwork
- D. 23 33 00 - Air Duct Accessories

**1.02 SCOPE OF WORK**

- A. Install air outlets and inlets as indicated by drawings and schedules and by requirements of this Section.

**1.03 SUBMITTALS**

- A. Shop Drawings: Submit manufacturer's assembly-type shop drawings for each type of air outlet and inlet, indicating materials and methods of assembly of components.
- B. Maintenance Data: Submit maintenance data, including cleaning instructions for finishes, and spare parts lists. Include this data, product data and shop drawings in maintenance manuals.

**1.04 PRODUCT DELIVERY, STORAGE & HANDLING**

- A. Deliver air outlets and inlets wrapped in factory-fabricated fiberboard type containers. Identify on outside of container type of outlet or inlet and location to be installed. Avoid crushing or bending and prevent dirt and debris from entering and settling in devices.
- B. Store air outlets and inlets in original cartons and protect from weather and construction work traffic. Where possible, store indoors; when necessary to store outdoors, store above grade and enclose with waterproof wrapping.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Diffusers/Registers/Grilles: Metalaire, Carnes, Krueger, Nailor, Titus, Tuttle & Bailey, Price

**2.02 REGISTERS & GRILLES**

- A. Except as otherwise indicated, provide manufacturer's standard registers and grilles where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated; and as required for complete installation.
- B. Performance: Provide registers and grilles that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device as listed in manufacturer's current data.
- C. Surface Compatibility: Provide registers and grilles with border styles that are compatible with adjacent systems, and that are specifically manufactured to fit into construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of construction which will contain each type of register and grille.
- D. Types: Provide registers and grilles of type, capacity and with accessories and finishes as listed on register and grille schedule.

**PART 3 - EXECUTION**

**3.01 INSPECTION**

- A. Examine areas and conditions under which air outlets and inlets are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

- A. Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended functions.
- B. Coordinate with other work, including ductwork and duct accessories, as necessary to interface installation of air outlets and inlets with other work.
- C. Locate ceiling air diffusers, registers and grilles as indicated on general construction "Reflected Ceiling Plans." Unless otherwise indicated, locate units in center of acoustical ceiling modules.
- D. All register, grille, and diffuser connections shall have a minimum 2" collar as required by Code.

**END OF SECTION**

**SECTION 23 82 00 - TERMINAL UNITS****PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 General Mechanical Requirements
- B. 23 05 13 Motor Requirements for HVAC Equipment
- C. 23 05 23 Valves for HVAC Piping
- D. 23 05 29 Hangers and Supports for HVAC Piping & Equipment
- E. 23 05 93 Testing, Adjusting & Balancing for HVAC
- F. 23 21 13 Hydronic Piping
- G. 23 21 19 Hydronic Piping Specialties

**1.02 SCOPE OF WORK**

- A. Extent of terminal unit work is indicated by drawings and schedules, and by requirements of this Section.
- B. Types of terminal units required for project include the following: finned tube radiation, convectors, unit heaters, cabinet heaters, coils, radiant panels.

**1.03 SUBMITTALS**

- A. Shop Drawings: Submit assembly-type shop drawings showing unit dimensions, construction details and field connection details.
- B. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to terminal units. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
- C. Maintenance Data: Submit maintenance instructions, including lubrication instructions, filter replacement, motor and drive replacement, and spare parts lists. Include this data, product data and shop drawings in maintenance manuals; in accordance with requirements of Division 01.

**1.04 DELIVERY, STORAGE & HANDLING**

- A. Handle terminal units and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged terminal units or components; replace with new.
- B. Store terminal units and components in clean, dry place. Protect from weather, dirt, fumes, water, construction debris and physical damage.
- C. Comply with manufacturer's rigging and installation instructions for unloading terminal units and moving them to final location.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Convectors: Vulcan, Trane, Rittling, Sigma, Sterling, Airtherm

**2.02 CONVECTORS**

- A. Provide convectors having cabinet sizes and in locations as indicated, and of capacities, style, and having accessories as scheduled.

- B. Cabinets: Minimum 18-ga steel front and top panels, 20-ga side panels, and 20-ga back panels. Phosphatize and galvanize back panels, baked enamel finish with any color as chosen by Architect, not limited to manufacturer's standard options. Multiple colors may be chosen at no cost to project.
- C. Elements: Aluminum fins, ribbed steel side plates, fin-tube supports and copper tubes, cast-iron headers. Factory test each element to 150 psi air pressure under water.
- D. Accessories: Provide the following accessories:
  - 1. 1/2" insulation on cabinet back.
  - 2. Access doors in front for valve access.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Examine areas and conditions under which terminal units are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### **3.02 INSTALLATION OF CONVECTORS**

- A. Install convectors as indicated and in accordance with manufacturer's installation instructions.
- B. Locate convectors as indicated, coordinate with other trades to assure correct recess size for recessed convectors.

#### **3.03 ELECTRICAL WIRING**

- A. Install electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.
  - 1. Verify that electrical wiring installation is in accordance with manufacturer's submittals and installation requirements of Division 26 sections. Do not proceed with equipment startup until wiring installation is acceptable to equipment installer.

#### **3.04 ADJUSTING & CLEANING**

- A. After construction is completed, including painting, clean unit exposed surfaces, vacuum clean terminal coils and inside of cabinets.
- B. Retouch any marred or scratched surfaces of factory-finished cabinets, using finish materials furnished by manufacturer.
- C. Install new filter units for terminals requiring.

**END OF SECTION**



**SECTION 26 05 00 - BASIC MATERIALS & METHODS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.

**1.02 DRAWINGS & SPECIFICATIONS**

- A. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown on or mentioned in both. In case of any discrepancy in drawings or specifications, the matter shall immediately be submitted to the Architect/Engineer, without whose decision said discrepancy shall not be adjusted by the Contractor except at his own risk. Scale of drawings shall be field verified by Contractor.
- B. The Contractor shall consult the Architectural Drawings for all dimensions, furred spaces, suspended ceilings, etc. The Contractor shall also check the Architectural Drawings verifying the heights of cabinets and counters to place wall outlets over this equipment at the proper heights; location of closets, doors and window frames which may interfere. Particular attention shall also be given to the height and location of convectors and radiators. The Contractor shall check with other trades for interference and shall cooperate to avoid such interferences.
- C. The Contractor shall verify all rough-in locations and requirements with equipment supplier shop drawings prior to installation.

**1.03 MANUALS, PARTS LISTS & INSTRUCTIONS**

- A. Each Contractor shall furnish and turn over to the Engineer two (2) complete sets of manufacturer's instruction manuals. Manuals shall, in addition to one copy of each approved shop drawing, include operation and maintenance instructions for such items of equipment furnished, including assembly drawings and parts lists. Parts lists shall include identification symbols or parts numbers for all replaceable parts and assemblies. The list shall also include the name and address of the nearest supply house carrying spare parts for the equipment. These materials shall be bound in hard covers. Upon approval, these instructions will be turned over to the Owner. The Contractor shall also supervise the initial operation of all equipment and instruct an operator selected by the Owner to thoroughly acquaint him with the best operating and maintenance practice. The Contractor shall have the Owner sign off on all training.

**1.04 EQUIPMENT ACCESSIBILITY**

- A. The Contractor shall locate all apparatus requiring adjustments, cleaning or similar attention so that they will be readily accessible. This shall include access doors and panel of proper size for proper maintenance of various parts. Front top and side clearances to electrical equipment shall be in line with NEC.

**1.05 FIRE & SAFETY PRECAUTIONS**

- A. Each Contractor shall: Take all necessary precautions for safety of employees, employees of Owner and public; comply with applicable provisions of Federal, State and Local laws, ordinances and requirements; erect and properly maintain necessary safeguards for said protection as required by conditions and progress of job and shall post danger signs warning against hazards of construction. Each Contractor shall exercise extreme care to maintain and exercise adequate fire safety precautions throughout construction. Provide barriers around all excavations and openings where uncontrolled descent could cause injuries.

- B. All cutting, welding or brazing operations carried on in the vicinity of or accessible to combustible material shall be adequately protected to make certain that sparks or hot slag does not reach the combustible material and thus start a fire.
- C. Whenever combustible material has been exposed to molten metal or hot slag from welding or cutting operations, or splatter from electric-arc, a person shall be kept at the place of work for at least one hour after completion to make sure that smoldering fires have not been started.

#### **1.06 GUARANTEES**

- A. The Contractor shall assume responsibility for any defects which may develop in any part of the system caused by faulty workmanship, material or equipment and agrees to replace any such workmanship, material or equipment during a period of one year from the date of final acceptance of the work without cost to the Owner. Acceptance of the work shall not waive this guarantee.

### **PART 2 - PRODUCTS**

#### **2.01 PROTECTION**

- A. Materials - The Contractor shall, at all times, protect the materials and equipment to be installed in such a manner that when the installation is completed it will present the same new appearance as when uncrated.
- B. This shall be achieved by covering all equipment securely with weatherproofing canvas, by keeping other trades from abusing such material and equipment and by avoiding the final setting of such equipment in location where protection is either difficult or impractical. Any material or equipment damaged as a result of inadequate handling or protection may be ordered taken out and replaced to the satisfaction of the Engineer.
- C. Guards - Provide guards to enclose belts, pulleys, sheaves, gears and couplings, of galvanized expanded or perforated sheet steel with angle frame and angle or channel mounting supports. Make guard easily removable for access. Provide galvanized pipe railing guards where required. Conform to State and Federal codes and regulations.
- D. All materials shall be new, undamaged and shall bear the UL label of approval and shall be listed for use in each specific location unless approval does not apply.
- E. Samples of materials proposed for use shall be presented to the Engineer for his approval when requested.
- F. When two or more items of the same equipment are required, they shall be of the same manufacture.

#### **2.02 DEFECTIVE MATERIALS**

- A. In the event damaged or defective material is discovered during tests or during the guarantee period, this defective or damaged material shall be replaced at the Contractor's expense. The repair of defective or damaged materials shall be at the decision of the Engineer. Neither final payments nor any provision in the contract nor whole or partial use or occupancy of the premises shall constitute the acceptance of work not done in accordance with the specifications nor relieve the Contractor of liability for faulty materials or workmanship in accordance with the specification or law.

### **PART 3 - EXECUTION**

#### **3.01 MANUFACTURER'S DIRECTIONS**

- A. Materials and equipment shall be installed in strict accordance with the manufacturer's directions for

installation, connection and startup of factory-assembled units and/or composite parts assembled into a system unless specifically designated herein.

### **3.02 TRENCHING & BACKFILLING**

- A. Each Contractor shall perform his own excavation as necessary and required in compliance with the standards of Divisions 31 thru 33 and the additional applicable requirements listed below.
- B. Excavation may be either by hand or by machine. Remove all stones, unsound material and other foreign material from the trench bottom. Provide sheeting and bracing as required to hold walls of excavation. In the event bottoms are carried below grade, backfill to proper grade with sand at no expense to the Owner.
- C. Trenches for electrical conduits and cables shall have a minimum excavation depth to comply with the NEC or as shown on the drawings or called out in the specifications, the deepest depth shall govern, and shall be backfilled with sand or gravel 1/4" maximum dimension surrounding the conduit or cable 3" on all sides and thoroughly tamped in place. Place balance of the trench with excavated material, if sound, in 6" layers. Add berm for settlement. This backfill material shall be free of stones larger than 2". Compact to 95% density of original soil. Use special care in excavating and backfilling under buildings where compaction shall be 98% of original soil. Add moisture if required to secure maximum consolidation.
- D. In the event unsound materials are excavated and cannot be reused for backfilling, the Contractor shall provide and install suitable backfilling materials. Excess material not used in backfilling shall be removed from the site by the Contractor.
- E. Contractor to call Gopher State 1-800-252-1166 before any digging.

### **3.03 EXISTING CONDITIONS & SERVICE INTERRUPTIONS**

- A. When encountered in work, protect, brace, support, existing active services including, but not restricted to sewers, gas, electric and other systems where required for proper execution of work. If existing active services are encountered that required relocation, make request in writing for determination. Do not proceed with work until written directions are received. Do not prevent or disturb operation of active services that are to remain.
- B. When encountered in work, remove, cap or plug inactive services. Notify utility companies or municipal agencies having jurisdiction; protect or remove these services which will be shut down only during the time actually required to make necessary connections to existing work.
- C. Where work makes temporary shutdown of services unavoidable, shut down at night, or at such times as approved by Owner, which will cause least interference with established operating routine. Arrange to work continuously, including overtime, if required, to assure that services will be shut down only during the time actually required to make connections to existing work.

### **3.04 TESTS, INSPECTIONS & ADJUSTMENTS**

- A. Furnish all items and labor necessary for tests required in this Division. The Contractor shall notify the Engineer a reasonable period ahead of time before the tests are to be made. Concealed work shall remain uncovered until required tests have been completed; but, if necessary, tests on portions of the work may be made and these portions covered up after proving satisfactory. Tests shall be repeated after defects have been eliminated.
- B. Tests will be as prescribed by Local, State or National codes insofar as they apply. Where inspections are made by an enforcing agency, a copy of the Certificate of Compliance of Acceptance shall be forwarded to the Engineer before the final inspection will be made. Tests shall be made at the

Contractor's expense. Each portion of work shall be subject to inspection of the Engineer at times he deems necessary for inspection of materials and construction and shall give instructions as he may consider requisite.

- C. Workmanship, materials or equipment, either at the site or intended for it, are subject to inspection and approval of Engineer at any time. Contractor must render such facilities as Engineer requires for inspection whatever they may be. Engineer may reject and require removal from premises any materials or work which he may decide to be contrary to the contract. The Engineer shall have the right to make minor changes as may be considered necessary by job conditions, where no change in cost is involved.
- D. At the time of final inspection of the work under the contract, the work covered by this division shall be complete in every respect and in perfect operating condition. All surplus materials of every kind shall have been removed.
- E. After final inspection is made, the Contractor shall receive a list of items requiring adjustment, correction, replacement or completion. The Contractor shall comply completely with all the listed requirements.
- F. Test for opens, ground and shorts of feeders and branch circuits at time of construction. All equipment shall be left in first-class operating condition. All outlets, switches, light fixtures and devices shall be in first-class working order. Motors shall be tested for rotation at time of connections.
- G. All factory-assembled equipment shall be checked when being installed for loose, missing or broken parts. Any items found loose shall be tightened and items found broken or missing shall be replaced all at no expense to the Owner. Contractor shall obtain and pay for certification by State Electrical Inspector.
- H. Provide training to all Owner personnel on all basic electrical systems. Training shall include review of all installed systems, walk-through of systems, location of main electrical panels and panelboards, and all control panels.
- I. The Contractor shall furnish all instruments, labor, communication devices and expertise needed for conducting and recording tests.
- J. The Engineer may require a factory-trained representative to be on site at final walk-thru and training. The Engineer may require a factory-trained representative to be on site twice during the warranty period.

### **3.05 CUTTING & PATCHING**

- A. Each Contractor shall perform all cutting necessary to perform his work and shall patch damaged work. However, special permission shall be obtained from the Architect before cutting structural members or finished materials. All patching shall be performed in such a manner as to leave no visible trace and to return the part affected to the condition of undisturbed work. All conduit holes shall be core drilled in existing construction.

### **3.06 STREET, SIDEWALK & CURB REPAIR**

- A. Each Contractor will be responsible for the replacement of existing street pavement, curbs, sidewalks, etc., removed by him or damaged by him in the course of the work. Pavement repairs shall be done as required by the Owner, State or City; and the Contractor shall make the necessary arrangements to perform such repairs and shall pay all costs in connection with same unless such work is to be reconstructed under the General Contract.

### **3.07 ROOF CURBS & FLASHINGS**

- A. The Roofing Contractor will provide roof curbs and do all flashing for pipes, ducts and conduits at the

time the roofing material is installed providing conduit is in place at time of roofing, otherwise flashing will be responsibility of the Contractor.

### **3.08 PAINTING**

- A. Unless otherwise specified, all finished painting will be done by the Painting Contractor. The Contractor shall provide preservation and prime coats. This Contractor shall paint all hangers, straps, braces, supports and equipment requiring same installed by him immediately after installation with Rustoleum paint or equal. If equipment furnished by the Contractor has started to rust or is painted, equipment shall be repainted to the satisfaction of the Engineer.

### **3.09 CLEANING**

- A. Upon completion of work, all rubbish must be cleared away; all fixtures, panels, hangers and trim, etc., shall be thoroughly cleaned and ready for use. All fingermarks around access doors and outlet openings shall be cleaned or repainted if the marks cannot be removed by cleaning.

### **3.10 CORE DRILLING WALLS/FLOORS**

- A. Contractor shall provide all holes thru walls, floors and ceilings of existing construction necessary for the installation of new conduits. All holes shall be core drilled and of sufficient size to allow the conduit to pass thru the opening.
- B. All conduit passing thru these openings shall be sized for a snug fit around the conduit, or the openings are to be reduced by using grout or other cement type closing materials approved by the Engineer. The grout shall be troweled smooth on both sides of the wall and primed for painting.
- C. Firestopping - See Firestopping Specifications Section 07 84 00.

### **3.11 "PROVIDE"**

- A. "Provide" means to furnish and install.

**END OF SECTION**

**SECTION 26 05 01 - GENERAL PROVISIONS - ELECTRICAL****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the General Provisions of Division 01 apply to all work of this Section.
- B. The work to be done under this specification includes the furnishing of all labor, materials, equipment and services necessary for the proper completion of all electrical work.
- C. The omission of express reference to any parts necessary for or reasonably incidental to the complete installation shall not be construed as releasing the Contractor from furnishing such parts.

**1.02 PERMITS, LICENSES & FEES**

- A. The Contractor shall obtain and pay for all permits, notices, inspection fees, licenses, etc., necessary for the performance to the work included in this contract, including plan review costs; and he shall observe any requirements stipulated thereon.

**1.03 CODES, REGULATIONS & STANDARDS**

- A. All work under this division shall be in strict conformance with the applicable parts of the following codes, laws, rules, regulations and applicable standards of technical societies where referenced herein-after. References to standards, codes, regulations, etc., shall mean the latest edition of such publications adopted and published at date of the invitation to submit proposals.

National Electric Code (NEC)  
 Regulations of the State Department of Health  
 Regulations of the State Industrial Commission  
 Rules of the National Board of Fire Underwriters  
 Local Codes, Rules and Regulations  
 Occupational Safety and Health Act (OSHA)  
 State Building Code Division  
 Local Electric Utility  
 American Disabilities Act (ADA)  
 Minnesota Building Codes:  
   1300 Building Code  
   1302 Construction Approvals  
   1303 Minnesota Provisions  
   1305 Adoption of IBC  
   1306 Special Fire Protection  
   1307 Elevators & Related Devices  
   1311 Rehabilitation of Existing Buildings  
   1315 Electrical Code  
   1341 Accessibility Code  
   1346 Mechanical Code  
   1365 Snow Loads  
   4715 Plumbing Code  
   1323 Commercial Energy Code

**1.04 REFERENCES**

- A. References to standards, codes, specifications, recommendations shall mean the latest edition of such publications adopted and published at date of invitation to submit proposals. Reference to technical societies, trade organizations, governmental agencies is made in mechanical and electrical work sections in accordance with the following abbreviations:

AGA	American Gas Association
AIEE	American Institute of Electrical Engineers
ANSI	American National Standards Institute
ASHARE	American Society of Heating and Air Conditioning Refrigerating Engineers
ASTM	American Society for Testing Materials
CSD	Commodity Standards Division, US Department of Commerce
NAFM	National Association of Fan Manufacturers
NBFU	National Board of Fire Underwriters
NEC	National Electric Code
NEMA	National Electrical Manufacturers' Association
UL	Underwriters' Laboratories, Inc.

### 1.05 CONTRACTOR'S QUALIFICATIONS

- A. This Contractor shall be a licensed Class "A" Electrical Contractor in the State. All work shall be installed and completed by electricians skilled in their trade and shall be installed in a practical and workmanlike manner.

### 1.06 INSPECTION OF THE SITE

- A. The Contractor is urged to examine the site and familiarize himself with existing conditions on the premises and surrounding area. No extras will be authorized because of the Contractor's misunderstanding as to extra work required in order to comply with these plans and specifications, or his lack of knowledge of conditions in connection with the work. Information received by the Contractor from verbal conversations shall not be construed as relieving the Contractor from actually visiting the site and making his own analysis of conditions.

### 1.07 SHOP SUBMITTALS

- A. This Contractor shall submit for approval at least six (6) copies of shop drawings to the Engineer at least six (6) weeks in advance of ordering date. Shop drawings will be returned without consideration if the following are not included before submittal:
1. A check by this Contractor for space conformance and performance characteristics.
  2. Contractor's stamp or signature.
  3. Identify each item by equipment number (from the drawings) or, in absence of an equipment number, identify by specification section.
  4. Check or underline specific model to be submitted on catalog sheets containing several models.
- B. The Engineer's approval of the shop drawings is general and does not relieve the Contractor from the responsibility for adherence to the specifications, nor shall it relieve him of the responsibility for any error which may exist.
- C. Dimensions and quantities are the responsibility of the Contractor. Submit shop drawings on equipment listed on the equipment schedule of the drawings and the following pertinent to this project:
- |                                      |                   |                   |
|--------------------------------------|-------------------|-------------------|
| Main Distribution Board              | Panelboards       | Lighting Controls |
| Automatic Transfer Switch            | Motor Control     | Firestopping      |
| Emergency Generator                  | Alarm Systems     | Communications    |
| Electronic Safety & Security Systems | Lighting Fixtures | Wiring Devices    |
- D. Shop drawings and O&M manuals shall be provided on a CD at the end of the project. The CD shall include the shop drawings, O&M manuals, links to the web sites of all the manufacturers and links to all of the equipment specifications and manuals.

### 1.08 RECORD DRAWINGS

- A. The Contractor will be provided a clean set of drawings for the purpose of recording conduit routings (underground and concealed) and locations of equipment that deviate from the contract drawings. Additional detail of difficult routing shall be sketched on the record drawings to more clearly show routing around where interference was encountered during construction. Sufficient measurements shall also be recorded on the drawings to locate routings that have been made inaccessible by walls, floors or ceilings. Upon completion of the project, the record set of drawings will be reviewed with the Engineer before delivering to the Owner.
- B. Record Drawings - The Contractor shall update the CAD files of all changes made during construction and provide these files to the Engineer for approval before turning over to the Owner.

### 1.09 ABBREVIATIONS

- A. Following is a key to abbreviations used in mechanical and electrical work sections:

a-c	alternating current	Ht	total heat gain
AFF	above finish floor	ID	inside diameter
AFG	above finish grade	in or "	inch
amp	ampere	ips	intermediate-pressure
atm	atmosphere	ips	iron pipe size
boiler hp	boiler horsepower	kw	kilowatt
bhp	brake horsepower	kwhr	kilowatt/hour
BTU	British thermal unit	lb	pound
BTUH	BTU per hour	lin ft/LF	linear foot
C	degree Celsius	max	maximum
cfm	cubic feet/minute	M&E	Mechanical & Electrical
c.i.	cast iron	M&ER	M&E Requirements
c-p	chrome-plated	MBH	thousand BTU/hour
cu in	cubic inch	MCF	1000 cubic feet
cu ft/CF	cubic feet	min	minimum
cu yd	cubic yard	m-p	medium-pressure
db	decibel	o.a.	outside air
d-c	direct-current	o.c.	center to center or on centers
deg	degree	od / OD	outside diameter
dia	diameter	os&y	outside screw and yoke
dif	diffuser	oz	ounce
edr / EDR	equivalent direction radiation	prv	pressure reducing valve
exh	exhaust	psi	pounds/square inch
F	degree Fahrenheit	PVC	Polyvinyl Chloride
FBO	furnished by others	R.A.	return air
FD	Fire Department	RAG	return air grille
FD	floor drain	reg	register
fpm	feet/minute	rpm	revolutions/minute
F & T	float & thermostatic	sec	second
ft or '	foot	sq ft	square foot
gal	gallon	sq in	square inch
gph	gallons/hour	sp	static pressure
gpm	gallons/minute	swp	steam working pressure
Hg	mercury	std	standard
h-p	high-pressure	tdh	total dynamic head
hp	horsepower	temp	temperature
Hs	sensible heat gain	wwp	water working pressure
hr	hour	XFMR	transformer

### 1.10 STARTER CODE

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STARTER CODE



	A = MAGNETIC STARTER WITH OVERLOADS
1ST DIGIT	B = MANUAL STARTER WITH OVERLOADS
	C = TWO SPEED MAGNETIC STARTER
	D = ELECTRONIC SOFT START
2ND DIGIT	NO. OF POLES
3RD DIGIT	NEMA STARTER SIZE
4TH DIGIT	QUANTITY OF AUX. INTERLOCKS
	A = STOP - START IN COVER
	B = SELECTOR SWITCH IN COVER "OFF-HIGH-LOW"
5TH DIGIT	C = SELECTOR SWITCH IN COVER "HAND-OFF-AUTO"
	D = PILOT LIGHT IN COVER

NOTES

1. LOCATE STARTERS ON WALL AT 5'0" UP.
2. LOCATE MAGNETIC STARTERS IN ACCESSIBLE LOCATION FOR SERVICING.
3. THERMOSTATS FURNISHED BY OTHERS UNLESS OTHERWISE SHOWN.
4. ROOF VENTILATOR DISCONNECTS PROVIDED UNDER HOOD WITH FAN.

