Nova Classical Academy
Building Improvements and Expansion Project

Request for Proposal (RFP) for
Construction Manager as Constructor
at Risk (CMAR)
for a Guaranteed Maximum Price (GMP)

Release Date: July 16, 2025

Deadline for Submission: Tuesday, August 19, 2025 @ 3:00 p.m.

Owner: Friends of Nova Classical Academy
1455 Victoria Way, St. Paul, MN 55102

For additional information, please contact the Owner's Project Manager:
Jesse Prins, Facility Manager, Nova Classical Academy
jprins@novaclassical.org (Email is the preferred form of contact.)
P: 651.209.6320

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ADDITIONAL RFP DOCUMENTS:

Nova Classical Academy has assembled the following additional RFP Documents (available to view online) at Nova Classical Academy's website at this link: (https://www.novaclassical.org/communications/facility-expansion/) for review by the Respondent:

- MINNESOTA DEPARTMENT OF EDUCATION (MDE GUIDE FOR PLANNING SCHOOL CONSTRUCTION PROJECTS (INCLUDES REQUIRED DESIGN STANDARDS), 2018 - CURRENT VERSION
- NOVA CLASSICAL ACADEMY PHASE II ESA REPORT AND RESPONSE ACTION PLAN, DATED FEBRUARY 27, 2025
- LETTER OF NO ASSOCIATION DETERMINATION, DATED OCTOBER 28, 2016

Section 1: General RFP Information

REQUEST FOR PROPOSAL (RFP)
FOR CONSTRUCTION MANAGER AS CONSTRUCTOR AT RISK (CMAR),
FOR A GUARANTEED MAXIMUM PRICE (GMP)

Owner: Friends of Nova Classical Academy, 1455 Victoria Way, St. Paul, MN 55102

Friends of Nova Classical Academy (the "Owner") is accepting proposals for the selection process to enter into a contract with a Construction Manager as Constructor at Risk (CMAR) firm to provide pre-construction services such as constructability guidance, cost estimates, and construction schedules; bidding/procurement and award of Subcontractors; and perform complete Construction Services for the Nova Classical Academy Building Improvements and Expansion Project for a Guaranteed Maximum Price.

Optional pre-proposal walk-through appointments are available on Tuesday the 22nd, Wednesday the 23rd, or Thursday the 24th of July between 9:00 am to noon CST (walkthroughs are non-exclusive; other proposers may be present) at 1455 Victoria Way, St. Paul, MN 55102. Proposers must become familiar with existing conditions in order to submit a Proposal. Contact Jesse Prins to schedule an appointment, no later than Monday July 21, 2025.

Direct all questions regarding this RFP to:

Jesse Prins, Facility Manager, Nova Classical Academy
Email - (preferred form of communication) jprins@novaclassical.org
Phone - 651.209.6320

This document provides information for interested parties to prepare and submit a Proposal in response to this Request for Proposal (RFP) for consideration by Nova Classical Academy. Requirements outlined include requirements for GMP Fee Proposals, as well as requirements for the qualification of Responders. Proposers are to read carefully the entire RFP and all Exhibits and attachments.

1. The Owner will rank the Respondents based on the published criteria. Interviews of select CMAR firms may follow at the Owner's option.
2. Nova Classical Academy reserves the right to modify the terms, conditions, scope of work, project schedule, and any data within this RFP at any time at its sole discretion prior to the final RFP due date, in writing through an addendum.
3. All Proposals duly received and meeting all requirements in this RFP will be reviewed by the Review Committee. Proposals must be fully complete and in accordance with the RFP requirements and the attached exhibits and documents. Proposers who do not fully complete and submit all required Proposal Documents may be deemed unresponsive. Indicate, in Proposers submittal, any and all changes required or requested from requirements indicated in this RFP.
4. No guarantee is offered as to any subsequent award. No reimbursement in any form at any time for any costs related to preparation and submission of a Proposal is offered to proposing firms nor their participants.
5. Each Proposal shall be accompanied by a Bid Bond issued by a surety licensed to do business in the State of Minnesota in the amount of 5% of proposed GMP in Dollars.
6. No Proposer may withdraw its Proposal within one hundred twenty (120) days after the actual date of the opening of the Proposals (Due date) and agrees to this by submitting a Proposal.
7. Owner reserves the right to reject any or all Proposals, and to waive any informalities or irregularities therein.
8. Owner reserves the right to negotiate any aspect of a Proposal submitted to the Owner with any Respondent and to negotiate with more than one Respondent at the same time.
9. Owner reserves the right to request additional information at any stage of the RFP, review, and award process.
10. It is the complete responsibility of the Respondent to ensure that Proposals are received by the submittal deadline.
11. Only registered Plan Holders may submit a Proposal. Plan Holders must register with the Owner's identified representative by the date that questions are due, in order receive Addenda and Qualify as a Plan Holder.

Section 1: General RFP Information

A. RFP AND PROPOSAL SCHEDULE

Release Date:	**July 16, 2025**
Walkthroughs:	**By appointment only: Tuesday 07/22/25 - Thursday 07/24/25; 9:00 am - noon CST**
Proposer Questions Due:	**Friday, July 25, 2025 @ 3:00 p.m. CST**
Addenda Issued:	**Tuesday, July, 29 2025**
Proposal's Due:	**Tuesday August 19, 2025 @ 3:00 p.m. CST**
Proposer Interviews:	**August 25-29, 2025** (may be extended, if needed)

The anticipated award process schedule is as follows: (Dates may vary.)

- Owner's Board Conditional Approval of CMAR and GMP: on or around Sept. 8 - September 29th, 2025. (Date to be adjusted at Owner's discretion.)
- Anticipated Notification of Intent to Award; Owner sends (conditional) Agreement documents to CMAR, anticipated on or around three (3) business days of Nova Classical Academy's Executive Board Conditional approval.
- The CMAR is required to obtain insurance and P&P Bonds and return all properly signed documents to the Owner within seven (7) calendar days of receiving the contracts and Intent to Award notification.
- Contracts Executed: anticipated on or around three (3) business days of receipt of CMAR's signed Agreement, required Insurance, and P&P Bonds in the full value of hte GMP.
- Notice to Proceed: Anticipated within one week of CMAR GMP Contract Execution (upon completion of all required signatures), on or around September 23 - October 27, 2025. (Date to be adjusted at Owner's discretion.)

Submit Proposals to in response to this RFP to:

Owner's Representative: Jesse Prins, Facility Manager, Nova Classical Academy via e-mail at jprins@novaclassical.org, in PDF format. Also provide one printed copy of the complete Proposal and all attachments delivered to Nova Classical Academy, 1455 Victoria Way, St. Paul, MN 55102 - Front Desk Hours are 9:00am-3:00pm Monday-Friday, except for holidays. Call Jesse Prins to inform him of the delivery and obtain a receipt from the office personnel for hand deliveries.

It is the sole responsibility of the Respondent to ensure that their Proposal is received by the Owner by the due date and time.

B. DEFINED TERMS

Terms used in this RFP which are defined below have the following meanings which are applicable to both the singular and plural thereof:

The term "A/E" is used to designate the design team's professional consultants (Architects and Engineers).

"Agreement" – The legally binding Agreement (or Contract) between Owner and Construction Manager as Constructor and the related Provisions of the Agreement included in the RFP.

"Amendment" – A written Amendment Form, if executed, between Owner and Construction Manager as Constructor at Rick, modifying the "Agreement" for Pre-construction services or establishing the Guaranteed Maximum Price for work described in the GMP Documents.

"Architect" – When the term "Architect" is used herein, it shall refer to the Architect, Bloom Companies, LLC (Bloom Hay Dobbs), or an Engineer or Landscape Architect, or its licensed professional or professional services vendor, or its duly authorized representative.

"Owner" – Friends of Nova Classical Academy. The Owner may act through its Directors, Nova Classical Academies Board of Directors, or any duly authorized representative thereof.

"Proposal" – The offer of a Proposer which is submitted in response to the RFP setting forth the Respondent's

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Qualifications, Price(s), Project Team, and other required information and documents, as set forth in the RFP.

"Proposal Security" – Bid Bond furnished by the Proposer and made payable to Nova Classical Academy for the Guaranteed Maximum Price (GMP).

"Proposer" – The legal entity who submits a Proposal for the Project and the Work described herein who is also called the Bidder, Respondent, throughout this document. When referenced as Construction Manager at Risk (CMAR), General Contractor, Construction Manager, Construction Manager as Constructor, and Contractor, reference is made to the Successful Proposer.

"Successful Proposer" – The most qualified responsive Proposer entering into a subsequent Agreement for the Work.

C. DATA PRACTICES AND CERTIFICATION

The Contractor agrees to comply with the Minnesota Government Data Practices Act (Minnesota Statutes, Chapter 13), to the extent applicable, and all other applicable state and federal laws relating to data privacy or confidentiality. The Contractor and any of the Contractor's sub-consultants or sub-contractors retained to provide services under this RFP or a subsequent Contract shall comply with the Act and be subject to penalties for non-compliance as though they were a "governmental entity." The Contractor must immediately report to the Owner any requests from third parties for information relating to a subsequent Contract. The Contractor agrees to hold the Owner, its officers, and employees harmless from any claims resulting from the Contractor's unlawful disclosure or use of data protected under state and federal laws.

1. The Owner considers all information, documentation and other material submitted in response to this solicitation to be of a non-confidential and/or non-proprietary nature and therefore subject to public disclosure under Minnesota Statutes.
2. Information in any tangible form which is submitted by respondents will be treated as confidential until such time as a contract is executed. After that time, the information may be disclosed to requestors, if required, under Minnesota Statutes. If a respondent believes all or a portion of the information submitted is proprietary and confidential and should therefore be exempt from disclosure, they must clearly designate the specific item(s) as proprietary and confidential, and the proper statutory citation must be provided in each instance.
3. Owner will share any subsequent contract and the Proposers Proposal Documents with other entities, if deemed necessary, at the Owner's discretion. Other entities may include, but are not limited to, the Owner's Affiliated Building Company (ABC), Owner's Executive Board, Owner's Facility Improvement Committee, Owner's Financial, Accounting, and Bonding Representative(s), Owner's Prime Consultant (Architect), and Owner's Attorney(s).
4. All information required to be disclosed with others in relation to a subsequent Agreement is also subject to disclosure by the Owner.
5. Respondents are hereby notified that the Owner may post any resultant Contract from this RFP on the Internet website of Owner.
6. Proposals and any other information submitted by Respondents shall become the property of the Owner.
7. Data Practices Affidavit: By signing and submitting a Proposal, Proposer hereby certifies that it agrees to the release of data in accordance with this section.

D. NON-COLLUSION CERTIFICATION AND REQUIREMENTS

Non-collusion Certification: By signing and submitting a Proposal in response to this RFP, the Respondent certifies that the response submitted has been arrived independently and has been submitted without collusion with, and without any agreement, understanding, or planned common course of actions with, any other vendor of services described in the RFP Documents and Scope of Work, designed to limit independent bidding or competition.

Proposer/CMAR further agrees shall not enter into an agreement, participate in any collusion, or otherwise take any action in restraint of free competition in connection with this solicitation or any contract which may result from its acceptance, including actions involving other contractors, competitors, Owner's employees, Owner's consultants or Owner's Board members.