**PART 2 - PRODUCTS**

**2.01 SUBSTITUTE MATERIALS & EQUIPMENT**

- A. Contractor requests for materials and equipment in addition to that specified and not followed by "or equal" shall be considered substitution. Substitute materials and equipment will not be considered unless prior approval has been given by the Engineer. If such approvals are not requested, it shall be assumed materials and equipment specified will be furnished and no further substitution after the bid date will be accepted.
- B. "Or Equal Clause" - It shall be the sole responsibility of the Engineer to determine if materials, methods or procedures are "equal" to that which is specified. All such changes made without such authorization are subject to correction at no additional cost to the Owner. The "Or Equal Clause" in the General Conditions of this specification is not intended to allow the Contractor to redesign the system as specified. The Clause is also not intended to reduce the number of component parts as specified and as shown on the drawings.
- C. Request by the Contractor to use substitute equipment, methods or materials received at the Engineer's office will be considered only if received at least 7 calendar days prior to the Bid Opening date. Requests shall refer specifically to equipment number and/or specification section, and shall include data and drawings to allow the Engineer to compare the request for substitution. If approved, substitution will appear in addendum form. If a personal reply is desired, enclose a stamped, self-addressed envelope.
- D. Contractor shall be completely responsible for costs involved in equipment other than specified model number as to sizes, layout, interference with other equipment, access to appurtenances, changes in other appurtenances and additional work required because of this equipment change.

- E. Equipment called out as "No Substitution" shall be supplied as specified.

## 2.02 SALVAGE MATERIALS

- A. All materials removed by this Contractor shall be reviewed by the Owner. Materials not wanted by the Owner shall become the property of this Contractor and shall be removed by him from the premises. Material the Owner wants to keep shall be stored by him.

## 2.03 EXISTING WIRING & EQUIPMENT

- A. The Contractor shall disconnect all electrical power and controls of existing equipment in the existing building to be relocated. The Contractor shall connect electrical power to all new and relocated Owner's equipment. Existing conduits may be used wherever possible. Wiring to be abandoned shall be disconnected from the power source. In existing walls being removed, the downstream devices to remain shall have new wiring permanently installed for circuit continuity. Electrical Contractor shall disconnect and remove all existing electrical devices and wiring.
- B. Equipment Removal - This Contractor shall disconnect and remove existing light fixtures, electrical equipment, wiring, as indicated on the drawings or required to complete the work and blank off all boxes that are not to be reused. Concealed work not to be reused may be abandoned if disconnected from the electrical system and labeled for future use. Reconnect all down line devices that are affected by removal.

## PART 3 - EXECUTION

### 3.01 EQUIPMENT CONNECTIONS

- A. Unless otherwise specified, each contractor shall make all connections of his trade to all installed equipment whether provided by himself or by other contractors. Each contractor shall leave proper connections for equipment furnished by them including flanges, etc. Connections size shall be as indicated but not smaller than equipment.
- B. Plumbing - All domestic water, waste, vent and soil connections, including traps and fixture shutoffs, shall be made by the Plumbing Contractor.
- C. Steam, Condensate and Heating Water - All steam, condensate and hot water connections, including equipment, unions, traps and shutoffs, shall be made by the Heating Contractor.
- D. Electrical - Unless otherwise specified, the Electrical Contractor shall:
1. Perform all electric power wiring and make all electric power connections to all electrical equipment shown on the Electrical Drawings.
  2. Provide and install all starters, disconnects and overload protection. See motor and equipment schedule.
  3. Provide and install all control wiring shown only on the electrical drawings. Other control wiring shall be by the Contractor requiring the same.
- E. All Trades -
1. Furnish and set all motors required for their equipment.
  2. Submit a complete list and wiring diagrams to the Electrical Contractor and the Architect of all equipment showing the electrical characteristics.

### 3.02 COORDINATION OF WORK

- A. This Contractor shall coordinate the installation of all electrical equipment and appurtenances required for this project with other contractors to eliminate interferences. Installation shall be as shown on the

plans unless the coordination between contractors require minor deviations. These adjustments shall be made at no cost to the Owner. The Engineer shall be kept informed of all such deviations.

- B. Work or Supplies by Others - "Others" includes other contractors or persons outside the specified scope of Electrical Contractor or Electrical Subcontractors; such as General Contractor, Mechanical Contractor or Owner.

### **3.03 FINAL INSPECTION**

- A. When the project is complete and prior to acceptance by the Owner, a final inspection will be held. Before final inspection is made, the work shall be complete in accordance with plans and specifications.
- B. When the Owner is notified in writing that the work is complete, including the items noted on final inspection, a follow-up inspection will be made. The Contractor shall recognize the need for proper procedure and diligence for completing work on time, including prompt attention to finishing and follow-up work.
- C. Final payments will not be made until all corrective work and incomplete work has been properly finished. Additional corrective work found after the date of final payment will be subject to the provision of guarantees. No reduction in retained percentage will be considered until:
  - 1. The project is completed.
  - 2. Final inspection has been made.
  - 3. Corrective items and deficiencies noted on final inspection complete and finished as far as may be possible within the Contractor's control.
  - 4. Approval received from the Surety.
  - 5. Lien Waivers filed.

### **3.04 INSTRUCTION OF OWNER'S EMPLOYEES**

- A. Provide services of competent instructors, who will give full instructions in the care, adjustment and operation of all parts of the electrical system and equipment to the Owner's employees who are to have charge of the equipment.
- B. Each instructor shall be thoroughly familiar with all parts of the installation on which he is to give instructions and shall have full knowledge of the operating theory and practical operation-maintenance work. Factory-trained instructors shall be employed whenever they are available.
- C. Instructions shall be given during the regular work week after the building has been accepted and turned over to the Owner for regular operation. Provide a minimum of one man-week (40 hours) of instructions for electrical equipment and lighting. See individual sections for additional training of special systems.
- D. Document all instruction material, and submit prior to the commencement of training sessions and include with Operation and Maintenance Manuals.
- E. Provide detailed cost breakout of instruction and instructional materials. This breakout shall distinguish between each system and equipment.

### **3.05 CLEANING**

- A. The interior and exterior surfaces of electrical equipment enclosures shall be wiped or cleaned with a vacuum two weeks before scheduled use and again immediately prior to final completion.
- B. Accessible elements of disconnecting and protective items shall be cleaned with a vacuum before energizing.
- C. Scratches on painted surfaces shall be touched up with paint of equivalent quality and color.

**END OF SECTION**

**SECTION 26 05 02 - ELECTRICAL DEMOLITION****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this section.
- B. The work of this section includes all labor, material, equipment and services to do all demolition necessary to the construction for a complete job in accordance with the drawings and as specified herein.

**1.02 PROTECTION**

- A. Do all demolition in a careful and workmanlike manner as not to impair the strength or safety of the existing building.
- B. Existing conduit and feeders shall be temporarily supported where the existing circuit is to remain connected or be relocated.
- C. Coordinate with General Contractor and other trades during all demolition to avoid loss of services in other areas of the existing building and to prevent the spread of dust and foreign material into the occupied areas of the building.
- D. All debris must not be allowed to accumulate and shall be removed from the site immediately.

**1.03 DEMOLITION**

- A. Refer to all drawings for demolition areas. Visit the site before bidding to determine existing conditions. All notes are general and do not relieve the Contractor from disconnecting, removing and protecting all work required or necessary to complete the new construction.
- B. A general description of demolition items as follows:
  - 1. Lighting - Disconnect and remove all interior lighting including conduit, wiring, boxes, etc., except where existing circuits are to be reused or fixtures are to remain connected.
  - 2. Power - Disconnect and remove all wiring devices and equipment including conduit, wiring, boxes, etc., except where devices are shown to be reused and circuits to remain connected or extended. Panelboards and feeders to be disconnected shall first have the circuits verified by Electrical Contractor to determine if disconnection would create an outage on another floor. Provide temporary wiring and conduit to keep such circuits energized and connect to nearest panelboard spare breakers.
- C. All devices shown on demolition drawings are to be disconnected from electrical power and removed unless noted otherwise. Remove all conduit and wiring not being used.
- D. Electrical information shown on these plans has been compiled from previous construction drawings and job site observation and is included for the Contractor's information only. It shall not be construed as a guarantee that the systems were installed as shown. The Contractor shall field verify existing conditions and shall make modifications as necessary to complete the work as shown on the plans and in the specifications.
- E. Electrical Contractor shall disconnect and remove all electrical devices, including but not limited to, receptacles, switches, fire alarm system, exit light system, fixtures, wiring and conduit in all existing walls, ceiling and other demolition called out as being removed. Electrical Contractor shall reconnect "down line" devices affected by the removal of any devices; extend all wiring and/or raceways where necessary. Existing conduits and/or wiring shall be removed; abandon concealed conduit and/or wiring

and disconnect from source.

- F. Contractor shall remove all existing exposed conduit not being used. Cut off conduit flush where embedded in concrete. Verify removal with the Owner. Remove all existing wiring not being reused.
- G. Contractor shall verify all conduit and supports being reused meet current code and the specifications, including hanging methods.
- H. The floors, walls and ceilings shall be patched to match the existing conditions.
- I. Penetrations of rated floors, walls, and ceilings shall be firestopped. See architectural plans for ratings.

**END OF SECTION**

**SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS & CABLES****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and General Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material, equipment and services necessary to furnish and install wires and cables where shown or indicated on the drawings and specified herein.
- C. All wire and cable shall be new, of the best quality, and of the size, type and number indicated. Conductors shall be of soft annealed copper conforming to the requirements of ASTM specifications, latest edition. Unless otherwise noted, wire shall be rated 600V. All conduits are sized based on copper conductors unless noted on the drawings. Shall be listed or labeled by "UL."
- D. Neutral wire in all cases shall be provided with an outer identification of white or gray distinguishing color and shall be the same size as the phase wires unless otherwise noted. All branch wiring shall be color coded. #12 AWG wire shall be minimum size used throughout unless otherwise indicated on the drawings. All wire #10 AWG or larger and all control wiring shall be stranded.
- E. Electrical wire, cable and connectors shall be for power distribution, lighting circuits, equipment circuits, appliance circuits and motor circuits. All wiring and connectors shall be UL listed and labeled.
- F. Cross lines on the conduit runs indicate the number of wires to be installed. Where two or more neutrals are in one conduit, each shall be individually coded or rung out for identification of the proper circuit. Aluminum conductors shall be used only where shown on the drawings.
- G. Branch Circuit Color Coding -

<u>Color (120/208 volt)</u>	<u>Phase</u>
Black	A or 1
Red	B or 2
Blue	C or 3 (where applicable)
White or Gray	Neutral
Green	Equipment Ground

**PART 2 - PRODUCTS****2.01 WIRING**

- A. Wiring for branch circuits shall be THWN or THHN; 600 volt, 75°C minimum rating.
- B. Wiring pulled through wiring channels of continuous rows of lighting fixtures shall be THHN.
- C. Feeders shall be THWN.
- D. Type AC/MC cable shall be allowed for recessed light fixtures above a ceiling. No direct fixture-to-fixture connections are allowed.
- E. Compact aluminum conductors shall be allowed for feeders 200 amp and larger. (**Note:** Plans have copper wire sizing unless noted. Contractor to verify AL size and conduit.)
- F. Wiring placed underground shall be Type USE; 600V, 75°C min. (**Note:** Cannot be run inside building.)

## 2.02 CONNECTORS

- A. Joints for wiring sizes #10 and smaller shall be made with insulated, compression, spring-type connectors that exert pressure on the conductors as they are turned into the connector.
- B. #8 and larger connectors shall be solderless type lugs where the tightening screw does not bear directly on the conductor. Mechanical compression type connectors may be used if installed with a tool designed for the purpose by the manufacturer of the connector.
- C. Some of the known manufacturers are, but not limited to, as follows: Anixter, Rome, American, General, Southwire and Triangle, Appleton, Burndy, Panduit, Ideal, 3M, OZ Gedney, T&B.
- D. Mechanical compression-type connectors shall be used on all aluminum conductors. Connectors shall be used with a tool designed for the purpose by the manufacturer of the connector.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Install all electric wiring as indicated on the drawings in line with NEC, latest edition. Pull all conductors simultaneously when installed in the same raceway.
- B. Install all joints and splices with equal or better mechanical and dielectric strength than the conductors being spliced.
- C. All joint connectors must be compatible with the conductors being used.

### 3.02 FEEDER CIRCUITS

- A. Secondary electrical distribution shall be 120/208V, 3 phase, 4W, for power, lighting and outlets. Furnish and install all feeders from panels to various loads as indicated and specified. Feeders shall be of the types and sizes indicated.

### 3.03 BRANCH CIRCUIT SYSTEMS

- A. Power Circuits - Branch circuits shall be installed from power distribution panels to individual outlets or control equipment as indicated on the plans. Conductors shall be of the size and type noted and installed in conduit of size indicated or required by the number of conductors involved. Each motor shall be supplied by an individual branch circuit from the power distribution center (panelboard) indicated on the plans. Circuit conductors and raceways shall be of the size and type noted on the drawings.
- B. Lighting Circuits – Branch circuit conductors for the general lighting system shall be installed in conduit from the panelboard to outlets and between outlets as indicated on the plans. No wire smaller than #12 shall be used for any lighting branch circuit. If the single distance from panelboard to first outlet exceeds 50 ft., the minimum size conductor for this run shall be #10. If, in special cases, this distance must be exceeded, larger conductors of sizes noted on the plans shall be installed.
- C. Outlets shall be as specified herein and shall be of a type approved for installation conditions encountered (flush plaster or drywall, masonry construction, concrete slab, surface-mounted boxes or conduit fittings).
- D. Receptacle Circuits – Furnish and install branch circuits to receptacle outlets as noted on the plans. Circuits shall be as indicated in specific areas. No wire smaller than #12 shall be used for any branch circuit supplying convenience outlets.
- E. For excessively long runs (50 ft. or more) from panelboard to first receptacle outlet, minimum size wire

shall be #10 with conductors between outlets being #12. Receptacle circuits shall be circuit breaker controlled as indicated on the plans. Receptacles for specific areas shall be of the size and type indicated on the plans and specified herein.

**END OF SECTION**



**SECTION 26 05 26 - GROUNDING & BONDING FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material, equipment and services necessary to furnish and install all grounding as shown on the drawings and specified herein.

**1.02 SYSTEM DESCRIPTION**

- A. All conduit systems, switchboxes, cabinets, motor frames, switchgear, transformers and all other electrical equipment shall be solidly grounded in strict accordance with the NEC to form a continuous, permanent and effective grounding system.
- B. Grounding shall be connected to building water line if metallic. Alternate grounding as shown on the drawings are reinforcing rods in footings (minimum of 20 lin.ft. of rod). Additional grounds are grounding electrodes, ground rods, loop systems, separately derived grounds and connection to building steel.
- C. Neutrals shall be bonded to the grounding system only at the building service entrance and when establishing a separately derived system such as the secondary side of transformers.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Manufacturers offering grounding products shall be used wherever possible. All grounding products shall be UL listed and approved.

**2.02 MANUFACTURERS**

- A. Some of the known manufacturers of grounding products are, but not limited to, as follows: Burndy Corp., Crouse Hinds, Gould, Ideal, T&B, Blackburn, Joslyn and Cadweld.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Grounding shall be coordinated with utility, other contractors and all electrical systems requiring grounding.
- B. Where clean grounds are shown for electric equipment, the grounding conductor shall run separately to the main grounding point.
- C. Where grounding bars or grounding plates are shown, they shall be a minimum of 1/4" thick copper plate with lugs for connection of grounding conductors. They shall be provided with standoff insulators so tapped screws may pass through the grounding plate.
- D. Where grounding resistance tests are required, Contractor shall provide all labor and equipment to make the test and provide test reports to the Engineer. Generally, tests will be Fall of potential ground tests.
- E. Greenfield flexible conduit, MC Cable, and Type UA liquid type flexible conduits shall have proper size ground conductor jumper bonded to the rigid conduit system and to the electrical equipment where the

flexible conduit is terminated.

- F. The ground lugs on all 3-wire ground type receptacles shall be securely connected to the grounding system per the NEC. Additional grounding grids, driven ground rods, etc., shall be as shown on the drawings or specified in the section requiring additional grounding. GFI protection breakers or receptacles shall be used on construction site and where shown on the drawings.
- G. All underground grounding connections shall be made by the thermatic process of heat fusion of the electrical components together. All independent grounding conductors in a ground grid or loop grounding system shall be minimum of #2 stranded tinned bare grounding conductor.
- H. Special attention of the Contractor is called to metallic building components such as wireways, mechanical piping, building steel (structural and reinforcing) that they must be grounded in an approved manner according to the NEC.

**END OF SECTION**

**SECTION 26 05 29 - HANGERS & SUPPORTS FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install supporting devices where shown or indicated on the drawings and as specified herein.

**1.02 SUMMARY**

- A. Contractor to provide and install supporting devices for proper installation of electrical raceway systems and other equipment installed under this Division.
- B. Design and construct supporting structures of strength to safely withstand stresses to which they may be subjected and to distribute properly the load and impact over building areas. Conform to applicable technical societies standards, also to codes and regulations of State and Local agencies having jurisdiction.
- C. Equipment Supports - Supports shall be made of durable materials suitable for the application and shall be painted with two coats Rustoleum paint. Where excessively corrosive conditions exist, supports shall be protected by galvanizing or other approved suitable methods.
- D. Perforated iron or tie wires for supporting conduits will not be permitted. The required strength of the support assemblies and size and type of anchors shall be based on the combined weight of the conduit, wiring and hangers. Brackets, braces, reinforcing angles, etc., shall be installed in all partitions, ceilings, etc., not sufficient in themselves to support the electrical apparatus.
- E. Horizontal conduit runs shall be securely fastened to structure or, if suspended, shall be fastened to trapeze type hangers, which in turn shall be securely fastened. Fasteners shall extend into the structural walls and ceilings and not to the surface finish only. Horizontal runs shall be fastened at intervals as required by NEC including the last support to the outlet, junction box or fitting.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Provide supporting devices to the clevis hangers with rods, clamps, couplings, conduit straps, trapeze hangers, expansion anchors, toggle bolts and formed channels.

**2.02 MANUFACTURERS**

- A. Some of the known manufacturers are, but not limited to, as follows: Ackerman Johnson Fastening Systems, Inc.; Ideal Industries, Inc.; Joslyn Mfg. and Supply Co.; McGraw Edison Co.; Rawlplug Co., Inc.; Star Expansion Co.; Allied Tube and Conduit Corp.; B-Line Systems, Inc.; Greenfield Mfg. Co., Inc.; OZ Gedney Div; General Signal Corp.; Power-Strut Div; Van Huffer Tube Corp.; Unistrut Div; GTE Products Corp.

**2.03 SLEEVES**

- A. Fabricate sheetmetal sleeves from galvanized sheetmetal 3" and smaller - 20 gauge, 4" to 6" - 16 gauge, over 6" - 14 gauge; other sleeves shall be steel pipe Schedule 40, iron pipe ductile or cast iron, PVC Schedule 80 plastic. Provide STI EZ path where firestopping is required.

#### **2.04 SEALS**

- A. Where sleeves penetrate foundation walls below grade or exterior walls, make watertight with a watertight, non-toxic, UL classified sealing material of rubber, plastic or silicone type material supported and compressed by pressure rings.

#### **2.05 FIRESTOP**

- A. Where conduits, sleeves, etc., pass through, leave or enter fire-rated spaces; openings around conduits and equipment shall be firestopped. See Spec Section 07 84 00.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION**

- A. Install hangers, anchors, sleeves and seals as necessary to complete the electrical work in line with NEC and interface the work with other crafts to prevent interference. All supporting devices shall be attached to the building structure for support. Arrange parallel runs to be supported on trapeze hangers when practical.
- B. In pipe shafts, vertical run conduits may be supported at every floor but support intervals must not exceed 20 ft., and conduit must be made up with threaded fittings. If over 10 ft. between supports, exposed conduits 2" and smaller shall be fastened with one hole malleable iron clamps with brass or plated machine screw. Support larger sizes with rods and ring or clevis type hangers. Support multiple runs of conduit on trapeze hangers fastened to the building structure and spaced in line with NEC, latest edition.
- C. Where concrete foundations or pedestals are indicated or required, they shall be a minimum of 3" height and extend a minimum of 2" beyond machine bed plate. Machinery shall be leveled and grouted. Anchor bolts are to be hooked or threaded with nut and plate on embedded end. Floor stands, ceiling or wall mountings shall be constructed of structural steel members and properly braced and fastened to building structure, as approved. Each Contractor shall provide his own concrete. Concrete shall be not less than 4,000# mix.
- D. Light fixtures, conduit, and other electrical equipment shall have its own supports to structural. They shall not be supported by ductwork or other mechanical systems.

**END OF SECTION**

**SECTION 26 05 33 - RACEWAYS & BOXES FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install raceways, boxes and fittings where shown or indicated on the drawings and as specified herein.
- C. All wires, conductors and cables shall be installed in ferrous metal conduit unless otherwise indicated. See Section 26 05 19.

**1.02 RELATED SECTIONS**

- A. Divisions 00 and 01 shall be part of this Section.
- B. See power distribution, lighting, special systems, communication, heating and cooling, control and instrumentation sections for additional requirements.

**PART 2 - PRODUCTS****2.01 RIGID CONDUIT**

- A. Rigid conduit shall be ferrous galvanized inside and out. Fittings shall be ferrous galvanized threaded NEC standard elbows. Crouse Hinds, OZ/Gedney or Appleton condulets. Allied, Triangle, Wheatland or approved equal. Rigid conduit may be used throughout and shall be used as follows:
  - 1. In all structural stub ups or stub downs or out of slabs, where damage is possible.
  - 2. In structural slabs.
  - 3. In slabs on grade.
  - 4. In walls next to earth.
  - 5. Underground runs.
  - 6. Exterior runs.
  - 7. Where voltage exceeds 600V.
  - 8. Where hazardous conditions require.

**2.02 INTERMEDIATE METAL CONDUIT**

- A. Intermediate metal conduit and fittings as outlined in NEC Article 345 shall be ferrous and galvanized inside and out. The conduit shall use only approved ferrous threaded fitting couplings and connectors. Intermediate metal conduit may be used throughout except in the following locations:
  - 1. In wet or damp areas unless fittings are threaded and approved.
  - 2. In masonry load bearing walls unless fittings are threaded and approved.
  - 3. In structure slabs and slabs on grade unless fittings are threaded and approved.
  - 4. Where voltage exceeds 600V.
  - 5. Hazardous areas.

**2.03 EMT (ELECTRICAL METALLIC TUBING)**

- A. EMT may be used throughout except in the following locations:
  - 1. Wet or damp areas.

2. Where subject to mechanical hazards.
  3. In poured concrete load bearing walls.
  4. In structural slabs.
  5. In slabs on grade.
  6. In walls next to earth.
  7. Underground runs.
  8. Exterior runs.
  9. Over 4" in size.
- B. EMT shall be Wheatland, Allied, Bridgeport or approved equal. Fittings shall be UL approved, galvanized, set screw type, all steel devices. No indenter type fittings shall be used. Fittings shall be Appleton, T&B, Gedney, Raco or approved equal.

**C. MC cabling may be used in place of EMT where allowed by code.**

**2.04 FLEXIBLE METAL CONDUIT**

- A. Flexible conduit may be used in dry locations as follows:
1. Fixture connections.
  2. In stud walls.
  3. In bar joist construction.
- B. Flexible conduit shall not be used where nonflexible conduit is to be installed. See Rigid Conduit Section. Flexible conduit shall be Electroflex, Anixter, International or equal. Fittings shall be malleable compression type, all steel devices, as manufactured by Appleton, T&B, Raco, Gedney or approved equal. Fittings shall be as approved by the National Electric Code and of such type as to provide an adequate ground connection.

**2.05 LIQUIDTIGHT METAL CONDUIT**

- A. Liquidtight metal conduit may be used where flexible metal conduit can be used and shall be used where flexible watertight connections are required to:
1. Motors.
  2. Light fixtures.
  3. Weatherproof electrical equipment.
  4. When shown on the drawings.
- B. Liquidtight conduit by DIST, AFC or Electroflex, or approved equal.

**2.06 SURFACE RACEWAY**

- A. Provide and install where shown on the drawings surface raceway complete with necessary boxes, fittings, closers and other appurtenances to make a complete raceway system. Material shall be surface mounted and run in a neat and orderly fashion being parallel or right angles to fixed walls, doors or other guiding lines of the building. Raceway by Wiremold, Mono Systems or approved equal and shall be prime coated with manufacturer's standard ivory color.

**2.07 RIGID NON-METALLIC CONDUIT**

- A. Rigid non-metallic conduit may be used in the locations as follows:
1. Direct burial underground installation.
  2. Encased or embedded in concrete.
  3. In corrosive environments that are called out on the drawings.

- B. Rigid non-metallic conduit shall NOT be used in the locations as follows:
  - 1. Where subject to mechanical hazards.
  - 2. Inside buildings.
  - 3. In hazardous locations.
- C. Rigid non-metallic conduit shall be a minimum of Schedule 40.
- D. Provide Schedule 80 non-metallic conduit under roads and other improved surfaces.
- E. Primer/cleaner shall be used for the gluing of all joints.

## **2.08 FASTENERS, SUPPORTS & HANGERS**

- A. See Section ELECTRICAL SUPPORTING DEVICES in this specification.

## **2.09 ALUMINUM CONDUITS & FITTINGS**

- A. Aluminum conduits and fittings shall not be used.

## **2.10 OUTLET BOXES**

- A. Outlet boxes connected by thinwall conduit (EMT) shall be of the galvanized steel knockout type. Switch and receptacle boxes connected by rigid conduit shall be of the cast type with threaded hubs being part of the box. Each switch or gang of switches, light, power, outlet box in the interior of the building shall be equipped with an outlet box of the appropriate type unless installed in a wireway as shown on the plans.
- B. Boxes of the knockout type shall have plaster ring erected with rim flush with the finished wall where concealed. Boxes shall have the required dimensions to accommodate all conduit and wire entering same. Minimum depth shall be 1-1/2".

## **2.11 JUNCTION & PULL BOXES**

- A. Junction and pull boxes shall be furnished and installed wherever necessary for compliance with specifications; for convenience; for wire arrangement; or for conformance with the NEC. Junction and pull boxes shall be of code grade steel coated on the inside and outside to prevent oxidation, and size shall conform to the NEC standards or larger.

# **PART 3 - EXECUTION**

## **3.01 PREPARATION MATERIALS & FITTINGS**

- A. Cut conduit with hacksaw or approved pipe cutter, ream ends to remove burrs, sharp edges. Do not use running threads. The use of indenter type fittings will not be permitted anywhere in the project. Set screw type steel fittings shall be used with thinwall conduit in all dry locations. Use threaded, watertight fittings with all rigid, heavy wall conduit and intermediate conduit.
- B. Conduits shall have locknuts and bushings where they enter boxes, fittings or cabinets except at threaded hubs. Install fiber type bushings on all conduit terminations larger than 1-1/4" in diameter. Thermoplastic type bushings may be used 1-1/4" and smaller sizes. Provide grounding bushing where required.
- C. Flexible metal conduit and fittings shall be used for flexible connections to motors (36" maximum) and recessed lighting fixtures (48" maximum). Use sealtight conduit in wet locations where flexible conduits are required (3 ft. maximum).

- D. Fittings such as condulets shall be used on feeder conduits 1-1/2" and smaller. Junction and pull boxes shall be used on conduits 2" and above. No condulets shall be used in telephone or TV conduits.

### **3.02 CONDUIT BENDS**

- A. Bends shall be made with care to a radius shown in the NEC.

### **3.03 ABOVE GROUND INSTALLATION OF CONDUIT**

- A. Install all conduits concealed unless indicated. No conduits shall be installed in or under roof insulation unless approved by the Engineer before installation. Do not expose conduit bends at floor or ceiling. Install conduit horizontal only where unavoidable, never diagonally.
- B. Install exposed conduit only after proposed runs have been checked on plans and at site for interference with work of other trades. Wherever possible, locate conduits above piping of other trades. Install exposed conduit in parallel rows neatly racked parallel or perpendicular to walls, ceilings and structural members; keep at least 3/4" from such surfaces.
- C. Locate conduits at least 12" from steam, hot water and other hot surfaces. Provide conduit expansion joints or fittings where conduit crosses building expansion joint, also in straight runs of conduit 200 ft. or longer, and shall be proper size with allowance for building expansion, contraction and settlement. Install approved watertight flashing in all conduit runs penetrating the membrane roof. Provide pipe sleeve curbs where conduits pass through interior floors.
- D. All above ground conduit shall be 3/4" or larger.
- E. All conduit for telecommunications shall be 1-1/4" or larger.

### **3.04 UNDERGROUND INSTALLATION OF CONDUIT**

- A. All ferrous conduits coming in direct contact with the earth or sand bedding shall be coated with bitumastic #50 or similar material for the entire length of the run. Where conduits pass through outside and ground floor slabs, walls, such conduit entrance shall be grouted in and waterproofed inside and out with an approved caulking compound. Conduit in cinder fill shall be encased in a non-cinder concrete envelope at least 2" thick. Where waterproof membranes are installed below slabs, this Contractor shall use care in installing conduit and shall not puncture this membrane.
- B. In concrete construction, maintain a minimum of 3/4" cover over all conduit. Conduit shall be run parallel to the main reinforcement and maximum size in slabs shall be 1" conduit. Conduit in concrete or masonry shall be securely held in place during pouring and construction operations; provide template to hold groups of conduits terminating together, or passing through fire walls or floors. Install conduit with minimum number of joints; join with threaded couplings and fitting; make watertight with compound applied to male thread; make joints butted.
- C. Minimum cover requirements 0 - 600v; see NEC Tables.
- D. Install conduit for site lighting 6" from walks and 24" from curbs.
- E. All underground conduit shall be 1" or larger.
- F. PVC covered steel elbows shall be used in underground PVC runs.

### **3.05 CLEANING OF CONDUIT**

- A. Clean conduits with wire brush or other approved means prior to pulling in conductors. Leave 16-gauge nylon pull cord in all empty conduits. Do not pull in conductors under the following



conditions:

1. Before conduit and outlet boxes are permanently secured in place.
2. In concealed conduits located in plastered rooms, before brown scratch coat has been applied to walls/ceilings.
3. In concrete floors before slab is poured.

### 3.06 INSTALLATION OF ELECTRICAL BOXES & FITTINGS

- A. Install electrical boxes and fittings as indicated, in accordance with manufacturer's written instructions and applicable requirements of NEC. Draw all locknuts and fittings up tight. Provide bushings.
- B. Where located in suspended ceilings, boxes shall be attached to steel bars of sufficient length to firmly anchor the box to the ceiling supporting members. All outlet boxes shall be rigidly secured in place. Where fixtures shall be used, the outlet boxes shall be equipped with fixture studs. Where boxes are in brick, tile or other masonry which will not be plastered, deep sectional boxes shall be used, and they shall be completely covered with the plates or fixtures. Electricians shall cooperate with the bricklayers so no ragged joints will be exposed.
- C. Surface-mounted boxes shall be fastened to walls by use of plastic anchors and machine screws. Boxes located in between joist construction shall be fastened to the joist by use of metal strut fastened to the joists if fixtures are to be hung from the box.
- D. Coordinate with other crafts to locate boxes and fittings as shown on the drawings. Provide weathertight boxes where shown marked W.P. Close all unused holes in all boxes. Provide access to all boxes and avoid back-to-back in walls. No aluminum boxes or fittings will be used in concrete. Set boxes plumb and flush with the finished wall where recessed.
- E. Ground all boxes in line with National Electrical Code.

### 3.07 ALIGNMENT & LOCATION OF OUTLETS

- A. The below dimensions are given to assist the Contractor in estimating. The exact location shall be obtained from the Engineer at the time of installation or as shown on the drawings (consult architectural drawings). All measurements shall be taken from the Architect's general construction drawings. Mounting heights of equipment shall be as tabulated below:
 

1. Wall switches	42" or as noted
2. Thermostats	48" or as noted
3. Convenience receptacles – general wall type	1'6" or as noted
4. Panels	5'0"
5. Telephone/data	1'6" or as noted
6. Pushbutton station	5'0"
7. Disconnect switches	5'0"
8. Outdoor receptacles	4'0" or as noted
9. Motor starter	5'0"
- B. Heights are given from center of outlet or box to finished floor except as noted.
- C. Electrical Contractor to review mechanical and architectural drawings and notify Architect/Engineer where conflicts exist prior to starting work in any given area.
- D. Devices on opposite sides of fire-rated walls shall be spaced accordingly to conform to all applicable codes and maintain fire rating of wall.

**END OF SECTION**

**SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install electrical identification where shown or indicated on the drawings and as specified herein.
- C. Electrical identification shall be provided for buried cables, electrical power, control and communication conductors, phase relationships, nameplates, signs.
- D. Samples shall be submitted upon request by the Engineer.

**1.02 SUBMITTALS**

- A. Shop Drawings shall be submitted for approval for equipment as follows:
  - 1. Index of identification labels.
  - 2. Index of nameplates.
- B. Samples of each type of proposed label and/or signs shall be submitted for examination/approval as requested.
- C. Record Drawings - The Contractor shall keep layout plans on the job site, marking all changes made during installation. A set of as-built/record drawings shall be submitted.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Wire coding shall be insulation colors, painting, taping or precolored manufactured permanent plastic colors.
- B. Branch, feeder and service colors 600 volts and below shall be:
 

<u>Color</u>	<u>Phase</u>
Black	A or 1
Red	B or 2
Blue	C or 3 (where applicable)
White	Neutral
Green	Equipment Ground
- C. Underground plastic tape shall be a minimum of 6" wide and shall be red in color with "Danger: Electrical Cables Buried Beneath" or a standard manufacturer's logo. Tape shall have an embedded continuous metallic strip or core.
- D. Engraved plastic laminate, black face and white letters punched for mechanical fasteners.

**PART 3 - EXECUTION****3.01 NAMEPLATES - PLASTIC LAMINATE**

- A. This Contractor shall furnish and install nameplates as herein specified. All nameplates shall be black-white-black laminated 1/8" plastic plates. Letters or numbers shall be cut through the black and into the

white of the plate. Inscriptions shall be symmetrical about the centerlines of plates and the plates shall be attached to surface with self-tapping screws.

1. This identification shall indicate main switches, feeder number where feeder serves a number of branch circuit panelboards, or special equipment where this equipment operates from a separate feeder, disconnects and control equipment.
2. All branch circuit panelboards shall be identified as to letter designated on the drawings. Plastic plates as described in the above paragraph shall be used for this purpose and shall be attached to the inside of panelboard trim.
3. Each branch circuit panelboard cabinet shall be furnished with a clear plastic covered, typed circuit schedule mounted in a metal card holder. Each protective device shall be numbered consecutively at the device.
4. All disconnect switches, devices and controls for motors and equipment shall be identified with plastic plates as specified in the first paragraph.
5. Equipment and controls, where remotely located from each other, shall have included in the identification the final room number and unit number of the associated equipment and/or controls. Final room numbers will be furnished by the Owner. Equipment numbers should correspond to numbers for associated equipment.

### **3.02 IDENTIFICATION**

- A. Primary feeders shall be identified at all terminals, junction points, vaults and splices by means of stamped brass or lead tags attached by woven glass or nylon cord. The tags shall be approximately 1-1/2" in diameter and shall have 1/4" high lettering, tags shall read feeder number. Phases shall not be marked on tags. Each single conductor cable in each manhole shall be tagged at least twice. Tagging shall be completed before feeder is energized.
- B. Existing tags shall be removed from existing cable when they are no longer correct.

### **3.03 UNDERGROUND PLASTIC TAPE**

- A. During backfilling of each exterior underground electrical, signal or communication cable, install continuous underground-type plastic line marker located directly over buried line at 12" above the cables. Where multiple small lines are buried in a common trench and do not exceed an overall width of 18", install a single tape.

**END OF SECTION**

**SECTION 26 09 23 - LIGHTING CONTROL DEVICES****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and General Requirements apply to all work of this Section.

**1.02 SHOP DRAWINGS**

- A. As per General Requirements.

**PART 2 - PRODUCTS****2.01 OCCUPANCY SENSORS**

- A. Wattstopper Model #DT-200 or approved equal:
1. Combination of passive infrared and ultrasonic technologies.
  2. Dual Sensing Verification Principle (DSVP) reduces false triggers.
  3. Pulse count processing.
  4. Provide immunity to RFI and EMI.
  5. Advanced Signal Processing Circuitry helps eliminate false ONs.
  6. 40kHz frequency ultrasonic transmission.
  7. Digital time delay with tolerance of  $\pm 2\%$ ; adjustable from 15 seconds to 30 minutes.
  8. Isolated relay with N/O and N/C outputs; rated for 1 amp at 24 VDC.
  9. Built-in light level sensor from 2 to 200 footcandles.
  10. Swivel mounting bracket for corner mounting to wall or ceiling.
  11. Multi-level Fresnel lens.
  12. Two LEDs indicate occupancy detection by each technology.
- B. Provide power packs as required for each occupancy sensor, see details. Shall be self-contained, transformer relay system. 120V input, 24V DC; 150ma output. Watt stopper Model #B120E-P or approved equal.

**2.02 WIRING**

- A. See drawings for sizes and connections.

**2.03 MANUFACTURERS**

- A. Subject to compliance with requirements, provide systems by one of the following manufacturers. (Contractor to note that these systems do not all install in the same manner as indicated on the drawings.)
1. Wattstopper
  2. Hubbell
  3. nLight
  4. Leviton
  5. Sensor Switch

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Contractor shall provide and install all items together and wire to make a complete system.

1. Contractor to provide back boxes and mount all dimmers and sensors.
2. Connect to the circuits called out on the drawings.
3. Ground the system in line with NEC.
4. Test the dimmers and sensors after installation.
5. Manufacturer shall provide step-by-step instructions for installation and start-up calibration to design footcandle levels.
6. Contractor shall relocate all sensors one time at no expense to the Owner to get complete coverage and no false indications.
7. Provide and install power packs on all devices as necessary to provide a complete system.

### **3.02 GENERAL INFORMATION**

- A. Lighting control devices shall be installed in a neat and workmanlike manner. The NEIS Standard Practices for Good Workmanship in Electrical Contracting NECA 1-2006 is hereby adopted to define such workmanship and the installation of conductors and cables.
- B. System installation shall be accomplished in a professional manner by qualified personnel regularly engaged in and experienced in this type of work. All wiring and devices shall be installed in accordance with manufacturer's UL recommendations. Class II low-voltage occupancy sensor wiring in exposed areas shall be installed in metallic raceway. Class II low-voltage occupancy sensor wiring in concealed accessible areas that is not installed in conduit shall be plenum rated. All system junction boxes must be clearly marked for easy identification.
- C. Wiring splices shall be avoided and, if needed, must be made only in junction boxes. All conductors shall be labeled on each end with "E-Z markers," or equivalent. Conductors in cabinets shall be carefully formed and harnessed so that each drops off directly opposite its terminal Cabinet terminals shall be numbered and coded. All controls, function switches, etc., shall be clearly labeled on the equipment panel.
- D. All sensors shall blend in aesthetically; coordinate with Architect for final finish color.

### **3.03 PLANNING/COORDINATION**

- A. The Contractor shall arrange a *pre-installation* meeting with the lighting control device vendor(s), and an Owner's representative at the Owner's facility to verify placement of devices, installation criteria, and functionality.

### **3.04 OCCUPANCY SENSOR INSTALLATION**

- A. The Contractor shall locate and aim sensors for complete and proper volumetric coverage per manufacturer's recommendations. Rooms shall have 90% to 100% coverage of the designated controlled area to accommodate all occupancy habits of single or multiple occupants at any location with the room or area. The Locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms or areas which are to be provided with sensor protection. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation (placement and quantity) in the available space and to overcome local difficulties due to space limitations or interference of structural components. Provide additional occupancy sensors in a room or space beyond that indicated if necessary to provide coverage required.

### **3.05 WIRING INSTALLATION**

- A. Wiring Method - Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be 3/4".
1. Wirings within Enclosures - Comply with NECA 1. Separate power-limited and non power-limited conductors according to conductor manufacturer's written instructions.
  2. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
  3. Splices, Taps and Terminations - Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

### 3.06 COORDINATION

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including luminaires, HVAC equipment, smoke detectors, fire-suppression system and partition assemblies.

### 3.07 FIELD QUALITY CONTROL

- A. Field wiring shall be checked and tested to ensure that there are no grounds, opens or shorts. The minimum allowable resistance between any two conductors or between conductors and ground is 10 megohms after all conduit and conductors have been installed, but before the sensors are connected. Perform walk tests and set up procedures for each sensor as specified by the manufacturer to ensure that all boundaries of coverage are sufficient.
- B. The manufacturer's representative shall submit a written test report that the system has been 100% tested, approved and commissioned. The final test shall be witnessed by the Owner's representative, Electrical Engineer, Electrical Contractor, and performed by the manufacturer's representative. The final test report must be received and acknowledged by the Engineer prior to request for final payment. Perform all electrical and mechanical tests required by the equipment manufacturer. The installer shall prepare a checkout report and submit in triplicate, one copy of which will be registered with the equipment manufacturer. The report shall include, but not be limited to:
1. Indication that lighting control devices are properly located, adjusted, (time-delay confirmed, aimed and sensitivity level determined) and communicating with desired load equipment.
  2. Indication that lighting control devices are functioning as determined by the specifications and as decided at the pre-installation meeting.
  3. Identification and replacement of lighting control devices that failed tests.
  4. Tests of individual areas as applicable.
  5. Installer's name and date.
- C. Occupancy Adjustments - When requested within 10 months of date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

### 3.08 WARRANTY

- A. The Contractor shall provide parts and labor warranty for the completed occupancy sensor system wiring, equipment, and software to be free from inherent mechanical and electrical defects for a period of one year from the date of completion and acceptance as issued by the Architect's certification of

completion. The individual sensors shall have a five-year warranty.

### **3.09 DEMONSTRATION**

- A. Coordinate demonstration of products specified in this Section with demonstration requirements for any lighting control systems specified elsewhere in Division 26 Sections.
- B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices. Refer to Division 01 Section "Demonstration and Training." The training shall familiarize the Owner's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems. Provide forms and schedules for organization and documentation of all system operating parameters.

### **3.10 RECORD DRAWING DOCUMENTATION**

- A. After successful completion of all the tests and adjustments listed above, the Contractor shall submit the following information to the Engineer in the Operation, Maintenance and Warranty Data Manuals.
  - 1. Complete As-Built Wiring Diagrams
  - 2. System Operating Manuals
  - 3. Copy of the Test Report, as detailed above

**END OF SECTION**

**SECTION 26 24 16 - PANELBOARDS****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. Furnish and install where indicated on the drawings, circuit breaker panelboards in accordance with the following specifications and schedule indicated on the drawings.
- C. Panelboards shall be for power distribution, lighting and appliances as shown on the panelboard schedule. All breakers, spaces, cable connections, box, front and special modifications shall be furnished and connected to make a complete distribution system.
- D. Manufacturers must have built panelboard products of size, type and rating required for a minimum of 5 years. Panels must be UL listed and labeled.

**PART 2 - PRODUCTS****2.01 PANELBOARDS**

- A. Panelboards shall be circuit breaker panelboards of the double row type and shall be built in strict accordance with the requirements of NEC for panels of this class. The panels shall have main breakers or main lugs with solid neutral for service as shown on panel schedule and be equipped with circuit breakers of the bolted type, style and capacity as listed in the schedule. The panels shall also have spare space for future additions as listed in the schedule. Buss shall be tin-plated AL. Minimum breaker rating 10,000 amps I.C. for 240VAC and 14,000 for 480VAC. See Panel Schedule for other ratings.

**2.02 CABINETS**

- A. The panelboard cabinets shall be constructed of code gauge galvanized steel and of sufficient dimensions to accommodate all connections and in no case smaller than will provide 4" side gutters. The cabinets shall be arranged for flush mounting, or surface mounting, as indicated in the panelboard schedule or shown on the drawings and be complete with card holders, director cards and celluloid protectors on back of flush-mounting doors. All circuits shall be clearly typewritten. The flush-mounting door shall have flush lock and door, and all cabinets of the same type shall be keyed to the same key. Provide ground bar. Cabinets located next to each other shall be of the same size.
- B. Door trim shall be installed by flat oval head screws, into tapped holes in rough-in box flanges. Contractor to drill flanges on job site to ensure plumb, square and true appearance. NQOD/NLAB boxes shall be 20" wide and 5-3/4" deep. Provide full length piano-type hinges.

**2.03 MANUFACTURERS**

- A. Some of the known manufacturers are, but not limited to, as follows: Cutler-Hammer; General Electric Company; Siemens; Square D Company; or approved equal.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Installation shall comply with NEC.
- B. Provide 1/2" air space behind panels surface mounted to concrete wall construction by use of iron spacers. Securely fasten spacers and panels together.



- C. All lugs, terminals and screws shall be tightened in accordance with manufacturer's torquing requirements.
- D. Provide typewritten circuit directory. Provide Owner with an additional photocopy of all directories. Typewritten directory shall have room numbers of areas served listed. Room numbers shall be obtained from the Owner based upon final room numbering of the building. Plan room numbers shall not be acceptable.
- E. Ground panels and conduits with grounding bushings, jumper, bonding lugs and grounding conductor as approved by NEC or as shown on the drawings.
- F. Provide dead front and close all unused openings.
- G. Label busses by phases and cabinet by letter or number as shown on panel schedule.
- H. Replace any breakers that are faulty.
- I. Provide a 1" conduit stub above the ceiling for every 3 spares and/or spaces in all panels recessed in walls (minimum of 2).
- J. Provide replacement typewritten circuit directories for all existing panels that had circuits changed. Contractor shall provide Owner with photocopies of original and replacement directories. Typewritten directory shall have room numbers of areas served listed. Room numbers shall be obtained from the Owner based upon final room numbering of the building. Plan room numbers shall not be acceptable.
- K. Contractor shall identify the panelboard ID and power origin on each panelboard on the inside of the door.

**END OF SECTION**

**SECTION 26 27 26 - WIRING DEVICES****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install wiring devices where shown or indicated on the drawings and as specified herein.
- C. Typical wiring devices are:
  - 1. Receptacles
  - 2. Ground-fault circuit interrupters
  - 3. Switches
  - 4. Wallplates
- D. Colors shall be:
  - 1. Devices - White (Note: must be approved by Architect at shop drawing); provide Red where emergency power
  - 2. Plates - Nylon
- E. Contractor is responsible for matching color of all wiring devices, lighting controls, low voltage and technology.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Some of the known manufacturers are, but not limited to, as follows: Cooper; Hubbell, Inc.; Leviton Mfg. Co.; Pass and Seymour, Inc.

**2.02 WALL PLATES**

- A. Wall plates shall be high-performance unbreakable nylon construction for switches and receptacles for indoor use in finished spaces. Configuration to fit the device.