END OF SECTION 1

Section 2: Contract Requirements

A. EXECUTIVE SUMMARY

Nova Classical Academy (Owner) a Minnesota K-12 Public Charter School offering a high-quality classical education, is soliciting proposals from qualified General Contractors ("Proposers") to participate in our Construction Manager At Risk selection process, regarding a public charter school building improvement and expansion project.

The Owner is proposing a two-story building featuring a storm shelter which will connect with the existing school building through a skyway over Mercer Way. The proposed site improvements include a bus parking lot, stormwater detention pond, and related improvements. Please reference the project description, scope of work, and all related requirements within this RFP and its attachments to include the drawings and specifications.

The project (the "Project") includes a renovation and addition to the existing school at 1455 Victoria Way, St. Paul, MN 55102. It also includes the development of an existing undeveloped parcel, expanding the school's facilities by adding a new building on the adjacent pie-shaped lot directly north of the school. The existing and new buildings will be connected by a skyway.

The entire school site is located on the former Koch Tank site, which had extensive contamination. The site was occupied by portions of two larger bulk petroleum storage facilities from 1937 through 1996 at which time the storage tanks were dismantled. The City of St. Paul purchased the Koch Tank Farm Area site in 2004 and placed clean fill on site. The site was undeveloped until the construction of the existing school building began in 2011. The public charter school building was constructed in 2012. Numerous environmental assessments/investigations have been conducted related to the site. The site has been (partially) remediated, as required by the MPCA, for its current use. Please reference the attached environmental documents to understand the related Project requirements.

The existing school facility includes an 89,214-square-foot, three-story school building with a soccer field and playground located on a 3.11 parcel (PID 142823210063) at 1455 Victoria Way. The existing building will connect to the existing building across Mercer Way via a skyway. Minor renovations at the existing building are also included in the project.

Adjacent to the existing school site, across Mercer Way is the site of the expansion project at a 1.14-acre (~49,819 square foot) triangular parcel north of the existing school building (PID 142823210064) acquired by the Friends of Nova Classical Academy in 2016. The site is bound by local streets (Mercer Way, Madson St., and Kay Ave.).

An 28,363-square-foot, two-story, new building expansion features an ICC-500 compliant/certified school storm shelter, office space, locker rooms, restrooms, flexible classroom space, academic support services, learning spaces, and accessory spaces. The storm shelter includes a large multi-use area for instruction and recreation, a flexible use mezzanine fitness area, locker rooms, restrooms, and accessory spaces. Site improvements include a bus parking area, shallow lined stormwater detention pond, and landscaping that includes accessible routes to the new building. A passive vapor mitigation sub-slab system is proposed to meet MPCA requirements for the site.

The new building will face the school along Mercer Way with the main entrance facing Mercer Street. The skyway spanning Mercer Street will connect from a central location on the second floor of each school building. The skyway will be clad in metal panel with appropriately sized windows. The building facade will generally incorporate precast concrete in several colors and patterns, metal panels, curtainwall, windows, and doors echoing the adjacent school building's facade. Multiple roof lines will offer additional visual interest. Pedestrian scale glazing using "blocks of material types" to create visual interest and a sense of entry defines the main entry on the first level of Mercer Street. The incorporation of additional colors and textures to further break the building form into smaller "blocks" to create interest and relate to a human scale.

The expansion site will be attractively landscaped with accessible sidewalks, a shallow storm water detention pond, and off-street parking for school buses. ADA accessible routes connect the parking area, building, and right-of-way as well as between buildings at street level via a crosswalk, and between buildings through a skyway. The angled one-way-style bus parking area will be striped to be used as a vehicle parking overflow for the school during times when not used for buses. The project includes bike parking, landscaping, turf, plantings, and screening (fencing/plantings), efficient LED full-cut-off site lighting, and native plantings.

The following sustainability features are included in the new building's design, working together to create a Sustainable and resilient school environment:

- Energy Efficiency: Incorporation of high-performance insulation, energy-efficient windows, and LED lighting to reduce energy consumption.
- Renewable Energy Sources: A "solar ready" rooftop including the structural capacity to allow future solar panels to

generate clean energy on-site.

- Install ICC-500 compliant Solatube (or similar) systems into the roof/ceiling of the storm shelter to allow for natural lighting.
- Natural Ventilation: Storm shelter areas incorporate natural ventilation systems that promote airflow and reduce reliance on mechanical systems.
- Water Conservation: Low-flow fixtures to minimize water usage.
- Smart Building Technology: Utilize automated systems for lighting, heating, and cooling to optimize energy use and enhance comfort.
- Flexible Learning Spaces: Design multi-purpose areas that can adapt to different educational needs and activities, promoting resource efficiency.
- Landscaping will include environmental sustainability features such as a shallow stormwater detention pond, efficient LED site lighting, and native plantings.
- High efficiency mechanical equipment with energy recovery systems
- Interior finish materials selected with careful consideration of highly sustainable, durable materials.
- Interior design centered around occupant well-being (reduction/elimination of VOCs, Enhanced daylight, ventilation, acoustical controls, Red List free materials used where possible, etc.)
- Interior lighting with daylighting zoning/controls, occupancy sensing.
- Interior lighting with high CRI (90+) to enhance occupancy well-being.
- Site plantings will be selected to support animal/pollinator habitat where possible.
- Bird safe design - glazed areas will be designed to prevent bird strikes, and where necessary incorporate frit patterns or other coatings.
- Construction waste recycling is required.
- Continually sealed air barrier, with third party testing during construction to ensure whole building air-tightness.
- Use of stairs is promoted by providing conveniently located, aesthetically pleasing staircase design.
- Provide bike racks, shower, and changing facilities to support commuting by foot/bike.
- Use of environmentally preferred materials in the exterior (as applicable).
- HVAC and BAS commissioning, by CMaR (including all commissioning conforming to MDE requirements).

Entitlements, Applications, and Approvals related to this Project:

Owner is pursing the following Entitlements and Approvals: The CMAR will be bound to all requirements for the Project related to all Entitlements, Permits, and Applications their subsequent requirements.

1. Several entitlements are requested from the City of St. Paul, the Planning Commission, and the City of St. Paul City Council in connection with the Project due to unique circumstances created practical difficulties: an amendment to the Victoria Park Master Plan to use the subject parcel as an Institutional use (currently indicated as mixed-residential), a building setback variance, a FAR (floor-area-ratio) minimum decrease, a decrease to the building opening requirements (at the storm shelter), bus parking area related variances - lot frontage width increase, internal landscaping exception, and a front yard parking area setback increase/exception. Skyway related requests include a public works vertical clearance exception, an air rights vacation easement, and a right-of-way encroachment permit for footings and columns connecting the skyway to the existing building. A Site Plan Review application is underway. **Several of the physical entitlements require verification upon construction of conformance to regulatory requirements. CMAR is solely responsible to ensure final construction conforms to any such requirements. Contractor shall correct non-conforming Work, at no cost to the Owner, if found to be non-conforming.**

2. A separate preliminary review has been initiated with the St. Paul Capitol Watershed District and a permit will be applied for by the Owner to ensure conformance with their requirements.
3. A review by the Minnesota Department of Education (MDE) will also be conducted. See the enclosed Contractor Certification and Affidavit related to MDE requirements for the Contract.
4. The MPCA is reviewing a submitted Phase II ESA Report and Response Action Plan which includes a Construction Contingency Plan. Additionally, there are several restrictive covenants that must be complied with, and a Letter of No Association issued to Nova Classical Academy on October 28, 2016 which includes several conditions and site limitations. The Contractor is legally bound to comply with all applicable Environmental Requirements, even if addressed to the Owner, as they were addressed to the Contractor, as a condition of this contract.

Note: CMAR is required to flow down all legal obligations in this section to all applicable subcontracts and subconsultants.

B. CONTRACTING, GENERAL

- Any contract resulting from this solicitation will be executed through the Owner's Provided Agreement(s), a sample copy of which is attached. Upon Notification of Intent to Award, CMAR to provide all required Payment and Performance (P&P) Bonds and all required Insurance, and for CMAR to sign the Agreement and return all documents to the Owner within seven (7) calendar days of receipt.
- The contract will be based on the provisions of the AIA A201-2017 General Conditions of the Contract for Construction (AIA A201-2017 General Conditions), (sample attached), and the Owner's agreement: AIA A133-2019 Standard form of Agreement between Owner and Construction Manager as Constructor (GMP) where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price (AIA A133-2019 CMAR/GMP Agreement), (sample attached), and AIA A133-2019 Exhibits A & B, and as otherwise referenced within the provisions contained in this RFP and its attachments/exhibits.
- CMAR will be expected to coordinate with its Prime A/E Consultant, Bloom Companies, LLC including its subconsultants including, but not limited to, Civil Engineers, Structural Engineers, Landscape Architects, Mechanical/ Plumbing Engineers, Electrical Engineers, and other consultants engaged by Nova Classical Academy and Bloom Companies, LLC.
- The Contract Sum is expected to be Cost of the Work plus CMAR's Fee, for a Guaranteed Maximum Price. The Owner, at its sole discretion, may opt to discontinue work at any time upon Notification to the CMAR and will only pay for work that has been completed and conforms to all applicable requirements up until the time of Official Notification that work is to Stop. See the AIA A201-2017 General Conditions of the Contract and AIA A133-2019 CMAR/GMP Agreement documents for additional information.

C. OWNER'S SUPPLEMENTARY CONDITIONS OF THE CONTRACT

The Contract Documents are complimentary. The Contract Documents include the Procurement and Contracting requirements, Request for Proposals and Exhibits, and other documents included in this RFP, the selected Proposers Proposal and related documents included in their RFP response, AIA A201-2017 General Conditions of the Contract (for Construction Manager at Risk), Payment and Performance Bonds, and the executed AIA A133-2019 CMAR/GMP Agreement, and other documents, **as articulated in the final Agreement for the Project provided by the Owner.** (Note: Updated AIA Documents are anticipated to be issued via Addenda for the Proposers reference.)

Payment and Performance Bonds in the full amount of the GMP Contract (to include CMAR contingency), for the faithful performance of the Contract, are to be provided by the CMAR and to be effective and binding for the duration of the Project and Contract and continue through the Contractor's one-year corrective warranty period. If, through a Change Order, the GMP Contract Amount increases, the Payment and Performance Bonds will be increased to the new Contract Sum. Such costs are to be included by the Contractor in all subsequent Contractor pricing quotes/proposals and provided upon the Contractor's signature of the Change Order, for the Owner's final review and signature.

1. The specifications and concept drawings contained in this RFP are provided to interested Respondents to provide a

common understanding of the minimum requirements and intent for this Project, and the Scope of Services required for the Project.

2. The Bidder may choose to exceed specified minimum requirements, where it does not conflict with the design intent nor increase cost and schedule, if acceptable to the Owner. All services and work proposed shall conform to all applicable federal, state, and local requirements.
3. Time is of the essence on the Project. If the successful Bidder fails to meet any specified delivery Milestones, the Owner shall have the option of canceling any and all contracts issued to the Bidder in connection with this RFP.
4. Liquidated Damages: Should the Contractor not achieve the Required Completion Date/Substantial Completion Date as outlined in AIA A133-2019 CMAR/GMP Agreement § 6.1.6 and in accordance with the provisions of AIA A201-2017 General Conditions, liquidated damages will be assessed on a graduated scale for each day of delay beyond the Date of Required Completion/Substantial Completion.