**2.03 SWITCHES**

- A. Switches

Single pole	Cooper 2221
3-way	Cooper 2223
4-way	Cooper 2224
- B. Rated 120/277V, 20 amp.

**2.04 RECEPTACLES**

- A. 120V, 15 amp, single phase duplex grounded type, tamper resistant - Cooper TRBR15.
- B. 120V, 20 amp, single phase duplex grounded type, tamper resistant - Cooper TRBR20.
- C. GFI - Cooper TRVGR20 - 20 amp proper rectangular plate, tamper resistant. Install where required by

code.

- D. Outdoor convenience outlets shall be GFI receptacle as per Receptacles above with Cooper WLRD-1 weatherproof plate for damp locations. Provide Cooper 4966 or equal for wet locations.

### **2.05 GROUND FAULT PROTECTION**

- A. Ground fault protection shall be provided in line with the NEC for construction sites.

## **PART 3 - EXECUTION**

### **3.01 GENERAL**

- A. Switches shown ganged on drawings shall be installed under one plate, having the number of openings required. Sectional plates shall not be used to make up the required number of gangs. All plates for block or brick walls shall be jumbo size. All plates in one room or space shall be of the same size (i.e., jumbo or standard).
- B. Surface or flush mounted outlet boxes shown in the working areas shall be appropriate steel or cast plates, galvanized or cadmium plated as required to fit the box and the device located in the box.
- C. Coordinate with others such as block work, painting, etc., to interface the wiring devices with other work.
- D. Install wiring devices after wiring has been pulled.
- E. Install wall plates after painting has been completed.
- F. Ground all devices in line with National Electrical Code.
- G. After installation, test the devices for opens, shorts, grounds, improper circuit connectors, and polarity.
- H. All devices shall be marked on the back of the plate in permanent marker and on the front of the plate in "Kroy" tape or similar with the panel and circuit designation.

**END OF SECTION**

**SECTION 26 28 13 - FUSES****PART 1 - GENERAL****1.01 SUMMARY**

- A. Fuses
- B. See Equipment Schedule and Switchboard Schedules on drawings.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Fuses for motor circuits:
  - 1. Bussman Fusetron, FRN-R (250V), and FRS-R (600V)
  - 2. Ferraz Shawmut Trionic, TR-R (250V) and TRS-R (600V)
  - 3. Littelfuse Slo-Blo, FLN-RL (250V) or FLS-R (600V)
- B. Special application:
  - 1. For in-line fuses and weatherproof assembly, provide Bussman Tron Type HEB fuse holder and Type KTK fuse with 1A0513 boot or equal.
  - 2. For protection of control circuit transformers, provide Bussman Type FNQ time delay fuses or equal.

**2.02 MATERIALS**

- A. All fuses shall be of the same manufacturer.
- B. Fuses for motor circuits, 600 amperes and less:
  - 1. UL, Class RK5, time delay with interrupting ratings of 200,000 amperes.
  - 2. Shall also serve remote fused disconnect switches.
  - 3. Shall be rejection type.
- C. Provide one set of spare fuses for each size and type of fuse represented on project.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. All fusible switches either separately mounted or panel mounted shall be equipped with fuses as specified herein.
- B. Provide label inside each switch and motor starter cover stating type of fuse required for replacement.
- C. Fuses shall not be installed until equipment is ready to be energized.

**END OF SECTION**

**SECTION 26 28 16 - ENCLOSED SWITCHES & CIRCUIT BREAKERS****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install circuit and motor disconnects where shown or indicated on the drawings and as specified herein.
- C. The Contractor shall be responsible for the complete installation of electrical wiring as specified hereinafter and shown on the electrical drawings.
- D. Types of circuit and motor disconnect switches in this Section include the following:
  - 1. Equipment disconnects.
  - 2. Appliance disconnects.
  - 3. Motor-circuit disconnects.
- E. Wires/cables, raceways, and electrical boxes and fittings required in connection with circuit and motor disconnect work are specified in other Division 26 Basic Electrical Materials and Methods sections.

**1.02 QUALITY ASSURANCE**

- A. Manufacturers: Firms regularly engaged in manufacture of circuit and motor disconnect switches of types and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Installer's Qualifications: Firm with at least 3 years of successful installation experience with projects utilizing circuit and motor disconnect work similar to that required for this project.
- C. NEC Compliance: Comply with NEC requirements pertaining to construction installation of electrical circuit and motor disconnect devices.

**1.03 SUBMITTALS**

- A. Submit shop drawings of electrical circuit and motor disconnect switches showing accurately scaled switches, their layouts and proximity to associated equipment.

**1.04 DISCONNECTS**

- A. Disconnects shall be provided for all motors as required by code. Outlets for motors shall be located after the motor location has been determined.
- B. Disconnect switches shall be motor-rated switches, fused unless noted otherwise. Where a disconnect and starter are required or shown in one location, a combination switch and starter may be provided.
- C. All cabinet heaters, unit ventilators and roof exhaust fans shall have disconnects mounted within the unit enclosures. Disconnects shall usually be provided by the supplier of this equipment (check mechanical specifications and equipment schedules).
- D. Motor disconnects shall have auxiliary pole for control circuit disconnect where required and shall have provision for locking off the switch.

**1.05 CIRCUIT DISCONNECTS (SAFETY SWITCHES)**

- A. Furnish and install enclosed safety switches where shown on the drawings or otherwise required by Code. Safety switches shall be equipped with low peak or equal and approved type delay fuses of proper current capacity and voltage. Switches shall be Type HD. Type GD shall not be allowed.

### **1.06 FUSES**

- A. Fuses shall be furnished in ratings suitable for the particular application. This rating shall be such as to give protection to cable, motors or other equipment which the fuses are protecting. Disconnects shall be provided with time delay fuses or equal type or as recommended by the equipment manufacturer. Other fuses shall be as specified. Contractor shall field verify all nameplate ratings of equipment installed and provide proper sized fuses.

## **PART 2 - PRODUCTS**

### **2.01 EQUIPMENT**

- A. All disconnects shall be UL listed and labeled for 250V or 600V as the case may be.

### **2.02 DISCONNECT SWITCHES**

- A. Heavy-Duty Safety Switches: Provide surface-mounted, heavy-duty type, sheet-steel enclosed safety switches of types, sizes, and electrical characteristics indicated; fusible type, rated 600V, 60 Hz, 3 blades, 4 poles, solid neutral; and incorporating quick-make, quick-break type switches; construct so that switch blades are visible in OFF position with door open. Equip with operating handle which is integral part of enclosure base and whose operating position is easily recognizable, and is padlockable in OFF position; construct current carrying parts of high-conductivity copper, with silver-tungsten type switch contacts, and positive pressure type reinforced fuse clips. Provide NEMA Type enclosures as called out. Provide a minimum of NEMA 3R outdoors.

### **2.03 MANUFACTURERS**

- A. Some of the known manufacturers are, but not limited to, as follows: Cutler-Hammer, Inc.; Bussmann; General Electric Co.; Siemens; Square D Company; or approved equal.
- B. See motor and equipment schedules for equipment to be supplied and installed by the Electrical Contractor.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. Coordinate the location of control and disconnects with others to best use the available space and provide clearances for electrical gear as required by National Electrical Code.
- B. Install disconnect switches for use with motor-driven equipment within sight of the motor and the controller location.
- C. Ground all motor control and disconnects to provide the necessary electrical safety required by NEC.
- D. Install all fuses of the proper size. Verify all nameplate ratings.

### **3.02 FIELD QUALITY CONTROL**

- A. Subsequent to completion of installation of electrical disconnect switches, energize circuitry and demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units

at project site, then retest to demonstrate compliance; otherwise remove and replace with new units and retest.

**END OF SECTION**

**SECTION 26 29 13 - ENCLOSED CONTROLLERS (MOTOR STARTERS)****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install motor starters and control devices where shown or indicated on the drawings and as specified herein.
- C. All controls of a similar type for motors shall be of the same manufacturer, except where a specialty control is required, the controls may be of other manufacture.
- D. All overload heaters shall be sized to suit the motor nameplate current. Three-phase motors shall have three overload devices. Check and record motor current to insure that motor is not overloaded. Submit list of all motor currents and overload relay settings to the Engineer.
- E. Equipment for control of motors shall be located in such a manner as to be accessible and so as to most effectively serve motor. Disconnects shall be provided for all motors where required by code. Outlets for motors shall be located after the motor location has been determined.
- F. Contactors in magnetic starters shall have N.O. interlock for the holding circuit, under voltage protection and provisions for adding two additional interlocks. Overload relays shall be manual reset unless noted otherwise. Remote pushbuttons, controls and starters in finished spaces shall be flush mounted unless otherwise noted. Check with Engineer in case of questions. All starters controlled by automatic devices shall have "Hand-Off-Automatic" switch supplied and connected. All pilot lights shall be long life type. Control circuits shall be separately fused. Provide one pole for each ungrounded conductor.
- G. All cabinet heaters, unit ventilators and roof exhaust fans shall have disconnects mounted within the unit enclosures. Disconnects shall usually be provided by the supplier of this equipment. (Check mechanical specifications and equipment schedules.)
- H. All the special controls, such as unit heater thermostats and aquastats, E-P relays, P-E switches, float switches, ventilating unit control, etc., will be furnished by and installed by the Mechanical Contractor.
- I. Submit shop drawings on all motor starters and control equipment.
- J. All motor starters shall be UL listed and labeled.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Across the line or reduced voltage start with number of poles and size as shown on the drawings. Enclosures shall be as called out as NEMA type. Coil voltage shall be 120V. (CONTRACTOR NOTE: Where motors operate on 208, 240 or 480 volts, the Contractor shall provide a step down control transformer complete with fuse and shall provide an oversized enclosure to accommodate the control transformer.) Overload protective device shall be resettable. Manual motor starters shall have overload and enclosure as called out.
- B. Manufacturers are Allen Bradley, Sq. D, GE, Cutler Hammer or approved equal.
- C. Fractional horsepower motors shall have fractional horsepower manual starting switch units complete with overload elements and pilot light. For flush units, furnish satin finish stainless steel plates. For surface units, furnish the proper plate.



- D. All motors 5 HP and over shall have electronic soft starts to limit motor torque upon starting. Square Altistart or equal by GE, Cutler Hammer.
- E. Contractor shall size starters according to NEC tables. Overloads shall be sized at motor name plate rating.

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

- A. Mount where control will be accessible. Provide overloads in line with motor ampere rating. Ground motors with separate grounding conductors in line with Sections 430 and 250 of NEC.
- B. Install disconnect switches for use with motor-driven equipment within sight of the motor and the controller location.
- C. Ground all motor control and disconnects to provide the necessary electrical safety required by NEC.
- D. Install all overload heaters and fuses of the proper size.
- E. Install controls for motors as shown on motor schedule and plans. (Electrician to provide and install all disconnects, starters and overloads where called for.) Disconnects shall be motor horsepower rated.
- F. Provide and install all conduit, boxes and wire necessary shown on the electrical drawings. All line voltage control wiring shall be #12 THWN stranded or as shown. See "Equipment Schedule" for exact details of necessary control wiring for each unit.
- G. All VFDs furnished by others shall be installed by this Contractor and shall be considered the motor starter.

**END OF SECTION**

**SECTION 26 51 14 – LED LIGHTING****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. The Drawings, the provisions of the Contract including the General and Supplementary Conditions and the General Requirements apply to the work of this Section.

**1.02 QUALITY ASSURANCE**

- A. Conduct testing per the applicable IESNA and ANSI approved methods for products using Solid-State Lighting (SSL) sources. Test laboratories must be either National Voluntary Laboratory Accreditation Program (NVLAP) accredited for solid-state lighting testing as part of the Energy-Efficient Lighting Products laboratory accreditation program or one of the qualified labs listed on the Doe SSL web site ([http://www1.eere.energy.gov/buildings/ssl/test\\_labs.html](http://www1.eere.energy.gov/buildings/ssl/test_labs.html)) .
- B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

**1.03 SUBMITTALS**

- A. Shop Drawings shall be submitted for approval for the following:
1. Luminaires
  2. Emergency lighting units, including battery and charger
- B. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, maintenance and warranty data manuals.

**1.04 WARRANTY**

- A. Standard Warranty:
1. Provide a written **five-year** on-site replacement material, fixture finish and workmanship warranty. On-site replacement includes transportation, removal and installation of new products. Finish warranty must include warranty against failure or substantial deterioration such as blistering, cracking, peeling, chalking or fading.
  2. Provide a written **five-year** replacement material warranty for defective or non-starting LED source assemblies.
  3. Provide a written **five-year** replacement material warranty on all power supply units (PSUs).
  4. Provide a written **five-year** replacement warranty for luminaires producing inadequately-maintained illuminance levels at end of warranty period, as prorated from levels expected at end of useful life. For example, a luminaire expected to produce 70% of initial lumens at 100,000 hours would be expected to last over 11 years (continuous operation), so levels would be expected to be at 87% of initial at end of five-year warranty period. Warranty must cover all light sources (LED package, LED array or LED module) including, but not limited to the LED die, encapsulate and phosphor. If the expected useful life of the luminaire system as defined in Section 2.05 is not maintained, then the manufacturer must replace the light source(s) or luminaire as needed.
  5. Warranty period must begin on date of possession. The supplier will provide the Owner with appropriate signed warranty certificates. The Owner must receive certificates.

**PART 2 – PRODUCTS**

## **2.01 GENERAL**

- A. Luminaires must be the type indicated on Drawings and as specified. Fixtures of the same type must be provided by one manufacturer.
- B. All electrical equipment and material shall be new and bear a recognized testing laboratory's label, where applicable. The type of equipment and/or material shall be designated by the location where it will be installed and so defined by NEMA/NFPA 70 standards.
- C. Provide luminaires with lamps for each outlet shown on the Drawings and as specified herein. See luminaire schedule on the Drawings.
- D. The type of luminaires required are as noted by a capital letter on the Drawings. Contractor shall be solely responsible for the exact quantities. Any outlets not specifically noted on the Drawings shall be equipped with luminaires similar to those in rooms used for like purposes. No extra compensation will be allowed for luminaires for lighting outlets required, but not noted with luminaire type.
- E. All housing finishes must be baked-on enamel, anodized, or powder-coated, unless otherwise specified in subsections below.

## **2.02 MANUFACTURERS**

- A. In Luminaire Schedule and subject to compliance with requirements below, provide products by one of the manufacturers shown in schedule.

## **PART 3 – EXECUTION**

### **3.01 GENERAL INSTALLATION**

- A. Luminaires shall be installed in a neat and workmanlike manner. The NEIS Standard Practices for Good Workmanship in Electrical Contracting NECA 1-2006 is hereby adopted to define such workmanship and the installation of conductors and cables.
- B. Provide all equipment, wiring, conduit and junction boxes required for the installation of a complete and operating system in accordance with applicable local, state and national codes, the manufacturer's recommendations, these plans and specifications.

### **3.02 EXAMINATION**

- A. Examine conditions for compliance with lighting fixture (luminaire) and ambient-temperature requirements for each luminaire.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.
- C. Examine walls, floors, roofs and concrete bases for suitable mounting conditions where luminaire will be installed.
- D. Verify that ground connections are in place and requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" have been met.

### **3.03 INSTALLATION**

- A. Luminaires: Set level, plumb and square with ceilings and walls. Install lamps in each fixture.
- B. Support for Luminaires in or on Grid-type Suspended Ceilings: Use grid as a support element.

1. Install a minimum of four (4) ceiling support system rods or wires for each fixture. Locate not more than 6" from luminaire corners.
  2. Support Clips: Fasten to luminaires and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
  3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panels and support fixtures independently with at least two 3/4" metal channels spanning and secured to ceiling tees.
- C. Suspended Luminaire Support:
1. Pendants and Rods: Where longer than 48", brace to limit swinging.
  2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
  3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors."
- E. Provide luminaires and installations to meet seismic requirements of Codes and Standards and AHJ.

### 3.04 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
- B. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- C. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.
1. Verify operation of photoelectric controls.
- D. Prepare a written report of tests, inspections, observations and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

### 3.05 COORDINATION

- A. Coordinate layout and installation of luminaires and suspension system with other construction that penetrates ceiling or is supported by them, including HVAC equipment, fire suppression system and partition assemblies.

**END OF SECTION**

**SECTION 26 52 00 - EMERGENCY LIGHTING****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and General Requirements apply to all work of this Section.
- B. This Section includes all labor, material, equipment and services necessary to furnish and install emergency lighting and related items to complete the work indicated on the drawings and described in the specifications.

**1.02 SHOP DRAWINGS** (as per General Requirements)**PART 2 - PRODUCTS****2.01 EMERGENCY BATTERY LIGHTING UNIT – 3.6 VOLT**

- A. Provide and install 3.6 volt emergency battery lighting unit rated 6 watts for 1-1/2 hours. Unit to have two 1.5 watt led flood lights mounted on the unit. Charger shall be self-contained with the unit. Unit to be UL listed maintenance-free nickel cadmium with 7-year warranty. Securely fasten to structural members. Connect to constant source of power as shown. Lithonia, Teldyne, Elan, Exide, Surelights or approved equal.
- B. Remote Heads -
  - 1. Remote single head LED 1.5 watt sealed beam, mount on switchbox.
  - 2. Remote double LED 1.5 watt sealed beam remote unit. Mount on switchbox.
- C. Remote fixtures for use outdoors shall be raintight with gaskets. Unit shall be connected to the lighting power supply and shall operate if this power supply fails. Provide guards on all battery lighting units and remote heads.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Mount on switchbox with suitable covers. Remote fixtures for use outdoors shall be raintight and to be provided with gaskets. Units shall be connected to the lighting circuit power supply and shall operate if this power supply fails. Provide guards on all remote lighting units.

**END OF SECTION**

**SECTION 26 89 50 - ELECTRIC HAND DRYERS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install electric hand dryers as shown on the drawings and herein specified.

**1.02 SUMMARY**

- A. Provide and install electrically operated hand dryers as shown on the drawings and herein specified.

**1.03 DESCRIPTION OF SYSTEM**

- A. Contractor shall make all power connections for electric hand dryers.
- B. Electric hand dryers shall have "hands-free" operation.
- C. Air output shall be on bottom of unit. Nozzles will not be acceptable.
- D. Mount units at height as shown on drawings. Coordinate with Architect before rough-in for exact location of each unit.

**PART 2 - PRODUCTS****2.01 ELECTRIC HAND DRYERS**

- A. Electric hand dryers shall be World Airmax DMX5-973 with #304 stainless steel brushed finish.
- B. 110-120V AC, Single-Phase, 60 Hz
- C. 2300 Watts Rated Power
- D. Motor Type – 1/6 HP
- E. Motor Speed – 12,000 RPM
- F. Operation – Automatic
- G. Operating Airflow – 238 CFM
- H. 5-Year Warranty
- I. Color to be stainless steel.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Installation shall conform to NEC.
- B. Installation shall conform to all applicable State and Local Codes.

- C. Contractor shall provide and install branch circuit wiring and panel circuit breaker for each hand dryer. Branch circuit wiring shall be 2 #12, 1 #12 ground in 1/2" conduit. Panel circuit breaker shall be 20A-1P. Provide one dedicated circuit for each hand dryer.
- D. Contractor shall test each electric hand dryer for correct operation.

**END OF SECTION**

**SECTION 31 00 00 - EARTHWORK****PART 1 – GENERAL****1.01 GOVERNING SPECIFICATIONS**

- A. The State of Minnesota Department of Transportation “Standard Specification for Construction”, 2016 Edition shall apply to work covered by this Specification except as modified or altered in these Special Conditions.

Modifications herein shall take precedence over the provisions of the referenced Standard Specifications. Section numbers and headings refer to the corresponding sections of the above referenced Standard Specifications.

**1.02 SUBMITTALS**

- A. None.

**PART 2 – PRODUCTS (Not Used)****PART 3 – EXECUTION****3.01 EARTHWORK**

- A. Construction Requirements:

Excavation and embankment construction shall be performed in accordance with the provisions of 2105, except as modified below.

Embankments shall be compacted as required herein by the Quality (ordinary) Compaction Method.

The finished graded surface shall be in reasonably close conformity with the cross/sections shown in the Plans and the lines and grades directed by the Architect.

Excavation and backfill operations shall be conducted so as to maintain all existing utilities in service at all times.

Rock excavation shall consist of all materials that cannot, in the Architect/Engineer’s opinion, be excavated without drilling and blasting or without the use of rippers, together with all boulders and other detached rock each having a volume of 3 cubic yards or more.

Section 2105.3 D Disposition of Excavated Material is hereby amended to read as follows:

Excavated materials shall be utilized, to the fullest extent practicable and so far as the material is suitable, for construction of the embankments or as may otherwise be indicated in the Plans. The Architect/Engineer will designate those soils, which are considered unsuitable or unstable with respect to the requirements of the Plans and the provisions hereof. Peat, muskeg, muck, rock, and other unsuitable materials shall be disposed of by the Contractor.

Excavated materials may be utilized inside building footprint and around building footings if approved by geotechnical engineer. Please see unit price in Bid Form for credit.

No stone or salvaged bituminous material exceeding three inches in greatest dimension will be permitted in the upper six inches of the roadbed embankment nor within 18 inches of a structure. No stones exceeding six inches in greatest dimension will be permitted in the upper 12 inches of the roadbed embankment.



All combustible debris materials (stumps, roots, logs, brush, etc.) together with all noncombustible materials other than soils (oversized rock, broken concrete, metals, etc.) that cannot be placed satisfactorily in the embankments shall be disposed of in accordance with the provisions of 2104.3C. No burning shall be allowed within the city limits.

All surplus excavated soils and rock that are not wasted, stockpiled, or otherwise disposed of as specifically allowed or required by the Contract shall become the property of the Contractor and shall be lawfully disposed of by him outside of the Project limits.

The Owner reserves the right to require the Contractor to deliver surplus materials to streets, alleys, public properties or other locations designated or approved by the Engineer. If the Owner does not designate other sites the surplus material may be disposed of at the same site as the concrete and bituminous materials.

**END OF SECTION**

**SECTION 31 10 00 SITE PREPARATION****PART 1 GENERAL****1.01 SCOPE OF WORK**

A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.

B. This Section shall include furnishing all labor, material and equipment necessary to do all site preparation for the building, and do any work related to the earthwork construction.

C. Related Work Specified Elsewhere:

1. Demolition - Section 02 40 00
2. Excavation & Backfilling - Section 31 23 00
3. Topsoil - Section 32 91 00

C. Work includes, but is not limited to:

1. Protection of improvements.
2. Location of utilities and coordination with utility companies.
3. Furnishing and maintaining environmental/control measures.
4. Site demolition and abandonments.

**1.02 APPLICABLE STANDARDS**

A. All work shall comply with the Minnesota Department of Transportation Standard Specifications for Construction, current edition (MNDOT Std. Spec.), except as otherwise specified in this section. The measurement and payment provisions of the referenced standard do not apply.

**PART 2 (NOT USED)****PART 3 EXECUTION****3.01 CLEARING AND GRUBBING**

A. All vegetation including trees, brush, roots and other plants shall be removed to the "project limits" as shown on the drawings. Removal work shall include all stumps and roots.

**3.02 PROTECTION**

A. Protect improvements on site and on adjoining properties. Provide barricades, coverings, or other types of protection as necessary to prevent damage and to safeguard against injury. Restore to original condition improvements damaged by the work or improvements which required temporary removal during construction.

B. Maintain survey monuments, reference points, and benchmarks; notify A/E of disturbance to markers.

C. No extra payment or time will be allowed for protection work that could have been suspected or anticipated by site inspection and interpretation of bidding documents prior to execution of contract.