   For each two-week period following the Required Completion Date/Substantial Completion Date, the Contractor will incur the following daily charges, if incomplete:

   - Days 1-14: $250 per day
   - Days 15-29: $500 per day
   - Days 30-44: $1,000 per day
   - Day 45 and beyond: The pattern of doubling the daily penalty will continue for each subsequent two-week period delay (14 calendar days) past the Required Completion Date/Substantial Completion Date until Substantial Completion is achieved.
5. Phasing: The Scope of Work for the Project includes a Preconstruction Phase (with Bidding) and a Construction Phase (including two Construction sub-phases, Close Out, Turnover, and Warranty Services).
6. The Contractor shall not assign any interest in the Contract and shall not transfer any interest in the same either by assignment or novation without the prior written approval of the Owner.
7. Nothing contained in this RFP and a subsequent Contract is intended to, or shall be construed in any manner, as creating or establishing the relationship of employer/employee between parties. Contractor and its subconsultants and subcontractors shall at all times remain an independent Contractor with respect to the work and/or services being performed. Any and all employees of Contractor or other persons engaged in the performance of any work or services required by Contract under this RFP and a subsequent Contract shall be considered employees or subcontractors of the Contractor only, and not of the Owner; and any and all claims that might arise, including Worker's Compensation claims under the Worker's Compensation Act of the State of Minnesota or any other state, on behalf of said employees or other persons while so engaged in any of the work or services to be rendered or provided herein, shall be the sole obligation and responsibility of the Contractor.
8. The laws of the State of Minnesota shall govern all interpretations of a subsequent Contract, and the appropriate venue and jurisdiction for any litigation which may arise hereunder will be in those courts located within Ramsey County, State of Minnesota, regardless of the place of business, residence or incorporation of the Contractor.
9. All Work produced by the Contractor under a subsequent Contract is classified as "work for hire" and upon payment by the Owner to the Contractor will be the exclusive property of the Owner and will be surrendered to the Owner immediately upon payment for completion or cancellation of a subsequent warded and executed Contract in response to this RFP. All finished or unfinished documents, data, studies, surveys, maps, models, photographs, reports, construction, materials, equipment, reports, analysis, data, specifications, drawings, or other Work resulting from a subsequent Contract shall become the property of the Owner. The Owner at its own risk, may use, extend, modify, or enlarge any document produced under a subsequent Contract without the consent, permission of, or further compensation to the Contractor.

10. Payment: No down payments may be requested of the Owner. Contractors will only be paid according to the work completed. Unless otherwise indicated by the Owner's Authorized Representative, General Conditions of the Contract shall be paid only in proportion to the dollar value of the other Work completed.

D. CHANGES TO THE WORK:

For all changes in Work, the Contractor shall submit written Change Order requests to the Owner using the AIA G701 – 2001 Change Order form and shall include all necessary supporting documentation. Supporting documentation includes verification of Contractor's and Subcontractors' costs associated with the change in the scope. Change Order costs shall be calculated as follows:

1. Maximum Markup Percentage Allowable on Self-Performed Work: The maximum mark-up percentage fee to be paid to Contractor on self-performed work shall be a single markup percentage not-to-exceed 10% of the direct cost of labor, cost of material, and equipment.
2. Maximum Markup Percentage Allowable on Work Performed by Subcontractors: The maximum markup percentage fee allowable to the Contractor's subcontractors direct labor, material and equipment cost is 5%.
3. Direct and Indirect Costs Covered by Mark-up Percentages: As further clarification, the agreed upon maximum markup percentages allowable shall cover the Contractor's profit and all indirect costs associated with the Change Order work. Items covered by the maximum markup percentages allowable include, but are not limited to: home office expenses, branch office and field office overhead expense of any kind; officers; project management; safety director, superintendents, general foremen; non-working foremen, estimating, engineering; coordinating; expediting; purchasing; detailing; legal, accounting, data processing or other administrative expenses; shop drawings; permits; auto insurance and umbrella insurance; auto and pick-up truck costs; and warranty expense costs. The cost for the use of small tools is also to be considered covered by the maximum markup percentages allowable. Small tools shall be defined as tools and equipment (power or non-power) with an individual purchase cost of less than $1,000.00.
4. The application of the applicable markup percentage referenced in the preceding paragraphs will apply to both additive and deductive Change Orders. In those instances where a change involves both additive and deduction work, the additions and deductions will be netted out and the markup percentage adjustments will be applied to the net amount.
5. The Owner and Contractor may use lump sum or time and material not to exceed (NTE) as pay methods by which an increase to Contract Price is structured. Change Order requests proposing increases in Work do not entitle the Contractor with, nor obligate the Owner to, an adjustment of the date of Substantial Completion or the Contract Termination Date. The Contractor shall include information sufficient to verify that the increase in Work impacts the Critical Path or sequence of total project work in a manner which cannot be avoided, and such that an adjustment to the date of Substantial Completion or the Contract Termination date is justified. No work consistent with the changes in the Change Order shall commence until the Change Order has been reduced to writing and executed by both parties.

E. CONFLICT OF INTEREST/ ETHICS

1. The Contractor is required to disclose any potential Conflict of Interest to the Owner in their Proposal. The Owner may disqualify a Proposer if they deem a Conflict of Interest averse to the interests of the Owner.
2. The Contractor agrees, upon submitting a Proposal, to avoid any situation and immediately disclose to the Owner any relationship or circumstance that may give rise to a "conflict of interest." A "conflict of interest" will arise if Contractor represents any other party or other client whose interests are averse, in any way, to the interests of the Owner.
3. Ethics:
   - CMAR shall prioritize safety, health, and welfare, as well as legal, regulatory, and code compliance in their work.
   - Adhere to professional ethical duties. Provide a professional standard of care in the execution of duties for the Project, reflecting ordinary and reasonable care given similar circumstances in this general location.
   - Protect the Owner against financial and physical loss of property.

F. WARRANTIES AND GUARANTEES:

1. In addition to the Warranty covenants in the AIA A201-2017 General Conditions of the Contract and AIA A133 - 2019 Standard form of Agreement between Owner and Construction Manager as Constructor (GMP), attached, the following additional warranty requirements apply to a subsequent Agreement for the Project:
   - All Construction, installed equipment, materials, devices, and Work shall be fully warranted for one-year after the Date of Substantial Completion, in accordance with the minimum warranty requirements and obligations of the Contractor indicated in this RFP and in the General Conditions.
   - In addition, the General Contractor shall prepare a typed total Contract Warranty of the exact form, content, terms, provisions and conditions contained in the following Sample Contract Warranty form included as a part of the Warranty Requirements Section, prior to and as a condition of Substantial Completion.
   - Assemble, review, and submit all warranties and guarantees applicable to the Project and the Work. All warranties outlined in the Project Manual are to be provided. Special and manufacturer warranties are to be included in relevant submittals.
   - All standard manufacturer warranties are to be provided to the Owner, and Contractor shall apply for warranties and provide all such warranties to the Owner in a Warranties Manual, prior to and as a condition of Substantial Completion.
   - All products and equipment shall be suitable according to the manufacturer's printed product and equipment data and use information, and installed in accordance with installation requirements, and shall conform to all warranty requirements and all applicable manufacturer terms and conditions.
   - If a conflict arises that certainly or potentially voids a manufacturer's warranty requirements, immediately notify the Architect, prior to providing a product data submittal. Allow for adequate time in the schedule for coordination and resolution of potential conflicts.
   - Maintain all warranty requirements for the duration of the project.
   - Submit all warranty documents to the Architect for delivery to the Owner as a condition of Substantial Completion and shall be active a minimum of one-year from the date of Substantial Completion, or as otherwise specified in excess of one-year.
   - Two original signed copies of the Total Contract Warranty and all other warranties are required prior to substantial Completion to become binding at Substantial Completion.
   - Each warranty shall be signed, sealed and notarized as appropriate.
   - The Contractor shall assemble all warranties, guarantees, special Project warranties, service and maintenance contracts together into a Warranties Manual. Provide a Table of Contents as the first page of the Warranties Manual, identifying and organizing all contents by major Specifications Section number and name. Provide two (2) original copies of the Warranties Manual and all contents.
   - Failure of the Contractor to provide Special, Installer/Subcontractor, or Manufacturer warranties herein will not relieve the Contractor of their obligation to provide such warranties. All warranties are to be provided at the cost of the Contractor, where Contractor fails to secure such warranties.
   - All existing construction, amenities, utilities, equipment, devices, finishes, pavements, plantings, and other items to remain damaged by Construction will be repaired by the CMAR at no cost to the Owner, to meet the existing conditions or better, and shall be included in the CMAR's corrective work warranty. Contractor to provide additional warranties for any items damaged that are currently under warranty to meet or exceed the remaining warranty period.
   - Prior to the interruption of any services or utilities at the existing school, provide the Owner with a minimum of 72 hours' notice of the interruption, and adjust the schedule for the interruption at the request of the Owner, at no

cost to the Owner, if the proposed date and time of the interruption conflicts with important scheduled activities. Do not interrupt services or utilities during, or immediately prior to, the regular school day.

2. Consider the long-term durability and quality of the design and the Work, and provide construction, equipment, and materials that perform according to the Owner's intent. The Owner's general intent is as follows regarding durability, unless noted otherwise:
   - Building Envelope is to have a minimal life of approximately 20 years. Appearance shall be substantially similar to existing, as described in the enclosed documents and meeting all required design requirements by the AHJ.
   - Pavements: Parking lot pavements and sidewalks are to last approximately 20 years.
   - Equipment, Fixtures, and Devices: Equipment shall last approximately 20 years.
   - Finishes shall generally last approximately 10 years.
   - Low voltage, technology/data standards, access control, and door hardware, where not otherwise defined in the documents, shall be substantially similar to existing.

G. CONDUCT AND CMAR BACKGROUND CHECKS:

1. While on the Owner's property, Proposers, the CMAR's personnel, and all subcontractors and subconsultants shall observe the following:
2. No firearms and no weapons may be brought onto the Owner's property.
3. No alcohol, tobacco products, vaping, marijuana products, nor any illegal drug may be brought onto the Owner's property.
4. All personnel shall dress in a professional manner when on the Owner's property and shall always have on a shirt and slacks, and/or other professional clothing and PPE required to perform work.
5. On the Owner's property, no music or other recordings may be played that can be heard by those in the vicinity who are not working on site.
6. Always be courteous. Minimize all contact with students and those not directly involved with the Project.
7. Direct all Project and Work inquiries to the Owner's Representatives.
8. No felons are allowed on the Owner's property, unless explicitly waived by the CMAR and Owner. Conduct a basic criminal background check on all personnel working on site.

H. SCOPE OF SERVICES

1. **General Services: The CMAR shall be responsible for complying with all of the duties and obligations reasonably and customarily required of the CMAR. Such services include, but are not limited to, the following:**
   - Coordinate with the Owner, Bloom Companies, LLC, and its Subconsultant Team, and the Owner's other Consultants, Vendors, and Contractors.
   - Assist the A/E Team to successfully design the Project within the Approved Budget, meeting the design intent and all Owner requirements.
   - Comply with all applicable State of Minnesota Regulations and Statutes, applicable Federal and local regulations, and conform to all requirements of regulatory authorities.
   - Perform project tasks and the Work, when applicable and appropriate, through CMAR's subcontractors and subconsultants. The Contractor shall not sub-consult or sub-contract any services under this RFP or a subsequent Contract unless authorized in writing by the Owner. The Contractor shall provide written notice to the Owner and obtain the Owner's authorization to sub-contract any work or services to be provided to the Owner pursuant to an executed Contract.

Section 2: Contract Requirements

- Contractor shall pay all subcontractors for subcontractor's undisputed, completed work, within ten (10) days after the Contractor has received payment from the Owner.
- Provide all general conditions of the contract, automobiles, deliveries, freight, shipping, dunnage, rigging, equipment, cleaning, all weather provisions (cold, hot, humid, wet, dark, etc.), project/construction waste management and recycling and reporting, temporary utilities and related equipment, and hookups, submittals, professional services, Sewer Availability Charge (SAC) applications and charges, temporary facilities (including jobsite office, phones, toilets, drug testing, etc.), storage, tools, training, licenses, insurance, bonds, permits, construction area fencing and signage, protection of the work, project management, supplies, supervision, coordination, communication and documentation, and all other appurtenances, and general requirements of the Contract, under the CMAR GMP Agreement.
- Provide other services, if mutually agreed upon, in writing, through execution of approved forms and procedures.
- The Contractor, and any subcontractors, and subconsultants must coordinate and seek approval from the Owner for all telecommunications and IT network requirements prior to any purchase or installation/implementation of a technology solution need for the project.
- Provide for design of all security system, access control, surveillance, data/network system, and communications and technology equipment not included in the drawings, to meet the Owner's existing/current standards (or approved equal).
- Conduct bi-weekly meetings, minimally, throughout the course of the Project to coordinate activities with the Owner, A/E Team, and others either on site or virtually, as appropriate and as required by the Owner. Hold additional meetings, as necessary to coordinate project activities and the Work.
- Develop agendas for CMAR meetings and distribute meeting minutes. Incorporate team comments into final minutes.
- Assist Owner and Architect in working with various governing authorities, as requested.
- Develop a Key Project Decisions Log documenting important decisions and approvals on the project informing design, construction, schedule, and budget, indicating pending decisions, the approver(s), and additional relevant and important information, decisions, and approvals. Break the log down by logical categories (design, construction, schedule, budget, etc.) and make it available to all at each bi-weekly meeting, highlighting important pending and time sensitive pending decisions.
- CMAR to Provide a 3rd Party Independent Peer Review, Testing, and Inspection program for ICC-500 compliance and certification of the Storm Shelter by an independent registered design professional for compliance with the applicable requirements of the ICC-500-2014 Standard (ICC/NSSA) for the Design and Construction of Storm Shelters), Commentary, and all reference standards. Peer Reviewer (PE) preference is for an NSSA - Site Built Design Engineer Member and include an NSSA Credentialed Certified Professional and Inspector. Professional Engineers be experienced in the discipline they are reviewing and/or inspecting and currently licensed in Minnesota. CMAR to address all comments by the Peer Review and incorporate them into the design, in coordination with the A/E Team and Owner. All costs related to the Peer Review and changes to address the Peer Review comments are to be included in the GMP. Peer review will be conducted at the appropriate time in the Preconstruction Phase, and shall be integrated into the CMARs CPM schedule, as well as all required testing and inspections.
- CMAR to ensure Storm Shelter conforms to all applicable requirements of ICC-500 (ICC/NSSA) 2014 Standard for the Design and Construction of Storm Shelters", the current adopted MN State Building Code/amended International Building Code, and all other applicable codes and standards in enforcement (at the time of permitting), and all requirements of the AHJ's.
- If the construction fails tests or inspections by the CMAR's 3rd Party Independent Peer Inspector/Tester, CMAR to correct all deficiencies within the GMP, at no additional cost to the Owner.
- If required by the Authorities Having Jurisdiction (AHJ) or other regulatory authorities, CMAR's shall emply an NSSA licensed Professional to meet with the Owner to develop a written, certified, preparedness and emergency operations plan (ECP). The Professional certifying the plan shall submit it to the Authority Having Jurisdiction (AHJ) for approval, if required.

- Provide all required traffic control engineering, plans, encroachment permits, supervision, and traffic control measures required by the AHJ for the Work. Always provide an accessible (Temporary Pedestrian Access Route) TPAR when a ROW pedestrian route is impacted, regardless of AHJ requirements.
- Risk Management: CMAR to provide Risk Management in the planning and execution of its duties relative to the Project and the Work. Effectively identify, assess, and control risk that could affect the success of the Project. Develop a Risk Management Plan to identify and mitigate risk, protecting the Owner's interests to the greatest extent possible..
- Cost Management: Implement effective cost management control and tracking procedures to provide the Owner with the opportunity to make such decisions as required to keep project cost within the fixed budget.
- Cost Control: Implement and maintain cost control methods with "open book" sharing of cost information with Owner and Owner's Consultants.
- CMAR to inform Owner of pending cost issues within five (5) business days of identifying potential issues.
- Implement and maintain a current log of pending cost issues impacting the final cost of the project and review no less than monthly with the Owner.
- Provide a drawdown and cash flow projections for the project during construction and update as requested.
- Work with the Owner and Architect to develop and implement a change management process for the project.

2. Preconstruction Phase Services:

The Preconstruction Phase Services noted in this section will be initiated only upon the formal issuance of the Notice to Proceed for this phase. Work completed prior to the formal Notice to Proceed for this phase will not be paid/ reimbursed by the Owner. The Work in this phase may be conducted in conjunction with the Construction Phase.

- The Preconstruction Phase Services required will include performance of constructability analysis and guidance, design assistance cost estimates and multiple budget verifications, multiple constructability reviews, and construction systems or methods alternatives for "cost reduction" or "value engineering/added" purposes.
- Develop a Schedule of Values which will be the basis for monthly pay applications.
- Conduct analysis, evaluate site conditions, prepare reports, and prepare minutes and distribute them to the Project Team, as required to enable the project to progress.
- Develop a Quality Assurance Plan.
- Prepare and submit applications for all utility services (to include but not limited to: sanitary sewer, storm sewer, water, electric, gas, internet/ethernet - from Owner's preferred provider, WAC/SAC), pay all applicable fees and coordinate to facilitate completion of utility construction, equipment, and connections to meet all required Delivery Dates.
- Perform a code review with DLI and other AHJ representatives and include the Architect and other A/E representatives in the review. Schedule to accommodate Architect's availability.
- CMAR will further develop the project master schedule including:
  - ◊ Integration of A/E design efforts, key activities, preconstruction activities, procurement, construction activities, and work performed by other parties.
  - ◊ Establish, monitor, and enforce a construction critical path method (CPM) schedule construction including phasing, and logistics planning. Review a detailed preliminary CPM schedule with the Owner and Architect, providing a copy and opportunity for review and comment, within two weeks of the Notice to Proceed for this phase.
  - ◊ CMAR will identify long lead items requiring early bid packages and recommend issue dates for same to meet required completion date(s).
  - ◊ Evaluate other important project delivery and construction schedule parameters and challenges and incorporate them into the CPM schedule.

- ◊ CMAR will further develop the project master schedule including integration of A/E design efforts, all key activities, preconstruction activities, procurement/bidding activities, construction activities, lead times, and work performed by other parties.

- CMAR to develop a strategy for issuing bid packages that facilitate the completion of those packages and the project as a whole. The purpose is to utilize this bidding package strategy to gain the most advantageous issuing of documents, to maximize local subcontractor participation, minimize construction duration while allowing the bid packages to be completed efficiently. Early bid packages may be required for certain building components, assemblies, equipment, and/or systems to expedite the Work, that are subject to long lead times, and/or sub-trades that have high potential for cost escalation.
- Establish and conduct a CMAR, subcontractor, and subconsultant safety program (SSSP), meeting all regulatory requirements and ensuring the safety of all employees, subcontractors, subconsultants, the public, school students, and others visiting the construction site and/or impacted by Construction.
- At 70% and 90% complete (+/-) Construction Documents (CDs), per bid package if agreed upon by A/E, CMAR to provide a formal CD review, provide review comments for the A/E Team and Owner, and provide a detailed cost estimate. Estimate shall include a breakdown by bid package as well as by specification section, or as otherwise agreed upon. As part of this review, Contractor must provide value analysis/engineering efforts, including suggestions regarding potential changes and alternates. The duration of this review, comment, value analysis, and estimating period shall not exceed three (3) weeks unless otherwise agreed upon by the Owner and Architect.
- Develop RFP/Bid Documents for Sub-contractors and Sub-Consultants incorporating Architectural and Engineering Documents with related requirements, including flow-down requirements of the CMAR agreement, and all other requirements of the Owner. The CMAR Contractor shall be in compliance with Minnesota Statutes, section 471.345, governing municipal contracts issued for this project, including but not limited to, the bidding process, advertisement, qualification process, selection process, award process, and all subsequent agreements subject to Minnesota Statutes, section 471.345, as well as all other applicable regulatory procurement and contracting requirements. See the certification page in the Exhibits.
- Work with the Project Team to develop a project communication plan and system that is effective for the participants and meets the schedule requirements of the project.
- Provide other formal communications and reports, as requested by Owner, incidental to the GMP.
- Bidding Services
  - ◊ The Bidding Services noted in this section will be initiated only upon the formal issuance of the Notice to Proceed for this phase. Work for this phase completed prior to Owner's written notification to commence bidding services will not be paid/reimbursed by the Owner. The Work in this phase may be conducted in conjunction with the Construction Phase.
  - ◊ Manage and administer a competitive Subcontractor Bid Process (and Subconsultant RFP, if applicable), evaluate bids/proposals, and interview key subcontractors (along with the A/E and Owner). Invite bidders to bid, advertise bids, and perform all duties related to managing and administering the bidding process.
  - ◊ Following the Owners' approval of recommendation, CMAR to award and administer all subcontracts and material purchases, as the General Contractor.
  - ◊ Coordinate with the Owner, A/E, and all other relevant stakeholders as agreed upon with the Owner and/or A/E throughout the process.
  - ◊ If the CMAR desires to self-perform portions of the work, the CMAR must follow State of Minnesota competitive municipal contracting bid requirements with respect to those portions of the work.

3. Construction Phase Services

Section 2: Contract Requirements

Construction Phase Services will be initiated only upon the formal issuance of the Notice to Proceed for this phase. Work for this phase completed prior to the formal Notice to Proceed may not be paid/reimbursed by the Owner. The final decision regarding whether payment will be made for work performed prior to the Formal Notice to Proceed for this phase is at the Owner's discretion. The Work in this phase may be conducted in conjunction with other phases.