### **3.03 UTILITIES**

- A. Location and description of underground utilities and structures shown on drawings are approximate and are based on records available to Owner or surface features indicating their existence. There may be other utilities within project area that are not shown.
- B. Notify Gopher State One Call (800.252.1166) of construction operations at least 48 hours before beginning work near their facilities. Do not begin excavation work until underground utility locations have been marked.
- C. Use caution when excavating so that exact location of underground utilities, both known and unknown, may be determined. Provide adequate protection and support for utilities during construction operations.
- D. If uncharted or incorrectly charted utilities are encountered during excavation work, or if proposed construction conflicts with existing utilities, give prompt notice and submit proposed solution to A/E for approval. Cooperate with Owner and public and private utility companies to keep their services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

### **3.04 ENVIRONMENTAL CONTROLS**

- A. Maintain erosion control measures to protect the project site and prevent sediment pollution of adjacent water courses and properties.
  - 1. Install erosion control measures prior to start of construction and maintain them until final completion of work. Unless otherwise instructed, remove temporary erosion control measures prior to final application for payment.
  - 2. Construct and maintain filter fabric barriers, straw bale barriers, or temporary diversions to receive runoff leaving site.
  - 3. Protect storm drain inlets by using inlet protection of the type shown on Drawings. If not shown, use inlet protection fabric, silt fence barriers, erosion bale barriers, or equivalent.
  - 4. Remove soils and sediment reaching public or private streets not part of the construction site at the end of each work day. Legally dispose of sediments per all regulations.
- B. Minimize dispersion of dust from construction operations by application of water or other dust control materials. Controls shall confine dust and dirt within the immediate area of project.
- C. Provide noise control measures to limit the amount of noise and prevent nuisance. Properly equip all equipment with mufflers. Limit construction activities generating significant noise to normal working hours.

### **3.05 DEMOLITION AND ABANDONMENTS**

- A. Remove structures, pavements, and improvements within construction limits as indicated on the Drawings and as required for construction. Saw cut asphaltic and concrete pavement to provide a smooth straight joint.
- B. Pipes, manholes, inlets, and other items designated to be removed shall be completely removed from the ground and properly disposed of at an MPCA approved site. The contractor shall furnish a copy of the MPCA disposal permit to the A/E.
- C. Pipes designated to be abandoned in place shall be permanently plugged with concrete a minimum of 24 in. at each open end, including at manholes.

**3.06 DISPOSAL OF WASTE MATERIAL**

- A. Remove waste materials, organic material and unsuitable topsoil from the site and dispose of, off site, in a legal manner. Hauling routes to the waste site shall be maintained free of waste and debris.
- B. Remove debris and excess materials from site and legally dispose of it; do not burn debris.

**3.07 EXISTING SITE IMPROVEMENTS**

- A. Existing site improvements shall be either left in place, removed and relocated, removed and turned over to the Owner, or removed and properly disposed of as shown and noted on the drawings.
- B. Existing site improvements include sidewalks, retaining walls, curbs & gutters, benches, bike racks, parking devices, etc..

**END OF SECTION**

**SECTION 31 11 00 - CLEARING AND GRUBBING****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section shall include furnishing all labor, material and equipment necessary to do all site preparation for the building and site improvements, and do any work related to the earthwork construction.
- C. Related Work Specified Elsewhere:
  - 1. Site Preparation – Section 31 05 10
  - 2. Erosion and Sedimentation Control – Section 31 25 00
  - 3. Excavation & Fill - Section 31 23 00

**PART 2 – MATERIALS (NOT USED)****PART 3 - EXECUTION****3.01 CLEARING AND GRUBBING**

- A. All vegetation including trees, brush, roots and other plants shall be removed in areas to be covered by building, paving, and other site improvements as shown on the drawings. Removal work shall include complete removal of all stumps and roots.
- B. All trees to remain as indicated on the drawings shall be protected as directed by the Architect and as shown in the drawings. Fencing or other protective measure are to be as detailed on the drawings and specified hereafter shall be erected prior to any site disturbance, and, shall be repaired as needed and remain in place until project closeout or as directed by the Architect if/when acceptable conditions permit.

**3.02 TOPSOIL**

- A. Carefully remove all usable topsoil to its full depth in all building areas and adjacent areas requiring a change of contour. Stockpile this topsoil on the site within the contract limit line or at a location acceptable to the Landscape Architect for later use in finish grading. No topsoil shall be removed from the site without specific approval from the Architect.

**3.03 DISPOSAL OF WASTE MATERIAL**

- A. Remove waste materials, organic material and unsuitable topsoil from the site and dispose of, off site, in a legal manner per current State of Minnesota rule and Minnesota Pollution Control Agency (MPCA) requirements. Hauling routes to the waste site shall be maintained free of waste and debris.
- B. Burning of debris or any organic material will not be permitted on the Owner's property.

**END OF SECTION**

**SECTION 31 23 00 EXCAVATION & BACKFILL****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section shall include furnishing all labor, material and equipment necessary to do all excavating and backfilling for the building, work related to the earthwork construction, and site work improvements
- C. Related Work Specified Elsewhere:
  - 1. Selective Site Demolition - Section 02 41 13
  - 2. Concrete Forming – Section 03 11 00
  - 3. Cast-In-Place Concrete – Section 03 30 00
  - 4. Erosion and Sedimentation Controls – Section 31 25 00
  - 5. Aggregate Base Courses - Section 32 11 23
  - 6. Asphalt Paving - Section 32 12 16
  - 7. Planting Preparation – Section 32 91 00
  - 8. Subsurface Drainage – Section 33 46 00
- D. All trenching and other miscellaneous excavation designated under other sections of these specifications shall be in accordance with this section.
- E. Unit Prices - Contractor shall state in the appropriate spaces on the Bid Form, Unit Prices for the following items as defined herein:
  - 1. Rock Excavation - per cubic yard.
  - 2. Granular fill under floor slabs and footings - per cubic yard.
  - 3. Mass Excavation - per cubic yard.
  - 4. Hand Excavation - per cubic yard.

**1.02 DEFINITIONS**

- A. Rock - Is defined as stone or hard shale in original ledge, boulders 2 cu. yd. in volume or greater, masonry or concrete that cannot be broken and removed by normal job equipment without the use of explosives and drills. This classification does not include materials such as loose rock, concrete or other materials that cannot be removed by means other than drilling and blasting and wedging, but which, for reasons of economy in excavating, the Contractor prefers to remove by drilling or blasting.
- B. Earth: Material to be excavated that can be removed by hand shoveling, power shovel, bulldozer or other normal equipment but not requiring the use of drills shall be defined as earth removal, mass excavation or hand excavation.

**1.03 TESTING**

- A. Owner shall hire and pay an independent testing laboratory to verify soil conditions and do compaction tests on all backfill materials. Testing shall be performed to satisfy the requirements of this Section.
- B. This contractor shall cooperate with testing laboratory in developing a testing schedule.

C. Tests shall be made as follows:

1. **Fill under building** – one density test for every 200 cubic yards of fill placed with at least one test for every 2 vertical feet of fill placed.
2. **Footing trench backfill** – One compaction test for every 100 feet at vertical intervals not exceeding 2 feet.
3. **Under concrete walks** – one density test for every 500 cubic yards of fill placed with at least one test for every 2 vertical feet of fill placed.
4. **Under Paving** - one density test for every 500 cubic yards of fill placed with at least one test for every 2 vertical feet of fill placed.
5. **Gravel Base & Bituminous Surface** - 5 density tests of each layer.

#### 1.04 UTILITIES

- A. Rules and regulations governing the respective utilities shall be observed in executing all work under this Section.
- B. Active utilities shown on the drawings shall be adequately protected from damage and removed and relocated only as indicated or specified. Where active utilities are encountered but are not shown on the drawings, the Architect shall be advised; the work shall be adequately protected, supported or relocated as directed by the Architect; the contract price will be adjusted for such additional work.
- C. This contractor shall contact the local governing utility for assistance in locating utilities.
- D. As per Minnesota Statutes Chapter 216D, the Excavator shall contact the Minnesota State Gopher One Call Excavation Hotline at 1-800-252-1166 a minimum of 48 hours prior to digging.

### PART 2 - PRODUCTS

#### 2.01 FILL WITHIN BUILDING & UNDER CONCRETE WALKS AND FOOTINGS

- A. Gravel fill material under floor slabs and engineered fill under footings and foundation walls shall meet the following gradation requirements as per ASTM C-136 percent passing by dry mass:

3" sieve	100%
2" sieve	85% - 100%
¾" sieve	71% - 100%
No. 4 sieve	35% - 75%
No. 200 sieve	10% (max.)

Sandy gravel, sand, silt or clay with a plastic index less than 15 may be used.

- B. Compaction for fill under footings and foundations shall be a minimum of 95% of ASTM D1557.

#### 2.02 EXTERIOR BACKFILL

- A. Exterior backfill material shall be excavated material free from concrete, brick, broken masonry, stone, rock, wood, clay lumps, frozen earth, soft and unstable material which does not compact readily by tamping and rolling. Excavated material that is dry, clean granular material free of contaminants, organic matter, or other materials specified to be removed in Section 02 requirements may be used for backfill. Taconite tailings are acceptable as backfill.
- B. Additional fill required to bring up to design grades shall be furnished under this contract. Fill shall

meet the requirements set forth in the above paragraphs.

- C. Where excavation occurs at other areas, (i.e. utilities, site utilities, site remediation or any other reason) excavation shall be backfilled with compacted, engineered fill or as required by traffic above the excavation.
- D. Any excavated material may be used for berms around building. Compaction to be 90% standard proctor.

### 2.03 FILL AT DRAINTILE

- A. Fill at draitile shall be a uniform grade washed pea gravel.
- B. Pea Gravel - Shall be a uniform grade of 3/8" diameter rocks.
- C. Other fill above and below draitile shall be as per 2.01 (Fill within The Building & Under Concrete Walks) above.

### 2.04 COMPACTION CRITERIA

- A. Compaction criteria for this construction shall meet the following based on ASTM D1557:

Sub-grade Fills:	Minimum Percent Compaction
Below Footings	95
Below Slabs-on-Grade	95
Below Pavements	more than 3' below...95; within 3'...100
Subbase Fills:	
Below Footings	95
Below Slabs-on-Grade	95
Below Pavements	100
Aggregate Base Course (MDOT 22A)	100
Non-Structural Fills	90

## PART 3 - EXECUTION

### 3.01 EXCAVATION

- A. Provide barricades, fences and protective devices as required for safety around all excavations.
- B. Excavate all material of any nature to the lines and grades required by the drawings. Excavation shall be confined generally to the building lines allowing sufficient space for removal of form work, application of damp-proofing and similar foundation work.
- C. Where concrete slabs are to be placed on grade, all loam organic material or other undesirable soil shall be removed to its full depth. In any case, soil shall be removed to a point at least six inches below the bottom of the slab.
- D. When excavations have reached the required depth, make at least 4 borings, 2 inches in diameter and



3 feet deep where directed. If material disclosed is satisfactory to Architect, the holes shall be filled with concrete. If foundations require greater depth because of latent soil or other unusual conditions, adjustments will be made in the contract. No concrete shall be poured until soil at footing level has been examined and approved by the Architect.

- E. Proof roll the exposed material beneath the building, paved areas and walks using a tractor-drawn vibratory compactor.
- F. Protect bottom of excavation against freezing by means of heat blankets or straw as required. No fill or footings shall be placed over frozen ground and no frozen fill material shall be placed.

### **3.02 PUMPING**

- A. This Contractor shall provide and operate all pumping equipment necessary to maintain dry conditions. Pumps shall be operated as necessary to keep footing excavations dry until after footings have been poured. Operate pumps as necessary to keep excavated spaces clear of water during construction.

### **3.03 ROCK EXCAVATION**

- A. Material to be excavated is assumed to be earth and other materials that can be removed by power shovel, bulldozer or other normal equipment to excavation work, but not requiring the use of explosives or drills. If rock, as herein defined, is encountered within the limits of excavation, the contract price will be adjusted. When the rock is encountered, the Contractor shall immediately notify the Architect and shall not proceed further until instructions are given and measurements made for the purpose of establishing volume of rock excavation.
- B. Before placing concrete or masonry on rock surfaces, the surfaces shall be leveled off or shelved to a slope not exceeding 1" per foot.
- C. Payment for rock excavation, as defined above, shall be at the agreed unit price per cu. yd. Final computations will be made from a point not greater than 6" below bottom of footing.
- D. Excavators will not be paid for rock removal or backfill, by any means, beyond a depth of 6" below the lowest point needing to be excavated.

### **3.04 ROUGH GRADING**

- A. Rough grading the property adjacent to the building. Rough grade shall be a reasonably smooth surface approximately six inches below final grade. If sufficient material is not available at the site to raise grades to the contours shown, additional fill material shall be brought in. Fill material shall be sand or clean earth. Grade shall be sloped in such a manner that will insure drainage away from the building at all points.
- B. Grading shall be done to grade stakes placed not less than 50 feet on center each way over the area to be graded. After fill and backfill have settled fill in shallow areas to bring them to the proper grade.

### **3.05 FINISH GRADING**

- A. Surface tolerances, uniformly smooth grading shall be accomplished on all areas, including excavated and fill sections and adjacent transition areas. The finished surface shall be reasonably smooth, compacted and free from all building debris and rubbish. The degree of finish shall be that ordinarily obtainable from blade-grade operations, except as otherwise specified. The finished surface shall be not more than 0.10 foot above or below the established grade or approved cross section. All ditches

and gutters shall be finished so as to drain readily. The surface of areas to be topsoiled shall be finished so as to drain readily. The surface of areas to be topsoiled shall be finished as to a smoothness suitable for the placing of topsoil to depth as shown on the drawings. The surface of embankments or excavated areas on which pavement is to be placed shall not vary more than 0.50 foot from the established grade and approved cross section when tested with 10 foot straight-edge applied both parallel to and at right angles to the centerline of the area.

- B. Protection: Protect newly graded areas from the actions of the elements. Any settlement or washing that occurs prior to acceptance of the work shall be repaired and grades re-established to the required elevation and slopes. Fill to required subgrade levels any areas where settlement occurs.

### **3.06 FILL UNDER FLOOR SLABS ON GRADE**

- A. No backfilling shall be done until all walls, footings and foundations have been inspected by the Architect and approval given to backfill.
- B. The placing and compaction of fill under slabs after foundation walls are in place shall be coordinated with the backfilling against the outside of the wall or walls which shall be adequately braced to prevent damage.
- C. Do not fill until the subgrade has been checked and approved by the Architect. In no case shall fill be placed on a subgrade that is muddy, frozen or that contains frost. Deposit material in horizontal layers not exceeding 6" in depth before compacting. Spread fill evenly and compact each layer by uniformly rolling, pneumatic tamping or other improved equipment to minimum of 95% of ASTM D1557.
- D. It is the responsibility of the Contractor to provide the necessary vibratory compaction or rolling equipment in order to obtain the specified compaction. Compaction by travel of grading equipment will not be considered adequate for uniform compaction.
- E. In confined areas, small vibratory or hand tamping compactors will be required wherever fill may be placed adjacent to walls or around footing and similar areas.
- F. Any trenches dug in the compacted fill shall be backfilled firmly around the pipes in uniform layers not exceeding six inches in depth, with each layer being compacted with small vibratory or hand tamping compactors to the same density as specified above. The contractor or subcontractor digging and backfilling said trenches shall be responsible for obtaining this degree of density.

### **3.07 FILL OUTSIDE THE BUILDING AREA**

- A. Excavated material that is clean granular material free of contaminants, organic matter or other materials specified to be removed in Section 31 23 13 may be used for backfill outside the building.
- B. Any excavated material may be used for exterior backfilling and for berms around building. Compaction to be 95% standard proctor (SPD).

### **3.08 FILL AT DRAINTILE**

- A. DRAINTILE trench shall have a setting bed of pea gravel placed beneath the dRAINTILE to depth as shown on the drawing.
- B. After dRAINTILE is placed, it shall be filled along its sides and above the tile with pea gravel and install geotextile per Section 33 46 00 and as shown on the drawings.

**3.09 SETTLEMENT**

- A. Fill and backfill shall be compacted sufficiently to prevent future settlement or displacement of all finished surfaces. Particular emphasis shall be directed to utility trenches or deep excavations. If settlement does occur within the one year guarantee period, contractor shall correct the settlement conditions including, but not limited to, replacement of sidewalks and blacktopping, re-sodding, seeding or mulching at no expense to the Owner.

**END OF SECTION**

**SECTION 31 25 00 EROSION & SEDIMENTATION CONTROLS****PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. Section Includes:
  - 1. Temporary measures to control soil erosion or sediment control devices.
  - 2. Furnishing, installing and maintaining erosion or sediment control devices.
- C. Related Work Specified Elsewhere:
  - 1. Selective Site Demolition - Section 02 41 13
  - 2. Excavation & Fill – Section 31 23 00

**1.02 REFERENCES**

- A. Mn/DOT 2573 Erosion Control
- B. Mn/DOT 2573 – Temporary Erosion Control
- C. Minnesota Stormwater Manual published by the Minnesota Pollution Control Agency.
- D. EPA(NPDES) – National Pollution Discharge Elimination System, Construction General Permit, current edition.

**1.03 DEFINITIONS**

- A. For the NPDES permit process, the operator is defined as the Contractor.
- B. For the SWPPP Permit Process, the operator is defined as the Contractor.

**1.04 PERMITS**

- A. The Owner will obtain any erosion control permits required.

**1.05 UTILITIES**

- A. Rules and regulations governing the respective utilities shall be observed in executing all work under this Section.
- B. Active utilities shown on the drawings shall be adequately protected from damage and removed and relocated only as indicated or specified. Where active utilities are encountered but are not shown on the drawings, the Architect shall be advised; the work shall be adequately protected, supported or relocated as directed by the Architect; the contract price will be adjusted for such additional work.
- C. This contractor shall contact the local governing utility for assistance in locating utilities.
- D. As per Minnesota Statutes Chapter 216D, this Excavator shall give 48 hours notice (prior to digging) to the Minnesota State Gopher One Call Excavation Hotline 1-800-252-1166.

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

- A. Temporary Ditch Checks – shall be in accordance with MN/DOT 3889, Types 2 and 722, Type 1.
- B. Erosion Control Blanket – shall be in accordance with MN/DOT 3885 and 2575.
- C. Silt Fence – shall be in accordance with MN/DOT 3886 & 2573, hand-installed (HI) type.
- D. Rock Construction Entrance – shall be established prior to construction as shown on the plans.

**2.02 EROSION CONTROL BLANKET**

- A. Double Sided 100% Biodegradable Net Coir/Cocnut Fiber Erosion Control Blanket (North American Green **C125BN**)
  - 1. Matrix: 100% coconut fiber, min. wt. 0.50 lbs/yd<sup>2</sup> (0.27 kg/m<sup>2</sup>)
  - 2. Netting: Top and bottom woven biodegradable jute fiber with opening sizes of 0.50 1.00 in (1.27 2.54 cm)
  - 3. Stitching: Biodegradable thread on 1.50 in (3.81 cm) centers
  - 4. Roll Size: 8.07ft (2.4m) x 112.00ft (34.14m), 100.00yd<sup>2</sup> (83.61 m<sup>2</sup>)
  - 5. Roll Weight ± 10%: 65.25 lbs (29.61 kg)

**2.03 HEAVY DUTY SILT FENCE**

- A. Post spacing shall be 1.8 m (**6 ft**) on center (O.C.). Geotextile fastened to the posts with four plastic zip ties. Geotextile shall comply with the following requirements:

HEAVY DUTY	
Description	Hand installed geotextile fastened to posts on-site.
Geotextile	
Type	Bi- directional Woven monofilament*
Width	915 mm ( <b>36 inches</b> )
Grab Tensile ASTM D 4632 (machine direction)	59 kg ( <b>130 lb</b> ) min.
Apparent Opening Size ASTM D 4751	0.60 mm ( <b># 30 Sieve</b> )
U.V. Stability ASTM D 4355, 500 hrs.	70% min.
Permittivity (minimum) ASTM D 4491	1.0/sec
Flow Rate	100 GPM/SF min (4,073 L/MIN/SQ.M.)
Posts	
Material	Steel T-Post with welded plate
Min. Size	1.8 kg / m ( <b>1.26 lbs/ ft</b> )
Min. Length	1.8 m ( <b>6 feet</b> )
Min. Embedment	762 mm ( <b>30 inches</b> )
Max. Spacing	1.8 m ( <b>6 feet</b> ) O.C.
Geotextile Fastener to Post	
Fastener	Plastic Zip Ties - 22 kg ( <b>50 lb</b> ) Tensile
Min. Fasteners per post	4

\* No substitutions allowed, monofilament in both directions.

- B. Approved Products – the following are approved for use:
1. PROPEX – 2134, 2135
  2. EDGETECH-ETC C60SF
  3. Synthetic Industries – 111 F
  4. Or approved equal, per MN/DOT approved/qualified products list.

### **PART 3 - EXECUTION**

#### **3.01 GENERAL REQUIREMENTS**

- A. The Contractor shall control drainage and erosion on the Project including: haul roads, temporary construction, waste disposal sites, plant and storage locations, and borrow pits other than commercially operated sources. The Contractor shall clean up the area, shape the area to allow storm runoff with minimum erosion, replace topsoil, and establish vegetative cover to the satisfaction of the Engineer on areas where the potential for pollution has been increased due to the Contractors' operations.
1. Before Construction the Contractor shall install temporary erosion control measures as required before construction begins.
  2. During Construction the Contractor shall schedule and install temporary and permanent erosion control measures, construct drainage facilities, finish earthwork operations, place topsoil, establish turf, and conduct other work that will contribute to the control of erosion and sedimentation. Unless precluded by snow cover, all exposed soil areas with a continuous positive slope within 30 yards of surface waters, or from a curb, gutter, storm sewer inlet, temporary or permanent drainage ditch, or other storm water conveyance system, shall have temporary protection or permanent cover for the exposed soil areas within the following time frames (For the purposes of this provision, exposed soil areas do not include stockpiles or surcharge areas of sand, gravel, aggregate, concrete, or bituminous.)
  3. Vehicle Tracking. The Contractor shall minimize vehicle tracking of sediment or soil off site at locations where vehicles exit the construction site onto paved surfaces. Tracked sediment shall be removed from paved surfaces, which do not drain back into the construction site, within 2 hours of discovery.
  4. Suspension of Grading. The Contractor shall shape exposed soil and incorporate temporary and permanent erosion control measures to the satisfaction of the Architect before suspension of grading operations for any appreciable length of time.
- B. **Erosion Control Schedule.** The Contractor shall prepare and submit a weekly schedule of proposed erosion control activities for the Architect's approval. The Architect may require schedules to be submitted orally or in writing. The schedule shall provide a discussion of:
- 1) Proposed erosion control installations and when they will be installed.
  - 2) Areas ready for permanent turf establishment and when it will be accomplished.
  - 3) Grading operations and how erosion control will be incorporated into the work.
  - 4) Repair or maintenance required on erosion control installations and when it will be accomplished.
  - 5) Proposed erosion control measures during periods of suspension of work. The Architect may also require the Contractor to submit a site plan detailing proposed erosion control and sediment control measure and a chart indicating starting and completion times for each of the construction operations at the site. The Contractor shall not start work in the affected areas until the erosion control schedule and required documents have been accepted by the Architect.
- C. Maintenance. The Contractor will be responsible to maintain all erosion control devices throughout the duration of the project. The Contractor shall inspect the erosion control devices at least weekly and within 24 hours after any rain event that produces 0.5 inches or more rainfall at the site. Inspection shall be made daily during sustained rain events.

**3.02 PLACING TEMPORARY EROSION CONTROL ITEMS**

- A. Construct items in conformance with typical sections and elevation controls shown on the plans.
- B. Remove all items upon completion of the contract work when they are no longer mutually deemed necessary by the Owner, Architect and Contractor.
- C. Spread and shape accumulated sediment to permit natural drainage and provide for turf establishment. Do not remove from site.

**3.03 ACCEPTANCE OF WORK**

- A. Maintain and repair erosion control item to ensure proper function.

**END OF SECTION**

**SECTION 31 32 19 GEOTEXTILE SOIL STABILIZATION & LAYER SEPARATION****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section shall include furnishing all labor, material and equipment necessary to place geotextile fabric in conjunction with the drintile network, timber retaining walls, and planting beds at the locations shown on the plans.
- C. Related Work Specified Elsewhere:
  - 1. Aggregate Base Courses - Section 32 11 23.
  - 2. Timber Retaining Walls – Section 32 32 29.
  - 3. Planting Preparation – Section 32 91 00.
  - 4. Subsurface Drainage – Section 33 46 00.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Geotextile Fabric: Non-woven separator/strengthening material meeting the requirements of MnDOT Section 3733, Type V.