- Manage Value Engineering to ensure the Project is built within the Approved Budget (GMP), as approved by the Owner and Architect.
- Construction Schedule:
  - ◊ Monitor and enforce the construction critical path method (CPM) schedule. CPM Schedule to include design efforts, preconstruction activities, procurement of goods and construction activities, lead times, and other important information. CMAR to provide regular monitoring of the actual progress versus the scheduled progress, identify any variances and prepare a written action plan (if behind schedule) along with an updated schedule to maintain the scheduled completion dates.
  - ◊ CMAR to determine the adequacy of the subcontractors' personnel and equipment and the availability of materials and supplies to meet the schedule. Report status no less than weekly in regular bi-weekly coordination meetings.
  - ◊ CMAR to prepare a short-term (3-to-4 week look-ahead) schedule on a weekly basis.
- Establish, monitor, and manage regular Owner, Architect, and Contractor ("OAC") meetings to monitor design, construction progress, conformance to the requirements, and quality assurance throughout the course of the Project.
- Supervise the Work (whenever work is underway on-site) and coordinate with all CMAR subcontractors and subconsultants.
- Prepare and submit applications for all utility services (to include but not limited to: sanitary sewer, storm sewer, water, electric, gas, internet/ethernet - from Owner's preferred provider, WAC/SAC), pay all applicable fees and coordinate to facilitate completion of utility construction, equipment, and connections to meet all required Delivery Dates.
- Coordinate with regulatory authorities, as required, relative to the Project and the Work, to secure approvals, permits, and inspections to ensure timely completion and delivery of the Project. Note: The Design Documents adhere to current Building Codes in enforcement as of the date of this RFP. It is intended that all Building Permits are obtained prior to the adoption of new MN Building Codes. If the Contractor delays obtaining Construction Permits until after the new building codes are enforced in Minnesota, the Contractor shall pay all costs associated with redesign and Construction as a result of the newly adopted codes.
- Prepare Product Data, Shop Drawing, coordination drawing and physical sample submittals, submit applications, pay fees, and obtain all permits required for the Project and the Work, except where indicated otherwise in this RFP as a responsibility of the Owner.
- Analyze, negotiate and process change orders for the Owner's Representative and Architect's approval.
- Prepare Project reports, minutes with Subcontractors and suppliers and schedules.
- Implement a quality assurance plan.
- Contractor's Sub-consultant "Independent 3rd-party testing and reporting" agency, duly qualified and licensed in the State of MN for the work performed, unless noted otherwise.
- Maintain the as-built document set and provide it to the Owner prior to Final Completion, accurately documenting all changes to the Work.
- Prepare a punch list for each trade or subcontractor and assist in Substantial Completion and Final Completion inspections. CMAR to ensure completion of CMAR's initial punch list prior to A/E's punch-list walk-through.
- Owner to provide Geotechnical and Structural special inspections. CMAR to cooperate and coordinate with Owner's testing and inspection services.

- CMAR to provide all other 3rd party inspection services. See the attached exhibit indicating required 3rd party inspection services.
- CMAR will be responsible for the cost of additional testing due to failed tests and for the correction of deficient work and repairs and reconstruction due to deficient work. (Owner to provide Geotechnical and Structural special inspections.)
- Prepare Contractor payment applications and obtain partial lien waivers (when work is still in progress) from each subcontractor who performed work in the prior pay period and full lien releases for each subcontractor (prior to Final Completion).
- CMAR to develop and implement an effective HVAC and BAS Commissioning (Cx) Plan, cooperatively and in coordination with the Project Team, meeting all requirements indicated in the RFP and jurisdictional and regulatory authorities applicable to the Project, to include MDE. Perform commissioning and provide commissioning data, documentation, and reporting, including all labor tools and equipment required to provide commissioning services during preconstruction and construction, commissioning and close-out of the above Project, as required by Minnesota Department of Education, project specifications commissioning requirements and industry A/E certified commissioning procedures. Commissioning processes will follow industry standards such as ASHRAE, PECA, NETA, NFPA, ANSI, etc. Technicians will include AEE, TAB, NETA, and MDE procedures as required for the Project. Commissioned systems to include the following:
  - ◊ Heating, Ventilating, and Air Conditioning systems including piping and duct extensions
  - ◊ Air and Water Terminal Units
  - ◊ Air Handlers and Make Up Air Units
  - ◊ Terminal Space Conditioning and Control
  - ◊ HW Boilers, pumps and piping
  - ◊ Exhaust Fans
  - ◊ Storm shelter ventilation and emergency power and HVAC systems
  - ◊ Building Automation System and Controls
  - ◊ Domestic water systems, heaters and pump
  - ◊ Fire alarm and building systems interface
  - ◊ Lighting and Lighting control Systems
  - ◊ Power and electrical systems associated with the commissioned systems above
- Establish, monitor and enforce Contractor's safety programs.
- Receive, prepare, and submit all closeout documents including, without limitation, warranties, operating and maintenance manuals.
- Arrange and manage completion of all inspections with building officials, local municipalities, and obtain substantial completion (TCO) and final completion (CO) documents for the Work.
- Manage successful closeout of all permits associated with the Work, document successful closeout of all permits, and provide such documentation to the Owner and Architect, prior to Substantial Completion.
- Manage transfer of building operation to Owner.
- Provide monthly pay application to include a monthly report with each progress billing that details a project work status report, buy-out to schedule of value analysis, contingency status, schedule status and project progress commentary with applicable job-site photos. Provide additional back-up documentation to the Owner and Architect upon request.
- Provide an 11 month warranty review on site. Correct all deficiencies noted.

Section 2: Contract Requirements

H. CMAR PROJECT TEAM

- CMAR to provide competent, experienced, full-time staff dedicated to the Project. CMAR to provide a Project Executive, Project Manager (called "Construction Manager" in the AIA A133 -2019 Standard From of Agreement Between Owner and Construction Manager as Constructor) and day-to-day Project Contact along with other key CMAR employees required for the successful execution and completion of the Project on budget and on schedule, meeting quality and other requirements, and demonstrating high levels of effective, responsive, proactive project leadership.
- CMAR to provide an experienced construction field superintendent and project team to coordinate the work, maintain the progress of the subcontractors, coordinate with ongoing activities and operations, and provide overall direction to the Project during the construction phase.
- Establish on-site organization, chain of command, and levels of authority to carry out the overall plans of the construction team.
- CMAR to work cooperatively and constructively with members of the Project Team to foster positive relationships that support positive outcomes for the team members and the Project.
- CMAR will be contractually obligated to not reassign key staff members to other projects without the Owner's prior written consent. The Owner will have approval rights of any and all new personnel assigned to this Project.

I. REQUIRED DELIVERY DATES

Preconstruction:

- Preconstruction Phase Delivery date is as required to achieve the Construction delivery dates indicated below, and as required to complete the execution of all sub-contracts and pull all required permits prior to Jan. 1, 2026. Jan. 1, 2026, has been determined as a critical date by which all permits shall be pulled due to pending adoption of new Minnesota Building Codes likely becoming enforceable sometime in 2026. The project has been designed to meet building codes in force at the time of this RFP. It is vital that the CMAR obtain all permits under the current building codes.

Construction Phase:

The Proposer understands and agrees that time is of the essence for delivery and completion of this Contract. The Proposer, by submitting a Proposal and subsequently entering a contract with the Owner, agrees that Delivery Dates, as indicated above, shall be Substantially Completed as indicated in this solicitation.

- **Phase 1 Construction: Expansion and related Renovation.** Final Completion of the Entire Expansion Project on the currently Undeveloped Parcel, Final Completion of Skyway, and Final Renovation to the Existing Building by Areas impacted by the Skyway.

  The required delivery date for Construction Phase 1 is December 22nd, 2026, for Substantial Completion ("Phase 1 Construction Delivery Date").

- **Phase 2 Construction: Renovation.** Final Completion of the Renovation to the Existing Building in all areas not impacted by the Skyway.

  The required delivery date for Construction Phase 2 is March 22, 2027, for Substantial Completion ("Phase 2 Construction Delivery Date").

J. GUARANTEED MAXIMUM FEE

Guaranteed Maximum Price (GMP) shall be inclusive of all CMAR costs and fees, subconsultant(s) costs and fees, and all subcontractor(s) costs and fees, to include all applicable taxes, and as otherwise indicated in the RFP, the AIA A201-2017 General Conditions of the Contract, the AIA A133 - 2019 Standard form of Agreement between Owner and Construction Manager as Constructor (GMP), and as otherwise referenced within the provisions contained in this RFP and its attachments/exhibits.

Section 2: Contract Requirements

Owner may deem the GMP Fee Proposal as unresponsive when not conforming to applicable requirements in the RFP.

Guaranteed Maximum Price shall include a 5% Contingency and a $100,000 allowance (to be used only with Owner's written approval).

Submit Exhibit E - CMAR Fee and General Conditions Worksheet and Questionnaire. Complete this worksheet and submit as part of CMAR's Proposal. Include with Fee Proposal the following and all additional information required in conformance with Proposal/GMP submission requirements indicated in AIA A133 - 2019 Standard form of Agreement between Owner and Construction Manager as Constructor (GMP):

1. A list of the Drawings and Specifications, including all Addenda thereto, and the Conditions of the Contract;
2. A list of the clarifications and assumptions made by the Construction Manager in the preparation of the
3. Guaranteed Maximum Price proposal, including assumptions.
4. A statement of the proposed Guaranteed Maximum Price, including a statement of the estimated Cost of the Work organized by trade categories or systems, including allowances; the Construction Manager's contingency and the Construction Manager's Fee;
5. The anticipated date(s) of Substantial Completion (Delivery Dates) upon which the proposed Guaranteed Maximum Price is based; and
6. A date by which the Owner must accept the Guaranteed Maximum Price, minimally 120 days from the Proposal Due Date.
7. **Alternates:**
    - Alternate #1: Provide a Deduct Alternate Price (to be subtracted from the GMP) for Extension to the Delivery Dates, if available from CMAR to the Owner. Indicate proposed Delivery Dates for this Alternate. Also indicate the date by which all permits will be pulled under this Alternate.
    - Alternate #2: Provide an Add Alternate Price (to be added to the GMP) for providing a wood floor within the shelter area, including a recessed slab, to accommodate the new flooring system to have a finish floor flush with the adjacent surfaces and to achieve the designated FFE.
    - Other Alternates based on the RFP documents, Proposer to provide a list of other proposed Alternates to be deducted or added to the GMP, the alternate price to be added or subtracted, and any potential impact on the design, the required Delivery Dates, or other parts of the Project.

END OF SECTION 2

Section 3: Proposal and Proposer Requirements

Respondents shall carefully read the information contained in the following criteria and submit a complete Proposal conforming to all requirements herein. Incomplete Proposals will be considered non-responsive and subject to rejection. Your proposal should be a demonstration of your ability to communicate concisely and succinctly.

All questions concerning this solicitation shall be submitted in writing to the Person identified at the email address listed on the first page of this solicitation document.

Any protest regarding the intended award of a contract shall be submitted no later than five (5) business days after the notice of intent to award has been posted to the Owner's website. Protests shall be addressed to Jesse Prins and emailed to jprins@novaclassical.org and Proposer is responsible for confirming and ensuring delivery of their email.

A. PROPOSAL FORMAT:

All Proposals shall be provided in a single, indexed, and searchable electronic PDF format, with Exhibit Forms.

Structure the Proposal in the following format:

B. RESPONDENT'S QUALIFICATIONS TO PROVIDE CONSTRUCTION MANAGER AS CONSTRUCTOR AT RISK SERVICES

1. Proposers must be a legally licensed General Contractor and business licensed by the Minnesota Secretary of State and with office and employees dedicated to the Project located in the State of Minnesota. Qualification information submitted shall be applicable only to the company entity or branch that will perform this Work.
2. Proposers must qualify as a Responsible Contractor. (See enclosed Exhibit and return with Proposal.)
3. Proposers must have prior recent experience in CMAR GMP renovation and new public school educational facility construction projects in accordance with applicable codes, standards, rules, and regulations. Preference will be given to Proposers with specific CMAR GMP experience with public charter schools, constructing ICC-500 compliant storm shelters, as well as effective experience in working with the Owner of Saint Paul.
4. Priority will be given to Proposers whose principal place of business is located within the larger Minneapolis-St. Paul Metro area (includes Anoka County, Carver County, Chisago County, Dakota County, Hennepin County, Isanti County, Le Sueur County, Mille Lacs County, Ramsey County, Scott County, Sherburne County, Sibley County, Washington County, and Wright County) with strong track records delivering projects on time and on budget. Travel, mileage, parking, lodging, airfare, per diem, printing, and similar expenses are not directly reimbursable, but are to be included in the GMP overhead rates and fee costs.
5. Provide a statement of interest along with the respondent's unique qualifications as they pertain to the work of this project.
6. Additionally, provide the following information regarding your company:
   - Organization type, corporation, partnership, sole proprietorship, or joint venture. Identify state of incorporation and business licensure.
   - Year the firm was established.
   - Volume in dollars of work completed in Minnesota over the last 5 years: (Through date of RFP issuance)
   - Volume in dollars of work completed nationally over the last 5 years: (Through date of RFP issuance)
   - Identify the total number and dollar amount of contracts you currently have in progress.
   - Identify the percent of work and trades you normally perform with your own forces.
   - Identify if the company is currently for sale or involved in any transaction to expand or to be acquired by another business entity? If yes, please explain the impact to organization and management efforts.
   - Provide details of any past or pending litigation, or claims filed, against your company that may affect your

performance under an Agreement with the Owner.

- Provide details (date, nature of violation, summary of corrective actions, etc.) of all OSHA violations, within the last 5 years, and the current status of any violations (through date of your response.)
- Identify if your company has ever defaulted, failed to complete any work or otherwise been discharged prior to completion of the project? If yes, stipulate when, where and why.
- Identify if your company has ever paid liquidated damages or a penalty for failure to complete a contract on time. If yes, stipulate for which project, when and why.
- Does any relationship exist by a relative, business associate, capital funding agreement, or any other such kinship between your firm and any employee, officer, Board Member, Owner or school?

C. RELATED EXPERIENCE

CMAR to Demonstrate experience on:

1. Indicate the number of Charter School Projects completed as CMAR with a value of over 1 million dollars within the past five (5) years. Provide at least one Owner project reference for one of the Charter School projects on this list.
2. A minimum of three (3) similar projects to include only CMAR GMP projects and at least one ICC-500 Storm Shelter (certified) educational project, within the past five (5) years. Include the following information:

- Functional use and building code classification
- Gross square footage of renovation with brief description
- General renovation elements with descriptions, pictures, and/or floor plan
- Organization/school name, address and current phone number
- Approximate start and substantial completion dates
- Names of CMAR personnel involved with leading the project
- Construction budget, bid amount, final cost, and a general description of the major change orders
- Provide a project reference for each. References must include client name, organization/company, title, and address, project name and services provided, and phone number and e-mail.

D. SCOPE OF SERVICES AND APPROACH

- Describe your services and how they will be leveraged to plan, build, and renovate the Project.
- Describe the firm's approach to performing pre-construction services for this Project.
- Specifically address any union obligations that your company has that would limit the use of non-union subcontractors.
- List work that will be self-performed and how Fees will be applied to any self- performed work. Also describe how you will show that self-performed work is priced competitively.
- Describe how the firm would typically involve subcontractors in the pre-construction process and obtain subcontractor bids in a CMAR process for this Project.
- Describe the firm's approach to performing construction administration and construction management for this Project.
- Describe the firm's approach to controlling a project's budget and schedule for this Project.
- Describe the firm's approach to performing quality assurance and quality control during construction of this Project.
- Describe the firm's approach to achieving project close-out (commissioning, punch-list, and warranty work) for this Project.
- Provide an explanation of what work duties are being completed out of the office within Minnesota, and what duties will be conducted on site, as they relate to this Project. If any duties are to be completed outside of MN, indicate which duties, and where they will be done.
- Indicate proposed Subconsultants, if any, along with the Firm's related qualification information and role by phase.

E. PROJECT TEAM

- Provide an overall hierarchal chart showing all key personnel for the project indicating project responsibilities, phase of involvement, individual availability, and the % of their time that will be spend on the project on a weekly basis during the phase of their involvement. Include all senior CMAR employees/owners responsible for the project and/or supervising the project team. Indicate the person approved to make decisions on behalf of the CMAR and authorize/sign documents and contracts.
- Key personnel must include the Project Manager, Site Superintendent, Project Executive, and day-to-day Project Contact along with other key CMAR employees required for the successful execution and completion of the Project. Other key personnel may include safety director, general foremen, estimators, engineers, project coordinators, buyers/procurement specialists, project controls, etc.
- Include a resume for all key personnel indicating relevant experience, years of experience, licensure and certification, work location, and relevant education and certifications. (Upon request, within 48 hours, provide professional references for key individuals.)
- Indicate each individual's time employed by CMAR.
- Indicate any anticipated change of personnel during the Project from what is shown.
- Provide similar information for subconsultant personnel, if anticipated to have a key role.

F. PROPOSED IMPLEMENTATION TIMELINE

Provide a Preliminary Milestone Schedule of not more than 2 pages showing an understanding of the project and the required Delivery Date(s) and important project milestones using the Critical Path Method. Note any concerns and any proposed changes to the Preliminary Milestone Schedule.

G. PROPOSED GUARANTEED MAXIMUM PRICE AND RATES

1. Provide an explanation of quality assurance, value engineering, cost/budget management, risk management, and change management as it relates to financial aspects of the project and the GMP.
2. Complete the enclosed CMAR Fee Proposal Fee Form (GMP), Exhibit E, and submit it with your Proposal.
3. Complete the CMAR Hourly Rates Reference Sheet, Exhibit D, and submit it with your Proposal.

H. EXHIBIT FORMS REQUIRED TO BE SUBMITTED AS PART OF RESPONDENT'S PROPOSAL

EXHIBIT A – CMAR SIGNATURE AND CERTIFICATION PAGE

EXHIBIT B – PROPOSAL SUBMISSION CHECKLIST

EXHIBIT C – CONFIDENTIALITY & NON-DISCLOSURE AGREEMENT

EXHIBIT D – CMAR HOURLY PAY RATE REFERENCE SHEET

EXHIBIT E – CMAR FEE PROPOSAL FORM

EXHIBIT F – RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

EXHIBIT G – INTEGRITY CERTIFICATION-DEBARMENT-SUSPENSION

EXHIBIT H – STATE OF MINNESOTA RESIDENT BUSINESS FORM

Section 3: Proposal and Proposer Requirements

I. PROPOSAL EVALUATION CRITERION AND AWARD

The primary award criterion will be the most economically advantageous proposal that includes the requested services, by a qualified, responsive Proposer. The evaluation will also be based on the following criteria:

1. Contractor Fee (GMP plus Alternates)	Weighted Score: 30%
2. Demonstrated Competence: similar relevant project experience and references, competence, and local presence	Weighted Score: 20%
3. Past performance, including: schedules, cost control, quality, safety record, references, and responsiveness to owners	Weighted Score: 15%
4. Construction schedule approach and coordination of ongoing/on-site owner activities; reduce time and money at the same time maintaining design intent, safety and operations	Weighted Score: 15%
5. Conformance with all terms, conditions, and requirements in this RFP	Weighted Score: 15%
6. Compatibility of firm's size, location, expertise, availability of key personnel and experience	Weighted Score: 5%
7. Financial Stability	Pass/Fail

Qualified, responsive Proposals will be reviewed by a selection committee. The committee may request additional information from the Proposer or request personal interviews.
Nova Classical Academy reserves the right to:

- Select the vendor it deems to be most qualified to fulfill the needs of Nova Classical Academy.
- Adopt all or any part of the vendor's proposal.
- Negotiate with the Proposer(s) after Proposals are received, amending the requirements of this RFP in writing.

END OF SECTION 3

Section 4: Enclosed Exhibits

EXHIBIT FORMS REQUIRED TO BE SUBMITTED AS PART OF THE RESPONDENT'S PROPOSAL:

EXHIBIT A – CMAR SIGNATURE AND CERTIFICATION PAGE

EXHIBIT B – PROPOSAL SUBMISSION CHECKLIST

EXHIBIT C – CONFIDENTIALITY & NON-DISCLOSURE AGREEMENT

EXHIBIT D – CMAR HOURLY PAY RATE REFERENCE SHEET

EXHIBIT E – CMAR FEE PROPOSAL FORM

EXHIBIT F – RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

EXHIBIT G – INTEGRITY CERTIFICATION-DEBARMENT-SUSPENSION

EXHIBIT H – STATE OF MINNESOTA RESIDENT BUSINESS FORM

EXHIBIT A
SIGNATURES AND CERTIFICATIONS

KNOW ALL PERSONS BY THESE PRESENTS, that we,

_____

(Prime Proposer's Legal Firm Name, legal business address, and other information)

through our authorized Principal _____,
(Printed/Typed Name and Title)

officially submit our Proposal for Construction Manager as Constructor at Risk (CMAR) for a Guaranteed Maximum Price (GMP), for the Nova Classical Academy Building Improvements and Expansion Project.

Dated this _____day of _____20__.

Addenda(s) numbered _____have been incorporated into this Proposal response.

The Proposal may not be withdrawn for 120 days after the Proposal Due Date.

Principal has submitted the accompanying Proposal Document(s) for a Guaranteed Maximum Price and certifies the following in regard to our Proposal response:

1. **Respondent certifies that they are using this Exhibit as their Proposal Cover Page and that they have NOT modified or re-formatted the RFP Exhibits without written permission from the Owner.**
2. **The Respondent certifies they have read, understand, and agree to ALL applicable requirements of the Proposer/CMAR noted in the RFP Instructions and Requirements in the RFP document and its Exhibits and Attachments.**
3. **Respondent acknowledges and agrees to ALL Certifications (Use of Data, Non-Collusion, Conflict of Interest, etc.) as included in the RFP.**
4. **Respondent and agrees to all Rights Reserved by Nova Classical Academy, as stated in the RFP.**
5. **The Respondent certifies, if awarded a Contract in response to this RFP, the Project will be in compliance with school facility commissioning under Minnesota Statutes, section 123B.72, certifying the plans and designs for the heating, ventilating, air conditioning and air filtration for an extensively renovated or new facility meet or exceed current code standards, including the ASHRAE air filtration standard 52.1.**
6. **The Respondent certifies, if awarded a Contract in response to this RFP, to consider the American National Standards Institute Acoustical Performance Criteria, Design Requirements and Guidelines for Schools on maximum background noise level and reverberation times.**
7. **The Respondent certifies, if awarded a Contract in response to this RFP, that the project will be in compliance with Minnesota State Fire Code.**
8. **The Respondent certifies, if awarded a Contract in response to this RFP, that the project will be in compliance with Minnesota Statutes, chapter 326B, governing building codes.**

The CMAR will maintain documentation showing compliance with Certifications numbered 4-6 above as a condition of Substantial Completion.