**2.02 MANUFACTURERS**

- A. Geotextile Fabric: Manufacturers/materials must be on the current edition of the pre-approved products list at the MnDOT Approved/Qualified Products website (<http://www.dot.state.mn.us/products/>), as follows:
  - 1. Mirafi, Type 170N
  - 2. Trivera, Type 1125
  - 3. Phillips, Type 7NP
  - 4. Amoco, Type 4552
  - 5. Polyfelt, Type 7S650
  - 6. Or approved equal

**PART 3 - EXECUTION****3.01 PREPARATION**

- A. The prepared surface shall be relatively smooth and free of stones, sticks, or other debris or irregularities that would tend to puncture or tear the geotextile.

**3.02 INSTALLATION**

- A. If multiple pieces of geotextile are required, adjacent strips shall be field or factory sewn. All seams shall be sewn using a “double spool: machine capable of sewing a Federal Type 401 locking stitch. Seam type (flat, “J”, or butterfly), thread strength 11.34 kg (25lbs). Minimum, number of rows of stitching (1 or 2) and stitches per inch (typically 5-7) shall be consistent with achieving the required seam strength and as recommended by the geotextile manufacturer.
- B. The geotextile shall be adequately secured so that it is not displaced during subsequent construction. No traffic or construction equipment will be permitted to operate directly on the geotextile. Any damaged geotextile shall be repaired to the satisfaction of the Architect by patching and sewing, or when appropriate, a 900 mm (36-inch) overlap on all sides without sewing.



- C. Perform work in accordance with MnDOT Sections 2211 (Aggregate Base) and 2118 (Aggregate Surfacing).
- D. Material shall be placed onto the fabric in uniform lifts as required by the applicable specification and as approved by the Architect. Material shall be to depth, dimensions as shown in the plans.

**END OF SECTION**

**SECTION 32 11 23 AGGREGATE BASE COURSES****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials and equipment necessary to furnish place and compact aggregate base for exterior pavement structures where shown on drawings and specified herein.
- C. Related Work Specified Elsewhere:
  - 1. Excavation & Fill - Section 31 23 00
  - 2. Asphalt Paving - Section 32 12 16
  - 3. Concrete Paving – Section 32 13 13
  - 4. Curbs & Gutters - Section 32 16 00

**1.02 SUBMITTALS**

- A. TESTS: The following tests shall be made by an independent testing laboratory. The Owner shall pay for all tests. One set of the following tests shall be performed during construction of the Aggregate Base Course:
  - 1. Gradation.....ASTM C136 and C117
  - 2. Abrasion.....ASTM C131
  - 3. Spall Material.....ASTM C123
  - 4. Standard Proctor Density (SPD)....ASTM D1557

Field density tests shall be made in conformance with ASTM D1556. Test compaction of base course at locations not more than 50 feet on center.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Select Granular Borrow
  - 1. Must conform with MnDOT Section 3149.2B.
- B. Aggregate Base
  - 2. Must conform with MnDOT Section 2211 and 3138 for Class 5 Aggregate Base.

**PART 3 - EXECUTION****3.01 CONSTRUCTION REQUIREMENTS**

- A. Coordinate with work under other Sections to confirm prepared subgrade elevations and conditions prior to placing aggregate base.

- B. Conform with MnDOT Section 2211 (Aggregate Base) to place compacted layers/lifts not more than 3" in compacted thickness, except that if vibratory or other approved types of special compacting equipment are used, the thickness of each layer may be increased to a maximum of 6". Base course under all walks and paving shall be 6" compacted thickness unless otherwise noted on drawings.
- C. Compact the full thickness of each layer of aggregate base to 97% SPD/maximum density. Compaction tests are described in Article 1.02 above.

**END OF SECTION**

**SECTION 32 32 29 – TIMBER RETAINING WALLS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section shall include furnishing all labor, material and equipment necessary to furnish and install all exterior building-independent landscape timber retaining walls and all related materials as shown on the plans and specified herein.
- C. Related Work Specified Elsewhere
  - 1. Selective Site Demolition – Section 02 41 13
  - 2. Erosion and Sedimentation Control – Section 31 25 00
  - 3. Clearing & Grubbing – Section 31 11 00
  - 4. Excavation & Fill - Section 31 23 00
  - 5. Subsurface Drainage – Section 33 46 00

**1.02 SUBMITTALS**

- A. Submittals shall follow the General Provisions/Division 1 Requirements.
- B. Landscape Logs & Timbers: Submit wood preservative treatment MDS labels and certificates of compliance to the Landscape Architect as designated in Part 2 of this specification.
- C. Upon request, the Contractor shall furnish the Landscape Architect with additional Material Certificates indicating compliance with the drawings and specifications herein.

**1.03 SUBSTITUTIONS**

- A. Substitutions shall follow the General Provisions/Division 1 Requirements.
- B. Obtain written approval of the Landscape Architect for all material substitutions prior to use or installation.
- C. All substitutions not approved in writing by Landscape Architect shall be removed and replaced with specified materials at no additional cost to Owner.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. All material delivery, storage, and handling shall follow the General Provisions/Division 1 Requirements.
- B. Use only materials conforming to this specification and/or for which submittals have been provided to and approved in writing by the Landscape Architect.
- C. Store and handle material in accordance with all manufacturer's or supplier's requirements and recommendations in a way to avoid damage. Contractor shall replace any materials damaged on site at no additional cost to the Owner. Remove all damaged materials from the site and dispose of according to all applicable local, state, and federal requirements.

**1.05 SCHEDULING AND CONFLICTS**

- A. Follow the General Provisions (Requirements) and Covenants.

- B. Notify the Landscape Architect immediately of conflicts discovered or necessary changes to accommodate discovered or field conditions.
- C. Protect existing property at the site and off-site against damage, including the following:
  - 1. Take precautions to ensure that equipment, vehicles, and construction operations do not disturb or damage existing grades, walls, pavement, utilities, plants, lawns, and other facilities.
  - 2. Any damage to existing trees or shrubs, branches, and root systems to remain and/or to be protected shall be repaired and/or pruned by a registered Tree Care service, as listed with the Minnesota Tree Care Registry per Minnesota Statute Ch. 18G.07.
  - 3. Contractor shall repair, replace, and/or restore to the original condition any damaged item or area at no additional cost to the Owner.

#### **1.06 SPECIAL REQUIREMENTS**

- A. Special protection of the protected Lake Superior Beachgrass Dune ecosystem in site areas shown on the drawings shall be maintained in site preparation for- and construction of all timber retaining walls. See Section 00 31 19 Existing Condition Information.
- B. Conform to all local, state, and Federal requirements in pollution prevention and erosion & sediment control

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS**

- A. Landscape Timbers: Landscape timbers shall be #1 grade timbers, UC4B pressure-treated for ground contact, and shall be approved by the Landscape Architect prior to being incorporated into the wall. Timbers shall be straight and have at least 3 good sides. Timbers shall be solid throughout, shall exhibit no visible dry rot, and shall only exhibit a minor amount of non-structural splitting or cracking. Size shall be as shown on the drawings.
  - 1. Wood Preservative. Timbers shall use wood preservative meeting the requirements of AASHTO M133. Provide treated timber is clean and free of dripping treatment liquids. Submit manufacturer's certified copy of compliance that all materials have been produced in compliance with *Best Management Practices for the Use of Treated Wood in Aquatic Environments*, USA version, current edition - a publication of the Western Wood Preservers Institute and the Canadian Institute for Treated Wood.
- B. Landscape Logs: Landscape logs shall be #1 grade timbers, UC4B pressure-treated for ground contact, and shall be approved by the Landscape Architect prior to being incorporated into the wall. Logs shall be mechanically-rounded, straight, sound, and free of defects. Logs shall be solid throughout, shall exhibit no visible dry rot, and shall only exhibit a minor amount of non-structural splitting or cracking. Size shall be as shown on the drawings.
  - 1. Wood Preservative. Timbers shall use wood preservative meeting the requirements of AASHTO M133. Provide treated timber is clean and free of dripping treatment liquids. Submit manufacturer's certified copy of compliance that all materials have been produced in compliance with *Best Management Practices for the Use of Treated Wood in Aquatic Environments*, USA version, current edition - a publication of the Western Wood Preservers Institute and the Canadian Institute for Treated Wood.
- C. Geotextile Fabric: Geotextile fabric shall be as specified in Section 31 32 19 Geotextile Soil Stabilization & Layer Separation and as shown on the drawings.

- D. Draintile: Draintile shall be as specified in Section 33 46 00 Subsurface Drainage and as shown in the drawings.
- E. Aggregate Base: Aggregate base used for retaining wall upright timber setting bed shall be as per Section 32 11 23 Aggregate Base Courses, Class 5 Aggregate Base; base course compaction shall be as specified therein.

### **PART 3 - EXECUTION**

#### **3.01 SITE PREPARATION**

- A. All vegetation including trees, brush, roots, and other plant debris shall be removed in areas to be covered by retaining wall and foundations, as shown on the drawings. Removal work shall include all stumps and roots.
- B. All trees indicated as remaining on drawings shall be protected as directed by the Architect. Fence or other protective measure shall be erected prior to any site disturbance and shall remain in place until completion of the project.

#### **3.02 EXCAVATION**

- A. At locations where the wall is to be constructed against earth fill, the fill shall be constructed and compacted to a minimum of 95% Standard Proctor Density (SPD) per ASTM D 698 prior to initiating wall construction.
- B. After constructing fill, the wall cut shall be made to provide for 4 inches maximum behind the back of wall.
- C. At locations where the wall is to be constructed in cut, the contractor shall not over-excavate more than 4 inches beyond the alignment of the back of wall.
- D. No payment shall be made for over-excavation on the part of the Contractor unless a correction is deemed to require remediation.
- E. Any soil corrections shall be approved in writing by the Landscape Architect prior to retaining wall construction. All soil corrections must be completed prior to setting any walls or components.

#### **3.03 FOUNDATION & VERTICAL/UPRIGHT TIMBER INSTALLATION**

- A. Install upright timbers on 6-inch thick compacted aggregate base as shown in the drawings. Ensure correct batter from vertical as shown.
- B. Install Class A concrete surround to dimensions shown on the drawings as per Section 03 30 00 Cast-In-Place Concrete. Finish concrete surface at around each timber upright to slope away per drawings to ensure proper drainage away from the upright structure.
- C. Step foundation at regular intervals as necessary to maintain relative depth below grade, as shown in the drawings.
- D. All vertical/upright timbers shall have a neat, pleasant appearance and be constructed at a uniform alignment as shown on the drawings.

#### **3.04 HORIZONTAL LOG WALL INSTALLATION**

- A. All logs and courses shall be laid horizontal with proper pitch from front to back to create the required batter on the face of the wall. Shave logs as required in the field to ensure each course is of uniform

height across the face of the wall.

- B. Vertical joints in adjacent courses shall be staggered to prevent a vertical plane of weakness.
- C. Logs shall be sorted prior to installation so that only logs of similar thickness shall be used on each course.
- D. The best face of each log shall be rotated to face out at the face of wall.
- E. For course 1 only: after course is laid, install geotextile fabric and draitile as shown in the drawings. Attach/tack geotextile fabric to the back of the log with heavy-duty staples. Daylight draitile as shown on the drawings and as specified to landscape area(s) adjacent to the wall.
- F. For all additional courses: After each course is laid, attach/tack geotextile fabric to the back of the log course with heavy-duty staples. Fill and compact all voids behind the wall to a density equal to or greater than the existing soil behind the wall. At top course, ensure landscape fabric is not exposed at surface.
- G. All logs shall be securely fastened to the logs below with 12" x 3/8" landscape timber spikes approximately one foot from each end of the log. All hardware must meet AASHTO M 232 requirements for galvanized hardware. To facilitate installation, a 3/8" diameter pilot hole can be drilled into the upper tie to receive the spike.
- H. All horizontal log walls shall have a neat, pleasant appearance and be constructed at a uniform alignment as shown on the drawings.

### **3.05 DISPOSAL OF WASTE MATERIAL**

- A. Remove waste materials, organic material and unsuitable topsoil from the site and dispose of, off site, in a legal manner. Hauling routes to the waste site shall be maintained free of waste and debris.
- B. Burning of debris or organic material will not be permitted on the Owners property.

**END OF SECTION**

**SECTION 32 91 00 - PLANTING PREPARATION****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provision of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material and equipment necessary for furnishing and placing prepared soils over areas to receive future seed, sod, and/or planting, and planting bed preparation and finishing.
- C. Related Work Specified Elsewhere:
  - 1. Excavation & Fill - Section 31 23 00
  - 2. Geotextile Soil Stabilization & Layer Separation - Section 31 32 19
  - 3. Soil Preparation - Section 32 91 13
  - 4. Turf and Grasses - Section 32 92 00
  - 5. Plants – Section 32 93 00

**1.02 SUBMITTALS**

- A. Mulch - Submit 1 pint bag with physical sample of rock mulch for the Landscape Architect's approval prior to project installation.
- B. Landscape Geotextile Fabric - Submit Manufacturer's specification and product information for Landscape Geotextile Fabric.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Prepared Soils - Prepared Soil Material shall be as per Section 32 91 13 Soil Preparation.
- B. Landscape Geotextile Fabric – Geotextile fabric shall be a 100% polyester non-woven thermally-bonded filamentic fiber matrix, non-biodegradable, such as SRW SB3, or approved equal, and compliant with the following properties:

<b>FABRIC PROPERTY</b>	<b>TEST METHOD</b>	<b>UNITS</b>	<b>MIN. AVE. ROLL VALUE</b>
Grab Tensile	ASTM D 4632	lbs.	105
Grab Elongation	ASTM D 4632	lbs.	65
Wide Width Tensile	ASTM D 4595	lbs.	260.2
Trap Tear	ASTM D 4533	lbs.	45
Puncture	ASTM D 4833	lbs.	37
Water Flow	ASTM D 4491	GPM/ft <sup>2</sup>	114
AOS	ASTM D 4751	US Sieve	45

- C. Landscape Geotextile Fabric Anchors –Metal staples shall be fabricated from steel wire with the following requirements:
  - a. Material: 11ga. steel wire
  - b. Min Length: 6" (150mm)
- D. Mulch - Mulch shall be a shredded hardwood type with the following requirements:



- a. Wood or bark mulch shall be derived from hardwood trees and is double ground using a commercial grinder first through 6" screens, then through 2" screens to produce a fine fibrous mulch with uniform texture, partially composted, with natural color ranging from brown to dark brown, a pH ranging between 6.0-7.0 and being low in salinity.
  - b. Provide mulch from a supplier outside of the Emerald Ash Borer quarantine areas or, if the mulch originates from within the quarantine areas, obtain a Compliance Agreement with the MDA. The Department will not allow mulch transported in or through a quarantine area to be transported outside the Emerald Ash Borer quarantine area without approval from the MDA. Contact MDA for more information.
- E. Metal Edging - Metal edging shall be 3/16" x 5-1/2" Aluminum edging with mill finish. Edging shall be as manufactured by Permaloc Corp. (1-800-356-9660) or approved equal.
- F. Soil Separation Geotextile Fabric - Geotextile shall be as specified in Section 31 32 19.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION OF SURFACES**

- A. Before starting any work under this section this contractor shall examine the areas that are to receive his materials and report any deficiencies to the Landscape Architect in writing. Examination shall look for any irregular or settled subgrade surfaces, soft spots or settlements causing unsatisfactory surface drainage. Such deficient areas shall be corrected by the General Contractor before any work begins. Starting of any work by this contractor shall imply his acceptance of the surfaces as suitable to receive his materials.

#### **3.02 INSTALLATION (PREPARED SOILS)**

- A. Conform with MnDOT Section 2105, Finishing Operations for placing and finish grading prepared soils on the site.
- B. Coordinate furnishing and placing with other operations.
- C. Decompact/rip subgrade soils to a depth of 3 inches where prepared soils are to be placed and inter-mix prepared soils with subgrade soils to a uniform texture.
- D. After completion of finish grading, place prepared soil over entire area. Smooth grade to within 1/2" of finish grade after settlement to eliminate irregularities and to match adjacent pavements and walks. Minimum depth of prepared soil shall be 6" settled measure. Uniform compaction in all prepared soiled soil areas shall be 85% maximum Standard Proctor Density (SPD), typ..

#### **3.03 METAL EDGING INSTALLATION**

- A. Install edging to contain all planting bed areas as shown on the plans in softscape areas not directly adjacent to hardscaped or concrete surfaces. Planting beds adjacent to concrete, pavers with edge restraint, or other hardscaped areas shall not require metal edging.
- B. Edging shall be installed to be within 1/2" typ. height above finished grade at surface. If there is a surface elevation discrepancy relative to grades on either side of the edging, the higher of the grades shall be used to establish the 1/2" height above grade.
- C. Any areas that have been nicked or paint removed in the installation process shall be primed and painted in the field (installed) per all manufacturer's requirements.

#### **3.03 INSTALLATION (MULCHED PLANTING BEDS)**

- A. Install soil separation geotextile fabric over all planting bed areas as shown on the plans after installation of metal edging and prepared soils. Overlap adjacent sections of fabric by 3-4”.
- B. Install geotextile fabric over final graded bed prepared soil to cover. Overlap adjacent sections of fabric by 3-4”.
- C. Apply Geotextile fabric staples/anchors to cover landscape geotextile surface and anchor to soil at a rate of 1staple/2 feet, as measured from the nearest adjacent staple.
- D. Remove landscape fabric from planting installation areas to 4” typ. past extent of container or root ball in all directions prior to planting. Remove all soil fabric anchors from plant installation area.
- E. Complete planting per Section 32 93 00.
- F. Install Mulch to depth as shown on the drawings over the top of the landscape fabric taking special care to ensure no fabric is exposed at surface after mulch installation.
- G. All trees and shrub areas shall be mulched immediately after planting. Trees and shrubs shall be mulched to depth and dimensions as shown on the drawings and specified herein. Spread mulch in bed area to a uniform depth of three inches (3”) min., to cover all planting beds or pits, keeping mulch away from plant stems.
- H. For any areas where Geotextile fabric is exposed after mulch installation, remove mulch from area and tuck geotextile below final mulch surface and apply additional Fabric Staples to secure to surface. Replace mulch over surface to depth.

**END OF SECTION**

**SECTION 32 91 13 – SOIL PREPARATION****PART 1 – GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provision of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, tools, supplies, equipment and facilities requirements necessary for, and incidental to performing all operations in connection with furnishing, delivery, and installation of Planting Soils and/or the modification of existing site soil for use as Planting Soil, complete as shown on the drawings and as specified herein.
- C. Related Work Specified Elsewhere:
  - 1. Excavation & Fill - Section 31 23 00
  - 2. Planting Preparation – Section 32 91 00
  - 3. Turf and Grasses - Section 32 92 00
  - 4. Plants – Section 32 93 00

**1.02 REFERENCES**

- A. ASTM: American Society of Testing Materials, cited section numbers.
- B. U.S. Department of Agriculture, Natural Resources Conservation Service, 2003. National Soil Survey Handbook, title 430-VI. Available Online.
- C. US Composting Council at: [www.compostingcouncil.org](http://www.compostingcouncil.org) and [http://compostingcouncil.org/admin/wp-content/plugins/wppdfupload/pdf/191/LandscapeArch\\_Specs.pdf](http://compostingcouncil.org/admin/wp-content/plugins/wppdfupload/pdf/191/LandscapeArch_Specs.pdf)
- D. Methods of Soil Analysis, as published by the Soil Science Society of America (<http://www.soils.org/>).

**1.03 SUBMITTALS**

- A. Refer to the General Conditions for policy and procedures related to submittals.
- B. Submit all product submittals eight weeks prior to the start of the soil work.
- C. Product and Material data and certificates: For each type of manufactured product or material, submit data and certificates that the product meets the specification requirements, signed by the product manufacturer or supplier, indicating compliance with specifications in Part 2. with the following:
  - 1. Submit manufacturers or supplier's product data and literature certified analysis for standard products and bulk materials, complying with testing requirements and referenced standards and specific requested testing.
    - a. For each Compost product submit the following analysis by a recognized laboratory:
      - 1.) pH
      - 2.) Salt concentration (electrical conductivity)
      - 3.) Moisture content %, wet weight basis
      - 4.) Particle size % passing a selected mesh size, dry weight basis
      - 5.) Stability carbon dioxide evolution rate mg CO<sub>2</sub>-C per g OM per day
      - 6.) Solvita maturity test
      - 7.) Physical contaminants (inerts) %, dry weight basis
      - 8.) US EPA Class A standard, 40CFR § 503.13, Tables 1 and 3 levels Chemical Contaminants mg/kg (ppm)

- b. For Coarse Sand product submit the following manufacturer's/supplier's analysis:
  - 1.) Particle size distribution (percent passing the following sieve sizes):
    - 3/8 inch (9.5 mm)
    - No 4 (4.75 mm)
    - No 8 (2.36 mm)
    - No 16(1.18 mm)
    - No 30 (.60 mm)
    - No 50 (.30 mm)
    - No 100 (.15 mm)
    - No 200 (.075 mm)
  - c. For topsoil, existing site soil, and Planting Soil Mix, submit soil test analysis report for each sample of Topsoil, existing site soil and Planting Soil from an approved soil-testing laboratory and where indicated in Part 2 of the specification.
2. Samples: Submit samples of each product and material in a one (1) gallon Ziploc bag to the Landscape Architect for approval. Label samples to indicate product, characteristics, and locations in the work. Samples will be reviewed for appearance only.
  - a. Submit samples a minimum of 8 weeks prior to the anticipated date of the start of soil installation.

#### **1.04 SOIL COMPACTION – GENERAL REQUIREMENTS**

- A. Except where more stringent requirements are defined in this specification. The following parameters shall define the general description of the threshold points of soil compaction in existing, modified or installed soil and subsoil.
- B. The following are threshold levels of compaction as determined by each method.
  1. Acceptable Compaction:
    - a. Standard Proctor Method – 75-85%.
  2. Excessive Compaction:
    - a. Standard Proctor Method – Above 85%.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Weather: Do not mix, deliver, place or grade soils when frozen or with moisture above field capacity.
- B. Protect soil and soil stockpiles, including the stockpiles at the soil blender's yard, from wind, rain and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust and debris that may be detrimental to plants or soil drainage. Cover stockpiles with plastic sheeting or fabric at the end of each workday.
- C. All manufactured packaged products and material shall be delivered to the site in unopened containers and stored in a dry enclosed space suitable for the material and meeting all environmental regulations. Biological additives shall be protected from extreme cold and heat. All products shall be freshly manufactured and dated for the year in which the products are to be used.
- D. Bulk material: Coordinate delivery and storage with Landscape Architect and confine materials to neat piles in areas acceptable to Landscape Architect.

#### **1.06 EXCAVATING AND GRADING AROUND UTILITIES**

- A. Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.
- B. Determine location of underground utilities and perform work in a manner that will avoid damage. Hand excavate as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.

- C. Notification of Gopher State One Call, 1-800-252-1166, is required 48 hours prior to digging for all planting areas. The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the GSOC service.

## **PART 2 – PRODUCTS**

### **2.01 IMPORTED TOPSOIL**

- A. Imported Topsoil definition: Fertile, friable soil containing less than 5% total volume of the combination of subsoil, refuse, roots larger than 1 inch diameter, heavy, sticky or stiff clay, stones larger than 2 inches in diameter, noxious seeds, sticks, brush, litter, or any substances deleterious to plant growth. The percent (%) of the above objects shall be controlled by source selection not by screening the soil. Topsoil shall be suitable for the germination of seeds and the support of vegetative growth. Imported Topsoil shall not contain weed seeds in quantities that cause noticeable weed infestations in the final planting beds. Imported Topsoil shall meet the following physical and chemical criteria:
1. Soil texture: USDA loam, sandy clay loam or sandy loam with clay content between 15 and 25%. And a combined clay/silt content of no more than 55%.
  2. pH value shall be between 5.5 and 7.0.
  3. Percent organic matter (OM): 2.0-5.0%, by dry weight.
  4. Soluble salt level: Less than 2 mmho/cm.
  5. Soil chemistry suitable for growing the plants specified.
- B. Imported Topsoil shall be a harvested soil from fields or development sites. The organic content and particle size distribution shall be the result of natural soil formation. Manufactured soils where Coarse Sand, Composted organic material or chemical additives has been added to the soil to meet the requirements of this specification section shall not be acceptable.
- C. Imported Topsoil for Planting Soil shall have been screened to remove clods larger than 2 inches in diameter throughout the stockpile after harvesting.
- D. Stockpiled Existing Topsoil at the site meeting the above criteria may be acceptable.