EXHIBIT A
SIGNATURES AND CERTIFICATIONS

By signing this Exhibit, I hereby certify that I agree to all representations in this exhibit and all Binding Conditions herein.

Signed: By Firm's Authorized Signatory/Principal

_____
(Printed/Typed Name of Authorized Signatory/Principal and Title)

_____
(Signature of Authorized Signatory/Principal)

_____
(Company Phone, Cell Phone, and personal email address

_____
(Prime Proposer's Legal Firm Name, legal business address, and other information)

_____
(Prime Proposer's website URL and MN Business License Number)

_____
(Date Signed)

Witness of Notary with Seal and Signature Below (For witnessing or attesting a signature):

State of _____

County of _____

I certify that this is a true and correct copy of a document in the possession of

_____
(Name of Firm/Person(s)

_____
(Dated)

_____
(Signature of notarial Officer)

Stamp

Title (and Rank):_____

My Commission Expires: _____

END OF EXHIBIT

EXHIBIT B
PROPOSAL SUBMISSION CHECKLIST

PRIME CMAR Proposer Firm name: _____

Proposal Checklist for the Construction Manager as Constructor at Risk (CMAR) for a Guaranteed Maximum Price (GMP), for the Nova Classical Academy Building Improvements and Expansion Project

CHECKLIST

Required Item Name	Included? (X = Yes)
EXHIBIT A – CMAR SIGNATURE AND CERTIFICATION PAGE	
EXHIBIT B – PROPOSAL SUBMISSION CHECKLIST	
CONTRACTOR'S PROPOSAL DOCUMENT (PARTS A-E FROM SECTION 3)	
EXHIBIT C – CONFIDENTIALITY & NON-DISCLOSURE AGREEMENT	
EXHIBIT D – CMAR HOURLY PAY RATE REFERENCE SHEET	
EXHIBIT E – CMAR FEE PROPOSAL FORM	
EXHIBIT F – RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE	
EXHIBIT G – INTEGRITY CERTIFICATION-DEBARMENT-SUSPENSION	
EXHIBIT H – STATE OF MINNESOTA RESIDENT BUSINESS FORM	
BID BOND	

ALL ITEMS ABOVE ARE REQUIRED TO BE INCLUDED IN ORDER TO BE CONSIDERED A COMPLETE AND RESPONSIVE PROPOSAL

END OF SECTION

EXHIBIT C
CONFIDENTIALITY & NON-DISCLOSURE AGREEMENT

PRIME CMAR Proposer Firm name: _____

Project Name: Nova Classical Academy Building Improvements and Expansion Project

The Bidder/Proposer/Contractor hereby gives notice to Nova Classical Academy of Bidder/Proposer/Contractor's intent to submit a bid in response to the RFP, and consideration of the opportunity to submit a bid, and in order to induce Nova Classical Academy to provide Confidential Information to Bidder/Proposer/Contractor in connection with its bid, the undersigned Bidder/Proposer/Contractor hereby covenants and agrees as follows:

1. The term "Confidential Information" shall mean and include all non-public information relating to the Project (as defined in the RFP), or to Nova Classical Academy which Bidder/Proposer/Contractor may have obtained or generated in connection with the RFP; any other non-public evaluations, data, drawings, layouts, reports, procedures, schedules, cost estimates, budgets, trade secret information relating to Nova Classical Academy; non-public financial information, strategic plans, cost data, fee schedules, contract forms, employee information, plans, and other information obtained from, or on behalf of, Nova Classical Academy in connection with the Project and the RFP and which is not in the public domain at the time it is disclosed to or obtained by Bidder/Proposer/Contractor and is generally understood to be confidential information; and any other documents which contain or are based upon any confidential information. "Confidential Information" does not include information which:
    (1) is in the public domain at the time it is disclosed to or obtained by Bidder/Proposer/Contractor;
    (2) is known to Bidder/Proposer/Contractor at the time it is disclosed or obtained, and was not acquired directly or indirectly, from personnel of Nova Classical Academy, or is lawfully obtained from a third party not in breach of any obligation of confidentiality; or
    (3) becomes part of the public domain after disclosure by publication or otherwise, other than through the fault or action of Bidder/Proposer/Contractor.

2. Bidder/Proposer/Contractor will limit its use of Confidential Information solely for use in preparing its bid for the benefit of Nova Classical Academy. Bidder/Proposer/Contractor will not directly or indirectly disclose, divulge or communicate any of the Confidential Information to any person or entity other than to:
    (1) Nova Classical Academy;
    (2) certain of Bidder/Proposer/Contractor's employees for whom there is a "need to know" and who are legally bound to abide by, and be subject to, the remedies provisions of this Agreement; and
    (3) any other recipient to whom disclosure has been expressly authorized in writing by Nova Classical Academy provided, and subject to, the recipient's prior execution and delivery to Nova Classical Academy of a confidentiality and non-disclosure agreement acceptable to Nova Classical Academy. Bidder/Proposer/Contractor shall not copy Confidential Information unless approved in writing by Nova Classical Academy; provided, however, that the making and distribution of copies of Confidential Information to employees having a "need to know" is solely for purposes related to the bid, and subject to retrieval and destruction by Bidder/Proposer/Contractor of all copies upon completion of employees' tasks, shall not be deemed to be a breach of this Agreement.

EXHIBIT C
CONFIDENTIALITY & NON-DISCLOSURE AGREEMENT

3. Upon the earlier of Nova Classical Academy having entered into a Contract pursuant to the RFP with a person other than the undersigned, or termination of the RFP, the Bidder/Proposer/Contractor shall deliver to Nova Classical Academy all written or descriptive matter, in any form, which contains any Confidential Information, without keeping any copies of the Confidential Information.

4. A breach of any of the requirements in this NDA relating to the obligations of Bidder/Proposer/Contractor will be material, and shall be conclusively deemed to do irreparable harm to Nova Classical Academy; therefore, in addition to any and all remedies available under applicable law or in equity, Nova Classical Academy and its affiliates shall be entitled to injunctive or equivalent relief enjoining the breach of such obligations (with a maximum bond of $100); and Nova Classical Academy shall be entitled to commence and prosecute a civil action against Bidder/Proposer/Contractor and its employees for that purpose and monetary damages. The successful party in such action is to be awarded its reasonable attorneys' fees, expert fees and other costs and expenses incurred in the litigation.

Exclusive venue of any such action shall be in Ramsey County, Minnesota, and Minnesota law shall govern.

I agree to the above Non-Disclosure Agreement Terms and Conditions, as an Authorized Signatory on behalf of my Company and our Employees and Agents.

Signed and Attested by By Prime Proposer - Authorized Signatory/Principal

_____

(Printed/Typed Name of Authorized Signatory/Principal and Title)

_____

(Signature of Authorized Signatory/Principal)

_____

(Company Phone, Cell Phone, and personal email address

_____

(Prime Proposer's Legal Firm Name, legal business address, and other information)

_____

(Prime Proposer's website URL and MN Business License Number)

_____

(Date Signed)

END OF EXHIBIT

EXHIBIT D
CMAR HOURLY PAY RATE REFERENCE SHEET

PRIME CMAR Proposer Firm name: _____

Project Name: Nova Classical Academy Building Improvements and Expansion Project

The following represents our Proposed Hourly Rates for All Key and other Personnel for the Duration of the Project through the required Delivery Date(s) and Warranty Period. Rates are inclusive of all overhead, profit, markup, benefits, taxes, all other employer/employee financial obligations, and all reimbursable expenses.

FIRM NAME | POSITION TITLE	HOURLY RATE IN US DOLLARS
	$
	$
	$
	$
	$
	$
	$
	$
	$
	$
	$
	$
	$
	$
	$
	$

END OF EXHIBIT

EXHIBIT E
CMAR FEE PROPOSAL FORM

PRIME CMAR Proposer Firm name: _____

Project Name: Nova Classical Academy Building Improvements and Expansion Project

The following represents our Proposed Guaranteed Maximum Fee (in US Dollars) for Construction Manager as Constructor, at Risk, according to all requirements and the RFP and attached exhibits and documents.

1. **Proposers Fee for Preconstruction Phase Services: $_____.____**
2. **Proposers Fee for Construction Phase Services and the Work: $_____.____**
3. **Subtotal for both Phases (Line 1 and Line 2) above: $_____.____**
4. **Proposer's Required Contingency, 5% of line 3: $_____.____**
5. **Proposer's Guaranteed Maximum Price (Sum of Line 3 and 4): $_____.____**
6. **Construction Manager At Risk's Fee is _____% of the Cost of the Work, included in the GMP.**

***Attach a Proposed GMP Schedule of Values, indicating a breakdown by Phase and as described in the RFP.**

Signed: By Firm's Authorized Signatory/Principal

_____
(Printed/Typed Name of Authorized Signatory/Principal and Title)

_____
(Signature of Authorized Signatory/Principal)

_____
(Company Phone, Cell Phone, and personal email address

_____
(Prime Proposer's Legal Firm Name, legal business address, and other information)

_____
(Prime Proposer's website URL and MN Business License Number)

_____
(Date Signed)

END OF EXHIBIT

EXHIBIT F
RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

PRIME CMAR Proposer Firm name: _____

RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

PROJECT TITLE: Nova Classical Academy Building Improvements and Expansion Project

Minn. Stat. § 16C.285, Subd. 7. **IMPLEMENTATION. "…**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."	
Minn. Stat. § 16C.285, Subd. 3. **RESPONSIBLE CONTRACTOR, MINIMUM CRITERIA**. "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:	
(1)	The Contractor: (i) is in compliance with workers' compensation and unemployment insurance requirements; (ii) is in compliance with the Department of Revenue and Department of Employment and Economic Development registration requirements if it has employees; (iii) has a valid federal tax identification number or a valid Social Security number if an individual; and (iv) has filed a certificate of authority to transact business in Minnesota with the Secretary of State if a foreign corporation or cooperative.

(2)	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: (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; (ii) has been issued an order to comply by the commissioner of Labor and Industry that has become final; (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; (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;

EXHIBIT F
RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

	(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 (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;*
(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 the 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) and clauses (8) and (9).
(8)	The contractor or related entity has been in business under the current business name or Federal Employer ID number for a minimum of two (2) years prior to the issuance of this Request for Bids.
(9)	The contractor or related entity has not had any willful or repeated OSHA safety citations within the past two (2) years.

EXHIBIT F
RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

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 Attachments A and A-1 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, see Section 00 43 36 for Attachment A-2, 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 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. 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.

EXHIBIT F
RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

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 minimum criteria or 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.o2 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.

END OF EXHIBIT

RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

Minn. Stat. § 16C.285, Subd. 7. **IMPLEMENTATION.** … any prime contractor or subcontractor 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…

Minn. Stat. § 16C.285, Subd. 3. **RESPONSIBLE CONTRACTOR, MINIMUM CRITERIA**. "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:

(1)	The Contractor: (i) is in compliance with workers' compensation and unemployment insurance requirements; (ii) is currently registered with the Department of Revenue and the Department of Employment and Economic Development if it has employees; (iii) has a valid federal tax identification number or a valid Social Security number if an individual; and (iv) has filed a certificate of authority to transact business in Minnesota with the Secretary of State if a foreign corporation or cooperative.
(2)	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: (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; (ii) has been issued an order to comply by the commissioner of Labor and Industry that has become final; (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; (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; (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 (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;* (vii) has been convicted of a violation of section 609.52, subdivision 2, clause (19).