### **2.02 COMPOST**

- A. Compost: Blended and ground leaf, wood and other plant based material, composted for a minimum of 9 months and at temperatures sufficient to break down all woody fibers, seeds and leaf structures, free of toxic material at levels that are harmful to plants or humans. Source material shall be yard waste trimmings blended with other plant or manure based material designed to produce Compost high in fungal material.
1. Compost shall be commercially prepared Compost and meet US Compost Council STA/TMECC criteria or as modified in this section for “Compost as a Landscape Backfill Mix Component”.  
[http://compostingcouncil.org/admin/wp-content/plugins/wp-pdfupload/pdf/191/LandscapeArch\\_Specs.pdf](http://compostingcouncil.org/admin/wp-content/plugins/wp-pdfupload/pdf/191/LandscapeArch_Specs.pdf)
  2. Compost shall comply with the following parameters:
    - a. pH: 5.5 - 8.0.
    - b. Soil salt (electrical conductivity): maximum 5 dS/m (mmhos/cm).
    - c. Moisture content %, wet weight basis: 30 – 60.
    - d. Particle size, dry weight basis: 98% pass through 3/4 inch screen or smear.
    - e. Stability carbon dioxide evolution rate: mg CO<sub>2</sub>-C/ g OM/ day < 2.
    - f. Solvita maturity test: > 6.
    - g. Physical contaminants (inerts), %, dry weight basis: <1%.
    - h. Chemical contaminants, mg/kg (ppm): meet or exceed US EPA Class A standard, 40CFR § 503.13, Tables 1 and 3 levels.

- i. Biological contaminants select pathogens fecal coliform bacteria, or salmonella, meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) level requirements.

### 2.03 COARSE SAND

- A. Clean, washed, sand, free of toxic materials
  1. Coarse concrete sand, ASTM C-33 Fine Aggregate, with a Fines Modulus Index of 2.8 and 3.2.
  2. Coarse Sands shall be clean, sharp, natural Coarse Sands free of limestone, shale and slate particles. Manufactured Coarse Sand shall not be permitted.
  3. pH shall be lower than 7.0.
  4. Provide Coarse Sand with the following particle size distribution:

<u>Sieve</u>	<u>Percent passing</u>
3/8 inch (9.5 mm)	100
No 4 (4.75 mm)	95-100
No 8 (2.36 mm)	80-100
No 16 (1.18 mm)	50-85
No 30 (.60 mm)	25-60
No 50 (.30 mm)	10-30
No 100 (.15 mm)	2-10
No 200 (0.75 mm)	2-5

### 2.04 EXISTING SOIL, ACCEPTABLE FOR PLANTING WITH MINIMUM MODIFICATIONS

- A. General definition of existing soil: Surface soil in the areas designated on the soils plan as existing soil, that is not altered, compacted to root limiting density, graded or contaminated before or during the construction process and considered acceptable for planting and long term health of the plants specified either as it exists or with only minor modification.
  1. The Landscape Architect shall verify that the soil in the designated areas is suitable at the beginning of planting bed preparation work in that area. In the event that the work of this project construction has damaged the existing soil in areas designated for use as Planting Soil to the point where the soil is no longer suitable to support the plants specified, the Landscape Architect may require modification of the damaged soil up to and including removal and replacement with soil of equal quality to the soil that existed prior to construction. Examples of damage include further compaction, contamination, grading, creation of hard pan or drainage problems, and loss of the O, and or A horizon.
    - a. Do not begin work on additional modifications until changes to the contract price are approved by Landscape Architect.
  2. Soil testing results and soil observation notes that describe the pre-construction soil conditions in the existing soil areas are included as an appendix to this specification:
- B. Protect existing soil from compaction, contamination, and degradation during the construction process.
- C. Unless otherwise instructed, remove all existing plants, root thatch, and non-soil debris from the surface of the soil using equipment that does not increase compaction of soil to root limiting levels.
- D. Modifications:
  1. When results of soil tests recommend chemical adjustments, till surface soil to six inches or greater after chemical adjustments have been applied.
  2. Remove existing turf thatch, ground cover plants and weeds.
  3. Provide pre-emergent weed control if indicated.
  4. Make chemical adjustment as recommended by the soil test.

**2.05 EXISTING SOIL, MODIFIED - SOIL SUITABLE FOR PLANTING WITH INDICATED MODIFICATION(S)**

- A. General definition: Surface soil in the areas designated on the soils plan as Modified Existing Soil has been altered and or graded before or during the construction process but is still considered acceptable for planting and long term health of the plants specified with the proposed modifications. Modifications respond to the soil problems expected or encountered. The Landscape Architect shall verify that the soil in the designated areas is suitable for modification at the beginning of planting bed preparation work in that area.
1. The Landscape Architect shall verify that the soil in the designated areas is suitable for the specified modification at the beginning of planting bed preparation work in that area. In the event that the work of this project construction has damaged the existing soil in areas designated for modification to the point where the soil is no longer suitable to support the plants specified with the specified modification, the Landscape Architect may require further modification of the damaged soil up to an including removal and replacement with soil of equal quality to the soil that would have resulted from the modification. Damage may include further compaction, contamination, grading, creation of hard pan or drainage problem, and loss of the O, and or A horizon.
  2. General requirements for all soil modifications:
    - a. Take soil samples, test for chemical properties, and make appropriate adjustments.
    - b. Unless otherwise instructed, remove all existing plants, root thatch, and non-soil debris from the surface of the soil using equipment that does not add to the compaction in the soil.
    - c. All soil grading, tilling and loosening must be completed at times when the soil moisture is below field capacity. Allow soil to drain for at least two days after any rain event more than 1 inch in 24 hours, or long enough so that the soil does not make the hand muddy when squeezed.
    - d. Provide pre-emergent weed control after the soil work is complete and plants planted but prior to adding mulch to the surface, if indicated by weed type and degree of threat.
- B. Modified existing soil – soil removed, stockpiled, and spread
1. Description of condition to be modified: Existing soil that is suitable for reuse as Planting Soil but is in the wrong place of elevation, or cannot be adequately protected during construction. Soil is to be harvested, stockpiled and re-spread with or without further modifications as indicated.
  2. Modifications:
    - a. Excavate existing soil from the areas and to depths designated on the drawings. Stockpile in zones noted on the drawings or in areas proposed by the Contractor.
      - 1.) Prepare a soil stock pile plan for approval.
    - b. Protect stock piles from erosion by compacting or tracking the soil surface, covering with breathable fabric or planting with annual grasses as appropriate for the season, location, and length of expected time of storage.
    - c. Re-spread soil as required in Part 3 of this specification.
- C. Modified existing soil – compacted surface soil tilling
1. Description of condition to be modified: Surface soil compaction to a maximum of 6 inches deep from traffic or light grading. Original A horizon may be previously removed or graded but lower profile intact with acceptable compaction levels and limited grading. The soil organic matter, pH and chemistry in the A horizon may not be suitable for the proposed plants and may need to be modified as required.
  2. Modifications:
    - a. Till top 6 inches or deeper of the soil surface, with a *roto tiller*, *spade tiller*, ripper or agricultural plow. Spread 2 - 3 inches of Compost on the surface of the tilled soil and make any chemical adjustment as recommended by the soil test.
    - b. Till or disk the Compost into the loosened soil. Smooth out grades with a drag rake or drag slip.

- D. Modified existing soil – compacted subsoil
1. Description of condition to be modified: Deep soil compaction the result of previous grading, filling and dynamic or static compaction forces. Original A horizon likely removed or buried. The soil organic matter, pH and chemistry in the A horizon is likely not suitable for the proposed plants and should be modified as required.
  2. Soil Ripping:
    - a. Step one: After grading and removing all plants and debris from the surface, using a tracked dozer or similar large grading equipment, loosen the soil by dragging a ripping shank or chisel thru the soil to depths of 24 inches with ripping shanks spaced 18 inches or less apart in two directions. The number of shanks per pull is dependent on the degree of soil compaction and the size of the dozer.
    - b. Step 2: Spread 3-4 inches of Compost over the ripped area and till into the top 6 inches of the soil surface.
  3. Following soil ripping, the average penetration resistance should be less than 250 psi to the depth of the ripping or fracturing.
  4. Do not start planting into ripped soil until soil has been settled or leave grades sufficiently high to anticipate settlement of 10 – 15% of ripped soil depth.
- E. Modified existing soil – low organic matter
1. Description of condition to be modified: Low soil organic matter and/or missing A horizon but soil is not compacted except for some minor surface compaction. The soil organic matter, pH and/or chemistry are likely not suitable for the proposed plants and should be modified as required.
  2. Modifications:
    - a. Spread 3 - 4 inches of Compost over the surface of the soil and make chemical adjustment as recommended by the soil test.
    - b. Till Compost into the top 6 inches of the soil.

## 2.06 PLANTING SOIL MIXES

- A. General definition: Mixes of Existing Soil or Imported Topsoil, Coarse Sand, and or Compost to make a new soil that meets the project goals for the indicated planting area. These may be mixed off site or onsite, and will vary in Mix components and proportions as indicated.
- B. Planting Mix A: moderately draining soil for trees, shrub and perennial planting beds
1. A Mix of Imported Topsoil, Coarse Sand and Compost. The approximate Mix ratio shall be:

<u>Mix component</u>	<u>% by moist volume</u>
Imported Topsoil unscreened	45-50%
Coarse sand	40-45%
Compost	10%
  2. Final tested organic matter between 2.75 and 4% (by dry weight).
  3. Mix the Coarse Sand and Compost together first and then add to the Topsoil. Mix with a loader bucket to loosely incorporate the Topsoil into the Coarse Sand/Compost Mix or mix with a soil blending machine. Screen the soil. Only clumps of Soil, Compost and Coarse Sand meeting size requirements herein will be permitted in the overall Mix.
  4. At the time of final grading, add fertilizer if required to the Planting Soil at rates recommended by the testing results for the plants to be grown.
  5. Provide a two gallon sample with testing data that includes recommendations for chemical additives for the types of plants to be grown. Samples and testing data shall be submitted at the same time.

## 2.07 PRE-EMERGENT HERBICIDES

- A. No pre-emergent herbicides shall be allowed in this work.



**PART 3 – EXECUTION****3.01 SITE EXAMINATION**

- A. Prior to installation of Planting Soil, examine site to confirm that existing conditions are satisfactory for the work of this section to proceed.
  - 1. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope toward the under-drain lines as shown on the drawings.
  - 2. Confirm that surface all areas to be filled with Planting Soil are free of construction debris, refuse, compressible or biodegradable materials, stones greater than 2 inches diameter, soil crusting films of silt or clay that reduces or stops drainage from the Planting Soil into the subsoil; and/or standing water. Remove unsuitable material from the site.
  - 3. Confirm that no adverse drainage conditions are present.
  - 4. Confirm that no conditions are present which are detrimental to plant growth.
  - 5. Confirm that utility work has been completed per the drawings.
- B. If unsatisfactory conditions are encountered, notify the Landscape Architect immediately to determine corrective action before proceeding.

**3.02 COORDINATION WITH PROJECT WORK**

- A. The Contractor shall coordinate with all other work that may impact the completion of the work.
- B. Prior to the start of work, prepare a detailed schedule of the work for coordination with other trades.
- C. Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Landscape Architect of any conflicts encountered.

**3.03 GRADE AND ELEVATION CONTROL**

- A. Provide grade and elevation control during installation of Planting Soil. Utilize grade stakes, surveying equipment, and other means and methods to assure that grades and contours conform to the grades indicated on the plans.

**3.04 SITE PREPARATION**

- A. Excavate to the proposed subgrade. Maintain all required angles of repose of the adjacent materials as shown on the drawings or as required by this specification. Do not over excavate compacted subgrades of adjacent pavement or structures. Maintain a supporting 1:1 side slope of compacted subgrade material along the edges of all paving and structures where the bottom of the paving or structure is above the bottom elevation of the excavated planting area.
- B. Remove all construction debris and material including any construction materials from the subgrade.
- C. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope approximately parallel to the finished grade and/or toward the subsurface drain lines as shown on the drawings.
- D. In areas where Planting Soil is to be spread, confirm subgrade has been scarified.
- E. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use 1/2 inch plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.
  - 1. At the end of each working day, clean up any soil or dirt spilled on any paved surface.
  - 2. Any damage to the paving or site features or work shall be repaired at the Contractor's expense.

**3.05 SOIL MOISTURE**

- A. Volumetric soil moisture level, in both the Planting Soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilt point and below field capacity for each type of soil texture within the following ranges.

Soil texture	Permanent wilting point	Field capacity
Sand, Loamy sand, Sandy loam	5-8%	12-18%
Loam, Sandy clay, Sandy clay loam	14-25%	27-36%
Clay loam, Silt loam	11-22%	31-36%
Silty clay, Silty clay loam	22-27%	38-41%

- B. The Contractor shall confirm the soil moisture levels with a moisture meter (Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent). If moisture is found to be too low, the planting holes shall be filled with water and allowed to drain before starting any planting operations. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity.

**3.06 EXISTING SOIL MODIFICATION**

- A. Follow the requirements for modifying existing soil as indicated in Part 2 for the different types of soil modifications. The extent of the areas of different soil modification types are as directed by the Landscape Architect.

**3.07 PLANTING SOIL AND PLANTING SOIL MIX INSTALLATION**

- A. Prior to installing any Planting Soil from stockpiles or Planting Soil Mixes blended off site, the Landscape Architect shall approve the condition of the subgrade and the previously installed subgrade preparation and the installation of subsurface drainage.
- B. All equipment utilized to install or grade Planting Soils shall be wide track or balloon tire machines rated with a ground pressure of 4 psi or less. All grading and soil delivery equipment shall have buckets equipped with 6 inch long teeth to scarify any soil that becomes compacted.
- C. In areas of soil installation above existing subsoil, scarify the subgrade material prior to installing Planting Soil.
1. Scarify the subsoil of the subgrade to a depth of 3 – 6 inches with the teeth of the back hoe or loader bucket, tiller or other suitable device.
  2. Immediately install the Planting Soil. Protect the loosened area from traffic. DO NOT allow the loosened subgrade to become compacted.
  3. In the event that the loosened area becomes overly compacted, loosen the area again prior to installing the Planting Soil.
- D. Install the Planting Soil in 12 - 18 inch lifts to the required depths. Apply compacting forces to each lift as required to attain the required compaction. Scarify the top of each lift prior to adding more Planting Soil by dragging the teeth of a loader bucket or backhoe across the soil surface to roughen the surface.
- E. Phase work such that equipment to deliver or grade soil does not have to operate over previously installed Planting Soil. Work in rows of lifts the width of the extension of the bucket on the loader. Install all lifts in one row before proceeding to the next. Work out from the furthest part of each bed from the soil delivery point to the edge of the each bed area.

**3.08 COMPACTION REQUIREMENTS FOR INSTALLED OR MODIFIED PLANTING SOIL**

- A. Compact installed Planting Soil to the compaction rates indicated and using the methods approved for the soil mockup. Compact each soil lift as the soil is installed.
- B. Existing soil that is modified by tilling, ripping or fracturing shall have a density to the depth of the modification, after completion of the loosening, such that the penetrometer reads approximately 75 to 250 psi at soil moisture approximately the mid-point between wilting point and field capacity. This will be approximately between 75 and 82% of maximum dry density standard proctor.
- C. Installed Planting Soil Mix and re-spread existing soil shall have a soil density through the required depth of the installed layers of soil, such that the penetrometer reads approximately 75 to 250 psi at soil moisture approximately the mid-point between wilt point and field capacity. This will be approximately between 75 and 82% of maximum dry density standard proctor.
- D. Planting Soil compaction shall be tested at each lift using a penetrometer calibrated to the mockup soil and its moisture level. The same penetrometer and moisture meter used for the testing of the mockup shall be used to test installed soil throughout the work.
- E. Maintain moisture conditions within the Planting Soil during installation or modification to allow for satisfactory compaction. Suspend operations if the Planting Soil becomes wet. Apply water if the soil is overly dry.
- F. Provide adequate equipment to achieve consistent and uniform compaction of the Planting Soils. Use the smallest equipment that can reasonably perform the task of spreading and compaction. Use the same equipment and methods of compaction used to construct the Planting Soil mockup.
- G. Do not pass motorized equipment over previously installed and compacted soil except as authorized below.
  - 1. Light weight equipment such as trenching machines or motorized wheel barrows is permitted to pass over finished soil work.
  - 2. If work after the installation and compaction of soil compacts the soil to levels greater than the above requirements, follow the requirements of the paragraph "Over Compaction Reduction" below.

**3.09 OVER-COMPACTION REDUCTION**

- A. Any soil that becomes compacted to a density greater than the specified density and/or the density in the approved mockup shall be dug up and reinstalled. This requirement includes compaction caused by other sub-contractors after the Planting Soil is installed and approved.
- B. Surface roto tilling shall not be considered adequate to reduce over compaction at levels 6 inches or greater below finished grade.

**3.10 FINE GRADING**

- A. The Landscape Architect shall approve all rough grading prior to the installation of Compost, fine grading, planting, and mulching.
- B. Grade the finish surface of all planted areas to meet the grades shown on the drawings, allowing the finished grades to remain higher (10 – 15% of depth of soil modification) than the grades on the grading plan, as defined in paragraph Planting Soil Installation, to anticipate settlement over the first year.

- C. Utilize hand equipment, small garden tractors with rakes, or small garden tractors with buckets with teeth for fine grading to keep surface rough without further compaction. Do not use the flat bottom of a loader bucket to fine grade, as it will cause the finished grade to become overly smooth and or slightly compressed.
- D. Provide for positive drainage from all areas toward the existing inlets, drainage structures and or the edges of planting beds. Adjust grades as directed to reflect actual constructed field conditions of paving, wall and inlet elevations. Notify the Landscape Architect in the event that conditions make it impossible to achieve positive drainage.
- E. Provide smooth, rounded transitions between slopes of different gradients and direction. Modify the grade so that the finish grade before adding mulch and after settlement is one or two inches below all paving surfaces or as directed by the drawings.
- F. Fill all dips and remove any bumps in the overall plane of the slope. The tolerance for dips and bumps in shrub and ground cover planting areas shall be a 2 inch deviation from the plane in 10 feet. The tolerance for dips and bumps in lawn areas shall be a 1 inch deviation from the plane in 10 feet.

### **3.11 CLEAN-UP**

- A. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.
  - 1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.
- B. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The Landscape Architect seals are to remain on the trees and removed at the end of the warranty period.
  - 1. Make all repairs to grades, ruts, and damage to the work or other work at the site.
  - 2. Remove and dispose of all excess Planting Soil, subsoil, mulch, plants, packaging, and other material brought to the site by the Contractor.

### **3.12 PLANTING SOIL AND MODIFIED EXISTING SOIL PROTECTION**

- A. The Contractor shall protect installed and/or modified Planting Soil from damage including contamination and over compaction due to other soil installation, planting operations, and operations by other Contractors or trespassers. Maintain protection during installation until acceptance. Utilize fencing and matting as required or directed to protect the finished soil work. Treat, repair or replace damaged Planting Soil immediately.
- B. Loosen compacted Planting Soil and replace Planting Soil that has become contaminated as determined by the Landscape Architect. Planting Soil shall be loosened or replaced at no expense to the Owner.
  - 1. Till and restore grades to all soil that has been driven over or compacted during the installation of plants.
  - 2. Where modified existing soil has become contaminated and needs to be replaced, provide imported soil that is of similar composition, depth and density as the soil that was removed.

### **3.13 PROTECTION DURING CONSTRUCTION**

- A. The Contractor shall protect planting and related work and other site work from damage due to planting operations, operations by other Contractors or trespassers.
  - 1. Maintain protection during installation until the date of plant acceptance (see specifications section – Planting). Treat, repair or replace damaged work immediately.

2. Provide temporary erosion control as needed to stop soil erosion until the site is stabilized with mulch, plantings or turf.
- B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain, including large existing trees, soil, paving, utilities, lighting, irrigation, other finished work and surfaces including those on adjacent property, shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Landscape Architect shall determine when such cleaning, replacement or repair is satisfactory. Damage to existing trees shall be assessed by a certified arborist.

### **3.14 SUBSTANTIAL COMPLETION ACCEPTANCE**

- A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete.
- B. The date of substantial completion of the planting soil shall be the date when the Landscape Architect accepts that all work in Planting, Planting Soil, and Irrigation installation sections is complete.

### **3.15 FINAL ACCEPTANCE/SOIL SETTLEMENT**

- A. At the end of the plant warrantee and maintenance period, (see Specification section - Planting) the Landscape Architect shall observe the soil installation work and establish that all provisions of the contract are complete and the work is satisfactory.
1. Restore any soil settlement and or erosion areas to the grades shown on the drawings. When restoring soil grades remove plants and mulch and add soil before restoring the planting. Do not add soil over the root balls of plants or on top of mulch.
- B. Failure to pass acceptance: If the work fails to pass final acceptance, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged to the Contractor at the prevailing hourly rate of the Landscape Architect.

**END OF SECTION**

**SECTION 32 92 00 – TURF AND GRASSES****PART 1 – GENERAL****1.01 SCOPE OF WORK**

- A. The conditions of the Contract and the Provision of Division 01 apply to all work of this Section.
- B. This Section includes furnishing and placing fertilizer, sod and seed where indicated on plan. Prior to delivery, visit the site to review topsoil placement and finish grading to assure minimum erosion potential damage to turf areas. Do not begin work under this Section until surfaces are acceptable to receive turf materials.
- C. Related Work Specified Elsewhere:
  - 1. Planting Preparation – Section 32 91 00
  - 2. Soil Preparation – Section 32 91 13
  - 2. Plants – Section 32 93 00

**1.02 REFERENCES**

- A. Minnesota Department of Transportation (MnDOT) Standard Specifications for Construction, 2016 Edition
- B. State of Minnesota, Minnesota Department of Agriculture – Minnesota Seed Law & Rules, MN Statutes, Sections 21.80 – 21.92. 2015 Edition.

**1.03 TIMING**

- A. Seed installation shall be as per the following time periods requirements:

**MnDOT SEEDING MANUAL - TABLE 2  
SEASON OF PLANTING**

Seed Mixture Number	Spring	Fall
SEED MIX A	April 1 - June 1	July 20 - Sept. 20
SEED MIX B	April 15 – July 20	Sept. 20 – Oct. 20

**PART 2 - PRODUCTS****2.01 MATERIALS (SEEDING)**

- A. Includes all grass seed, native grass and flower seed as shown on the plan in accordance with the mix designs as follows, and as per all provisions of MnDOT 2575 Establishing Turf & Controlling Erosion and the 2012 MnDOT Seeding Manual.

1. Seed Mix A – Turfgrass & General Seeding as MnDOT Mix #25-151.

**MnDOT Mix #25-151**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Rate (lb/ac)</b>	<b>Rate (kg/ha)</b>	<b>% of Mix (by weight)</b>	<b>Seeds/ sq ft</b>
Elite Kentucky bluegrass	<i>Poa pratensis Elite</i>	30.00	33.63	25.00%	957.30
Low Maintenance Kentucky bluegrass	<i>Poa pratensis Low Maintenance</i>	30.00	33.63	25.00%	957.30
Park Kentucky bluegrass	<i>Poa pratensis Park</i>	30.00	33.63	25.00%	957.30
Perennial Ryegrass	<i>Lolium perenne</i>	20.40	22.87	17.00%	101.65
red fescue	<i>Festuca rubra</i>	9.60	10.76	8.00%	100.10
	<b>Total</b>	<b>120.00</b>	<b>134.50</b>	<b>100.00%</b>	<b>3073.65</b>
<b>Combine all components when blending this mix.</b>					

## 2. Seed Mix B –Native Dry Prairie Planting.

**MnDOT Mix #35-221**

Common Name	Scientific Name	Rate (lb/ac)	Rate (kg/ha)	% of Mix (by weight)	Seeds/ sq ft
big bluestem	<i>Andropogon gerardii</i>	0.78	0.70	1.92%	2.57
side-oats grama	<i>Bouteloua curtipendula</i>	3.36	3.00	8.22%	6.61
blue grama	<i>Bouteloua gracilis</i>	0.56	0.50	1.37%	7.35
kalm's brome	<i>Bromus kalmii</i>	0.82	0.73	2.00%	2.14
nodding wild rye	<i>Elymus canadensis</i>	1.12	1.00	2.74%	1.91
junegrass	<i>Koeleria macrantha</i>	0.28	0.25	0.69%	18.37
little bluestem	<i>Schizachyrium scoparium</i>	3.36	3.00	8.22%	16.53
Indiangrass	<i>Sorghastrum nutans</i>	0.78	0.70	1.92%	3.09
prairie dropseed	<i>Sporobolus heterolepis</i>	0.13	0.12	0.34%	0.73
	<b>Grasses Subtotal</b>	<b>11.21</b>	<b>10.00</b>	<b>27.42%</b>	<b>59.30</b>
blue giant hyssop	<i>Agastache foeniculum</i>	0.07	0.06	0.17%	2.07
lead plant	<i>Amorpha canescens</i>	0.10	0.09	0.26%	0.42
butterfly milkweed	<i>Asclepias tuberosa</i>	0.07	0.06	0.17%	0.10
Canada milkvetch	<i>Astragalus canadensis</i>	0.07	0.06	0.18%	0.40
bird's foot coreopsis	<i>Coreopsis palmata</i>	0.07	0.06	0.16%	0.21
white prairie clover	<i>Dalea candida</i>	0.07	0.06	0.15%	0.39
purple prairie clover	<i>Dalea purpurea</i>	0.21	0.19	0.51%	1.02
Canada tick trefoil	<i>Desmodium canadense</i>	0.07	0.06	0.18%	0.13
stiff sunflower	<i>Helianthus pauciflorus</i>	0.07	0.06	0.17%	0.09
rough blazing star	<i>Liatris aspera</i>	0.04	0.04	0.12%	0.25
wild bergamot	<i>Monarda fistulosa</i>	0.07	0.06	0.15%	1.42
stiff goldenrod	<i>Oligoneuron rigidum</i>	0.07	0.06	0.15%	0.83
large-flowered beard tongue	<i>Penstemon grandifloras</i>	0.07	0.06	0.17%	0.32
black-eyed susan	<i>Rudbeckia hirta</i>	0.35	0.31	0.84%	10.32
gray goldenrod	<i>Solidago nemoralis</i>	0.04	0.04	0.10%	3.86
heath aster	<i>Symphotrichum ericoides</i>	0.04	0.04	0.10%	2.58
smooth aster	<i>Symphotrichum laeve</i>	0.07	0.06	0.17%	1.26
hoary vervain	<i>Verbena stricta</i>	0.15	0.13	0.34%	1.29
	<b>Forbs Subtotal</b>	<b>1.68</b>	<b>1.50</b>	<b>4.09%</b>	<b>26.96</b>
Oats or winter wheat		28.02	25.00	68.49%	11.13
	<b>Cover Crop Subtotal</b>	<b>28.02</b>	<b>25.00</b>	<b>68.49%</b>	<b>11.13</b>
	<b>Total</b>	<b>40.91</b>	<b>36.50</b>	<b>100.00%</b>	<b>97.39</b>



**2.03 MATERIALS (SOD)**

- A. Submit sample prior to approval of materials to be furnished.
- B. Sod shall be well seasoned sod cut no earlier than normal industry season sod growth periods for the sod source region.
- C. Sod shall be of mineral soil source and shall be highland cultured sod. Thickness of cut shall be 3/4" + or - to permit rapid rooting into topsoils and adequate to avoid reveling or drying conditions. Conform to industry standards and practices described under MnDOT Section 3878 Sod. The following blend of materials may be approved on sample review. Generally, uniform combination of a blend of at least two of the following Bluegrass varieties, with minor quantities of red top, perennial fescue or perennial ryegrass: Rugby, Parade, Glade, Adelphi, Baron, Aquilla and Park (all Bluegrass varieties).

**2.04 MATERIALS (MULCH)**

- A. Mulch shall be Mn/DOT Types for installation as follows, by seeding type:
  - 1. Mn/DOT Type 1 Mulch – This mulch shall consist of grain straw, hay, cuttings of agricultural grasses and legumes. The material shall be free of seed bearing stalks of noxious grasses or weeds as defined by the rules and regulations of the Minnesota Department of Agriculture. In addition, mulch shall not contain the following species: cattail, reed canary grass, birds-foot trefoil or crown vetch. At the time of delivery the mulch shall be in an air-dried condition.
  - 2. Mn/DOT Type 3 (MCIA Certified Weed Free Mulch) - This mulch shall consist of clean grain straw and be certified by the Minnesota Crop Improvement Association (MCIA) to be free of noxious weed seeds, seed bearing stalks, and/or other reproductive propagules as defined by rules and regulations of the Minnesota Department of Agriculture. Documentation verifying that the mulch has passed MCIA field inspection shall accompany the material upon delivery to the job site. At the time of delivery, the mulch shall be in an air-dried condition.

**2.05 MATERIALS (SEEDING BLANKET)**

- A. Areas to receive Seeding Blanket are as noted on the drawings. Additional areas to receive Erosion Control Blanket are as specified in Section 01 57 13 Temporary Erosion & Sediment Control.
- B. Seed Blanket for establishment support shall be MnDOT Type 3 Straw 2S blanket or Type 4 Straw/Coconut 2S blanket.

**2.06 MATERIALS (EROSION CONTROL BLANKET)**

- A. Areas to receive Erosion Control Blanket material shall be as specified in Section 01 57 13 and as shown on the drawings.

**2.07 MATERIALS (BLANKETING SOIL ANCHORS)**

- A. Materials shall be for anchoring Seeding Blanket to soil surface to assist in seed protection during establishment.
- B. Soil Anchors for all Seeding Blanket areas shall be per MnDOT 3885 and MnDOT Table 3885-5, for Type 3,4 Blanketing as follows:
  - 1. Material: 11ga. steel wire
  - 2. Min Length: 6" (150mm)

**PART 3 - EXECUTION****3.01 CONSTRUCTION REQUIREMENTS (FERTILIZER)**

- A. Incorporate uniformly to a minimum depth of 2 to 4 inches. Coordinate with other operations to avoid compaction and grade disturbance.

**3.02 CONSTRUCTION REQUIREMENTS (SEEDING)****A. SEED MIX A – Turfgrass Drop Seeding**

1. Site Preparation - The site should be prepared by loosening topsoil to a minimum depth of 3 inches immediately before seeding.
2. Fertilizer – Apply fertilizer as specified above prior to seeding at a rate of 200 lbs/acre.
3. Seed Installation - Seed should be installed with a drop seeder that will accurately meter the types of seed to be planted, keep all seeds uniformly mixed during the seeding and contain drop seed tubes for seed placement (Brillion-type). The drop seeder should be equipped with a cultipacker assembly to ensure uniform seed-to-soil contact.
4. Seeding Rates - Rates are specified in the mixture tabulation for the specified mix.
5. Packing – If the drop seeder is not equipped with a cultipacker, the site should be cultipacked following the seeding to ensure seed-to-soil contact.
6. Mulch - The site should be mulched and disc-anchored following cultipacking. The standard mulch is Mn/DOT Type 1 at a rate of 2.0 tons/acre. Also see temporary erosion control for additional information.

**B. SEED MIX B –Native Seeding**

1. Site Preparation – The site should be prepared by loosening topsoil to a minimum depth of 3 inches.
2. Fertilizer – Apply fertilizer as specified above prior to seeding at a rate of 300 lbs/acre
3. Seed Installation – Seed should be installed with a drop seeder that will accurately meter the types of seed to be planted and keep all seeds uniformly mixed during planting (Trillion-type). The seeder should contain a minimum of three seed boxes; a fine seed box, a box for large/fluffy seeds, and a box for cool season or grains. It should be equipped with drop tubes and a packer assembly to compact the soil directly over the seed. All seeding should be done at a right angle to surface drainage.
4. Seeding Rates – Rates are specified in the mixture tabulation for the specified mix.
5. Harrowing – The site should be lightly harrowed or raked following seeding if the seeder does not contain a cultipacker.
6. Packing – Cultiacking the site following harrowing is recommended to ensure a firm seed bed.
7. Mulch – The site should be mulched and disc-anchored following packing using the following mulch type:
  - a. Mn/DOT Type 3 (MCIA certified weed free mulch) at a rate of 2.0 tons per acre
  - b. Type 3 Seeding Blanket and Metal Anchors as specified herein is acceptable alternate for Type 3 Mulch for use in sensitive areas.

**3.03 CONSTRUCTION REQUIREMENTS (SOD)**

- A. Conform with MnDOT Section 2575, Turf Establishment, excluding maintenance period which is defined under this project specification.
- B. The contractor will be required to perform all maintenance and any other necessary maintenance operations during the time period through sod placement until acceptance of the completed sod work. The work will be accepted when turf materials are established to control erosion.
- C. Re-sod at no extra cost to the Owner, where sod fails to become established, or where erosion loss occurs. Maintain until established.

**END OF SECTION**

**SECTION 32 93 00 - PLANTS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes furnishing all labor, materials and equipment necessary to place plant materials as shown on the drawings and specified herein.
- C. Related work specified elsewhere:
  - 1. Planting Preparation - Section 32 91 00
  - 2. Soil Preparation - Section 32 91 13

**1.02 REFERENCE STANDARDS**

- A. Conform with MnDOT Section 3861, Plant Stock. Only planting zone 3b or lower (University of Minnesota Extension Bulletin 267) will be accepted or approved equivalent.
- B. Plant material shall conform to nomenclature of "Standardized Plant Names: as adopted by the Joint Committee of Horticulture Nomenclature, latest edition. Size and grading standards shall conform to the American Association of Nursery Stocks", latest edition. No substitutions of size or grade shall be permitted without written permission of the Construction Manager. Each bundle of plants and all separate plants shall be properly identified with legible waterproof tags securely fastened to each plant or bundle of plants.
- C. All plant material shipments and deliveries shall comply with State and Federal laws and regulations governing the inspection, shipping, selling and handling of plant stock. A tag or label bearing the name and address of the licensed dealer or nurseryman and a certification that the material is from an officially inspected source shall accompany each shipment or delivery of plant material.

**1.03 QUALITY ASSURANCE**

- A. All plants shall be true to type. They shall have normal, well-developed branch systems and a vigorous fibrous root system. They shall be sound, healthy, vigorous plants free from defects, disfiguring knots, sunscald injuries, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall be nursery grown unless otherwise indicated. They shall have been growing in similar climatic conditions as the location of the project for at least two years prior to the date of this contract.
- B. All plants, including their roots, shall be free from disease, insects, or other injurious qualities. All local, state and federal laws pertaining to the inspection, sale and shipment of plant materials shall be complied with. The trunk bark of all trees shall be sound, trees shall have no large wounds, and any small wounds shall have a satisfactory callus roll formed or forming over them. Plants shall show good annual growth. Buds shall be plump and well filled for the species. Evergreen foliage shall be of good intense color.

#### **1.04 DELIVERY, STORAGE AND HANDLING**

- A. Plant stock shall be of Nursery-Stock quality, furnished as balled and burlapped (B & B) or approved container grown, and shall be moved with a compact dug ball of earth so firmly wrapped in burlap or container that upon delivery the soil in the ball is still firm and compact about the small feeding roots. Each ball shall be of sufficient size to encompass all the fibrous feeding roots necessary to insure successful recovery and development of diameters, and increased ball sizes for collected stock shall be in accordance with Recommended Balling and Burlapping Specifications as set forth in the current edition of the American Standard for Nursery Stock sponsored by the American Association of Nurserymen, Inc.
- B. Transport: All plants shall be labeled by plant name and size and shall bear name and address of source stock. All plants shall be dug and handled with reasonable care and skill to prevent injuries to the trunk, branches, roots and root ball. They shall be packed in the approved manner for that particular plant to insure arrival of the plants at the site in good condition necessary for the successful recovery and development of the plant. Drying of plants in transit and/or excessive sprouting of new shoots, shall be cause for rejection by the Construction Manager and replacement by the Contractor.

#### **1.05 SCHEDULING**

- A. The normal spring planting season for all plants shall extend to June 1. The normal fall planting season for all plants except evergreens shall begin on October 1. Fall evergreen planting shall be done between September 1, and October 1. Unless otherwise approved, planting shall not be done when the ground is frozen or when the soil is in a unsatisfactory condition for planting.

#### **1.06 GUARANTEE**

- A. All plants shall be subject to the approval of the Construction Manager. All plants rejected at the project site shall be replaced with acceptable plants of the same species, variety and size unless otherwise directed by the Architect.
- B. The Contractor shall guarantee all new plant materials for one year after the Date of Substantial Completion. If any plants die as a result of improper planting or related causes, they shall be replaced by this Contractor at no additional expense to the Owner. If any replacement plants die as a result of improper planting, they shall also be replaced by this Contractor at no additional expense to the owner.
- C. Fall plantings which fail to survive the winter dormancy period shall be replaced by the contractor during the following spring planting season and before beginning of the growing season.
- D. Near the end of the first full growing season, but no later than the expiration of the plant establishment period, an inspection of the planting will be made and only those plants that are alive and normally healthy will be accepted. Unaccepted material shall be removed and replaced by the contractor, at his own expense, during the next planting season. Material and method of replacement planting shall be the same as specified for the original planting.

### **PART 2 - PRODUCTS**

#### **2.01 PLANT MATERIALS**

- A. Trees, shrubs and ground cover; description, size and quantity are shown in the plant list on the drawings. Plants supplied shall conform to MnDOT Section 3861 and the following:
  - 1. All plants shall be nursery grown stock that has been transplanted or root-trimmed two or more times according to the kind and size of plant.

2. All plants shall be typical of their species and have well formed tops and root systems and shall be free from injurious insects, plant diseases or other plant pests. Plants shall be hardy under the climatic conditions at the site.
  3. Plants furnished shall be free from the following defects:
    - a. Serious injuries to top, branches, trunk, bark or roots.
    - b. Dried out roots.
    - c. Prematurely opened buds.
    - d. Thin or poor tops or root systems.
    - e. Evidence of molding.
    - f. Dry, loose or broken ball of earth in B & B stock.
    - g. Free of decay, sun scald injuries or insect pests.
  4. Plant stock shall conform to the code of standards set forth in the current edition of American Standard for Nursery Stock recommended for general use and adoption by the American Association of Nurserymen, Inc.
- B. Trees shall be a minimum diameter of 1-1/2 inch. Plant stock designated "B & B" shall be moved with a compact natural ball of earth firmly wrapped so that upon delivery, the soil in the ball will not have been loosened and caused to drop away from contact with the small feeding roots. Each ball shall be of sufficient width and depth to encompass the fibrous feeding necessary to ensure successful recovery and development of the plant.
- C. Plants shall be true to species and variety specified and nursery grown in accordance with good horticultural practices. They shall have been freshly dug. Plants shall not be pruned before delivery.

## 2.02 PLANTING SOIL

- A. Planting soil shall be prepared and installed per Section 32 91 13 - Soil Preparation..

## PART 3 - EXECUTION

### 3.01 PLANTING

- A. Conform with MnDOT Section 2571, Plant Installation, Place planting as follows:
1. Insofar as practicable, plant stock shall be planted on the day of delivery at the project site. In the event this is not possible, the plant stock shall be temporarily stored by "heeling-in" or by placing in a well ventilated, cool, moist storage place and shall be adequately protected against drying by the use of moist sphagnum moss, straw or other suitable covering around the roots of BR stock and the balls of B&B stock.
  2. Trees shall be planted in holes that are at least three times (3X) the width of the root ball, in the configuration of a circular pit with sloping sides. Original soil dug from the hole shall be used as fill for the planting hole. Depth of the excavated area shall be no deeper than and as much as 2 inches shallower than the distance between the root and the bottom of the root ball.
  3. In the event it is necessary to suspend planting operations until the following planting season, any open plant holes shall be backfilled before suspending the work.
  4. The bruised or broken parts or large or fleshy roots shall be cut off smoothly before planting or potting. The tops of deciduous plants shall be pruned either before or at the time of planting. This shall consist of removing only dead, broken or rubbing branches. The pruning shall be done so that the plant retains its natural form. Evergreen plants shall not be pruned except to remove dead or broken branches.

5. All planting shall be performed in accordance with the method herein provided, insofar as practicable.
6. A mound of soil shall be formed in the center of the hole to support the roots or ball of the plant. The plant shall be placed on the mound of soil and held in a vertical position. Plants shall be placed in their wrapped ball, and shall be moved and hauled only by the ball. For trees the bottom of the pit shall be undisturbed soil.
7. Trees must be planted so that the root collar is one inch (1") minimum above the final soil level. Plants and trees shall be centered in the pit and set plumb.
8. When approximately two-thirds of the plant hole has been backfilled, the hole shall be filled with water and the soil allowed to settle around the ball. Plants shall have the twine or rope and burlap cut away or folded back from the top of the ball at least half way down the root ball before applying the water. Wire baskets, if used, must be similarly removed. After the water has been absorbed, the plant hole shall be filled with backfill and tamped lightly to grade. Any settlement shall be brought to grade with backfill. Plants and trees shall be watered thoroughly at planting. Trees shall not be fertilized at planting time.
9. Mulch shall then be placed over the root core to a depth of 4", unless otherwise specified. Mulch shall be pulled back four inches (4") from the root collar.
10. Only those trees designated shall be guyed. The anchor stakes shall be notched to prevent slipping of the guy and shall be driven into the ground, at a slight angle away from the tree, to a depth of 24 inches or more until solid, and shall extend above the ground as shown on drawings. The bracing and guying materials shall consist of such wood or steel stakes, rubber hose, soft straps, and other material as needed to perform the work. Stakes shall be of solid durable wood approximately 2" x 2" and of the required length, except that stakes used for bracing may be approved steel posts of the required length.

### **3.02 MAINTENANCE**

#### **A. Maintain plants as follows during the construction period:**

1. The Contractor shall properly care for all plants from the time of planting until the date of substantial completion.
2. Proper care of plants shall consist of doing such watering, weeding, cultivating, pruning, spraying, tightening of braces and guys, remulching and such other work as may be necessary to keep the plants in a healthy growing condition.
3. A sufficient amount of water shall be placed in each plant hole at the time of each watering to keep the topsoil backfill material in a moist condition, and to keep the plant in a healthy growing condition.
4. All mulched areas shall be kept free of weeds by hoeing and hand weeding.
5. Pesticides shall be applied as required to control insects and disease and to keep the plants in a healthy condition during the maintenance period.

**3.03 CLEAN-UP**

- A. Any soil, manure, peat or similar material which has been placed on paved areas shall be removed and washed clean promptly, keeping the area clean at all times. Upon completion of the planting, all excess soil, stones, and debris shall be removed from the site. All ground areas disturbed as a result of planting operations shall be restored to their original condition or to the desired new appearance.

**END OF SECTION**



**SECTION 33 05 19 – GEOTEXTILE FOR EARTHWORK****PART 1 – GENERAL****1.01 GOVERNING SPECIFICATIONS**

- A. Minnesota Plumbing Code.
- B. The State of Minnesota Department of Transportation “Standard Specification for Construction”, 2016 Edition shall apply to work covered by this Specification except as modified or altered in these Special Conditions.

Modifications herein shall take precedence over the provisions of the referenced Standard Specifications. Section numbers and headings refer to the corresponding sections of the above referenced Standard Specifications.

**1.02 SUBMITTALS**

- A. Shop Drawings.

**PART 2 - PRODUCTS****2.01 GEOTEXTILE FABRIC**

- A. Geotextile Fabric shall be a woven separator/strengthening material meeting the requirements of Mn/DOT 3733, Type V.

**2.02 MANUFACTURERS**

- A. Mirafi, Type 170N
- B. Trivera, Type 1125
- C. Phillips, Type 7NP
- D. Amoco, Type 4552
- E. Polyfelt, Type 7S650
- F. Or approved equal

**PART 3 – EXECUTION****3.01 INSTALLATION**

- A. This work shall consist of placing geotextile below the fill material (may be underwater) at the locations shown in the Plan, or as directed by the Architect/Engineer. The work shall be accomplished according to Mn/DOT 2105, these Special Provisions, or as directed by the Architect/Engineer. The purpose of the geotextile layer is to provide separation between the fill and underlying softer soils, to prevent mixing, to provide stability during compaction, to provide some reinforcement and to minimize differential movement. The Contractors proposed construction sequence shall be submitted to the Architect/Engineer at least 21 days prior to beginning of this element of construction.
- B. The prepared surface shall be relatively smooth and free of sticks, stones, or other debris or irregularities that would tend to puncture or tear the geotextile. Unless otherwise directed or approved by the Architect/Engineer, the geotextile shall be placed with the highest strength direction (usually machine or rolled direction) oriented in the direction of the greatest expected field stress.

- C. If multiple pieces of geotextile are required, adjacent strips shall be factory sewn. Sewn seams shall have a strength as specified in 3733.2B3. All sewn seams shall be sewn using a “double spool” machine capable of sewing a Federal Type 401 locking stitch. Seam type (prayer “J”, or butterfly), thread strength (25 pound minimum), number of rows of stitching (1 or 2), and stitches per inch (typically 5-7), shall be consistent with achieving the required seam strength and as recommended by the geotextile manufacturer.
- D. The geotextile shall be adequately secured so that it is not displaced during subsequent construction. No traffic or construction equipment will be permitted to operate directly on the geotextile. Any damaged geotextile shall be repaired to the satisfaction of the Architect/Engineer by patching and sewing. A 36 inch overlap on all sides without sewing may be allowed in certain repair situations at the discretion of the Architect/Engineer.
- E. Fill shall be placed in uniform lifts as required by the applicable specification and approved by the Architect/Engineer. While filling no turning will be allowed over the geotextile until the fill has been compacted. No track equipment shall be used to fill above the fabric.

**END OF SECTION**

**SECTION 33 46 00 - SUBSURFACE DRAINAGE****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This section includes all labor, material, equipment and services necessary to furnish and install all drain tile, as indicated in accordance with the drawings and the specifications.

**1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Pea gravel: See Section 31 23 00 Excavation & Backfill.
- B. Section 31 32 19 Geotextile Soil Stabilization & Layer Separation.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Draintile - 4" diameter single wall corrugated polyethylene, perforated tubing with integral polypropylene protective fabric wrap, conforming to ASTM F405, as manufactured by Advanced Drainage System Inc., ADS or equal.
- B. Draintile Accessories - Provide all couplings, elbows and tees required to install new draintile to existing draintile shown on drawings. Accessories shall be from same manufacturer as draintile.
- C. Geotextile Fabric - Provide geotextile fabric for draintile as specified in Section 31 32 19 Geosynthetics Soil Stabilization & Layer Separation.
- D. Draintile Termination - Provide 19ga. ¼" galvanized mesh hardware cloth and stainless steel heavy-duty hose clamp, to fit specified draintile diameter.
- E. Pea Gravel - Provide pea gravel as pipe bedding and surround material to as shown in the drawings, materials shall be as specified in Section 31 23 00 Excavation & Backfill.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Install draintile according to manufacturer's instructions and as shown on the project drawings. Connect draintile to existing draintile as shown on drawings, if applicable. Provide an evenly sloping grade from existing draintile high point to low point.
- B. Provide a 2" minimum bed of pea gravel below and around draintile at the necessary elevations and to dimensions shown in the drawings.
- C. Install geotextile fabric as shown on the drawings and as specified in Section 31 32 19 Geosynthetics Soil Stabilization & Layer Separation.
- D. Terminate draintile at locations shown on the drawings. Draintile shall be daylighted with the open end covered with hardware cloth as specified above wrapped over the end to prevent the intrusion of small animals. Wire cloth shall be held securely in place with a heavy-duty hose clamp.

**END OF SECTION**