(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; and
(7)	All subcontractors 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.

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.

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 at the time that it responds to the solicitation document.

A contracting authority may accept a sworn statement 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. Failure to verify compliance with any one of the minimum criteria or a false statement under oath in a verification of compliance shall render the prime contractor or subcontractor that makes the false statement 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 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.

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.

By submitting 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,

2) I have included Attachment A-1 (below) with my company's solicitation response, and

3) if my company is awarded a contract, I will also submit Attachment A-2 as required.

Company Name:	
Printed Name:	**Title:**
Authorized Signature of Owner/Officer:	**Date:**

ATTACHMENT A-1
FIRST-TIER SUBCONTRACTORS LIST
SUBMIT WITH PRIME CONTRACTOR RESPONSE

NOTE TO CONTRACTOR:
Bids exceeding $50,000 MUST have a signed Responsible Contractor Verification and Certification of Compliance Form, including the completed A-1 Form, submitted with the bid. If not otherwise listed below, any subcontractors listed on any Small and Underutilized Business Program (SUBP) Participation forms(s) submitted with this bid *(if SUBP is a requirement of the bid)* are also incorporated herein by reference and considered to be listed below. By signing the Responsible Contractor Verification and Certification of Compliance Form, the bidder agrees to this incorporation by reference and that any certifications related to the below listed subcontractors is also true as to any subcontractors incorporated by reference.

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.

FIRST TIER SUBCONTRACTOR NAMES **(Legal name of company as registered with the Secretary of State)** **If you have no subcontractors for this project, indicate by writing "None" in the first space below.**	**Name of city where company home office is located**

ATTACHMENT A-2
ADDITIONAL SUBCONTRACTORS LIST
PRIME CONTRACTOR TO SUBMIT AS SUBCONTRACTORS ARE ADDED TO THE PROJECT
PROJECT NAME:

NOTE TO CONTRACTOR:
If additional subcontractors are added to a project after execution of a contract, complete and submit an updated A-2 Form to the Project Manager within 14 days of retaining the additional subcontractor(s).

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.

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

SUPPLEMENTAL CERTIFICATION FOR ATTACHMENT A-2	
By submitting this document, I certify that I am an owner or officer of the company, and I swear under oath that: 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.	
Authorized Signature of Owner or Officer:	**Printed Name:**
Title:	**Date:**
Company Name:	

EXHIBIT G
INTEGRITY CERTIFICATION-DEBARMENT-SUSPENSION

PRIME CMAR Proposer Firm name: _____

Project Name: Nova Classical Academy Building Improvements and Expansion Project

(1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and d) Have not within the three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default. (2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Signed and Attested by Prime Proposer - Authorized Signatory/Principal

_____

(Printed/Typed Name of Authorized Signatory/Principal and Title)

_____

(Signature of Authorized Signatory/Principal)

_____

(Company Phone, Cell Phone, and personal email address

_____

(Prime Proposer's Legal Firm Name, legal business address, and other information)

_____

(Prime Proposer's website URL and MN Business License Number)

_____

(Date Signed)

END OF EXHIBIT

EXHIBIT H
STATE OF MINNESOTA RESIDENT BUSINESS FORM

PRIME CMAR Proposer Firm name: _____

Project Name: Nova Classical Academy Building Improvements and Expansion Project

In accordance with Laws of Minnesota 2013, Chapter 142, Article 3, Section 16, amending Minn. Stat. § 16C.02, subd. 13, a "Resident Vendor" means a person, firm, or corporation that:

(1) is authorized to conduct business in the state of Minnesota on the date a solicitation for a contract is first advertised or announced. It includes a foreign corporation duly authorized to engage in business in Minnesota;

(2) has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately preceding submission of the bid or proposal for which any preference is sought;

(3) has a business address in the state; and

(4) has affirmatively claimed that status in the bid or proposal submission.

To receive recognition as a Minnesota Resident Vendor ("Resident Vendor"), your company must meet each element of the statutory definition above by the solicitation opening date and time. If you wish to affirmatively claim Resident Vendor status, you should do so by submitting this form with your bid or proposal. Resident Vendor status may be considered for purposes of preference for a Resident Business.

I hereby certify that the company listed below:

1. Is authorized to conduct business in the State of Minnesota on the date a solicitation for a contract is first advertised or announced. (This includes a foreign corporation duly authorized to engage in business in Minnesota.)
   Yes ☐ No ☐ (must check yes or no)
2. Has paid unemployment taxes or income taxes in the State of Minnesota during the 12 calendar months immediately preceding submission of the bid or proposal for which any preference is sought.
   Yes ☐ No ☐ (must check yes or no)
3. Has a business address in the State of Minnesota.
   Yes ☐ No ☐ (must check yes or no)
4. Agrees to submit documentation, if requested, as part of the bid or proposal process, to verify compliance with the above statutory requirements.
   Yes ☐ No ☐ (must check yes or no)

By signing below, you are certifying your compliance with the requirements set forth herein and claiming Resident Vendor status in your bid or proposal submission.

Name of Company: _____ Date: _____

Authorized Signature: _____ Telephone: _____

Printed Name: _____ Title: _____

END OF EXHIBIT

Section 5: Enclosed Attachments

- **SAMPLE A201 - 2017 GENERAL CONDITIONS GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION MANAGER AT RISK**
- **SAMPLE PRE-CONSTRUCTION SERVICES CONTRACT - A133 - 2019 STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONSTRUCTION MANAGER AS CONSTRUCTOR (GMP) (PRE-CONSTRUCTION, BIDDING AND CONSTRUCTION SERVICES CONTRACT)**
  - **SAMPLE A133 EXHIBIT A - 2019 - GUARANTEED MAXIMUM PRICE AMENDMENT**
  - **SAMPLE A133 EXHIBIT B - 2019 - INSURANCE AND BONDS**
- **PRELIMINARY CONSTRUCTION PROJECT MANUAL PROVIDED BY DESIGN TEAM**
- **CONCEPT PLANS PROVIDED BY DESIGN TEAM**

ADDITIONAL RFP DOCUMENTS:

Nova Classical Academy has assembled the following additional RFP Documents (available to view online) at Nova Classical Academy's website at this link: (https://www.novaclassical.org/communications/facility-expansion/) for review by the Respondent:

A.1. MINNESOTA DEPARTMENT OF EDUCATION (MDE GUIDE FOR PLANNING SCHOOL CONSTRUCTION PROJECTS (INCLUDES REQUIRED DESIGN STANDARDS), 2018 - CURRENT VERSION

A.2. PHASE II ESA REPORT AND RESPONSE ACTION PLAN, DATED FEBRUARY 27, 2025

A.3. LETTER OF NO ASSOCIATION DETERMINATION, DATED OCTOBER 28, 2016

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

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

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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Sample

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

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

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining

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provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

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

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

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

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

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

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ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

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

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the

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site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's

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capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

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

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

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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

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

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes

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remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

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

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

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

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

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

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

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

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

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.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

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

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

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

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

§ 3.12 Shop Drawings, Product Data and Samples

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

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

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

sample

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§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

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

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

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

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

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

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the

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time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

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

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

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ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

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

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under

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Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

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

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

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the

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

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

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

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate

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Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

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

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

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

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

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

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

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

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

§ 7.2 Change Orders

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

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

§ 7.3 Construction Change Directives

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

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

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

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

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

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

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

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

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

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

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The

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Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

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

§ 7.4 Minor Changes in the Work

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

ARTICLE 8 TIME

§ 8.1 Definitions

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

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

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

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

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

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

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

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

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable

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by the Owner to the Contractor for performance of the Work under the Contract Documents.

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

§ 9.2 Schedule of Values

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

§ 9.3 Applications for Payment

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

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

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

§ 9.4 Certificates for Payment

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

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The

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foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

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

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

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

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

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

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

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

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers

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to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

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

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

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

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

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

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

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

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

§ 9.9 Partial Occupancy or Use

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

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

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

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

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

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constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

.1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
.2 failure of the Work to comply with the requirements of the Contract Documents;
.3 terms of special warranties required by the Contract Documents; or
.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

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

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

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

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

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

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

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

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

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§ 10.2.8 Injury or Damage to Person or Property

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

§ 10.3 Hazardous Materials and Substances

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

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

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

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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

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

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the

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endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

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

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

§ 11.2 Owner's Insurance

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

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

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The

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Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

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

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

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

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the

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Contractor's expense.

§ 12.2.2 After Substantial Completion

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

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

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

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

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

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

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

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

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§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

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

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

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

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

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

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

§ 13.5 Interest

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

- **.1** Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- **.2** An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- **.3** Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- **.4** The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

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

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

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

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

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

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

§ 14.3 Suspension by the Owner for Convenience

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

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

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

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§ 14.4 Termination by the Owner for Convenience

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

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

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

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

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

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

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

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

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

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section

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15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

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

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

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

§ 15.2 Initial Decision

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

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

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

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

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

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

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

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

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

§ 15.3 Mediation

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

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

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

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

§ 15.4 Arbitration

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

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

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

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly

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consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

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

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

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

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AIA® Document A133® – 2019

*Standard Form of Agreement Between Owner and Construction Manager as **Constructor** where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price*

AGREEMENT made as of the _____ day of _____ in the year _____
(In words, indicate day, month, and year.)

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

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

for the following Project:
(Name, location, and detailed description)

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

The Owner and Construction Manager agree as follows.

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

AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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ARTICLE 1 INITIAL INFORMATION

§ 1.1 This Agreement is based on the Initial Information set forth in this Section 1.1.
(For each item in this section, insert the information or a statement such as "not applicable" or "unknown at time of execution.")

§ 1.1.1 The Owner's program for the Project, as described in Section 4.1.1:
(Insert the Owner's program, identify documentation that establishes the Owner's program, or state the manner in which the program will be developed.)

§ 1.1.2 The Project's physical characteristics:
(Identify or describe pertinent information about the Project's physical characteristics, such as size; location; dimensions; geotechnical reports; site boundaries; topographic surveys; traffic and utility studies; availability of public and private utilities and services; legal description of the site, etc.)

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§ 1.1.3 The Owner's budget for the Guaranteed Maximum Price, as defined in Article 6:
(Provide total and, if known, a line item breakdown.)

§ 1.1.4 The Owner's anticipated design and construction milestone dates:

.1 Design phase milestone dates, if any:

.2 Construction commencement date:

.3 Substantial Completion date or dates:

.4 Other milestone dates:

§ 1.1.5 The Owner's requirements for accelerated or fast-track scheduling, or phased construction, are set forth below:
(Identify any requirements for fast-track scheduling or phased construction.)

§ 1.1.6 The Owner's anticipated Sustainable Objective for the Project:
(Identify and describe the Owner's Sustainable Objective for the Project, if any.)

§ 1.1.6.1 If the Owner identifies a Sustainable Objective, the Owner and Construction Manager shall complete and incorporate AIA Document E234™–2019, Sustainable Projects Exhibit, Construction Manager as Constructor Edition, into this Agreement to define the terms, conditions and services related to the Owner's Sustainable Objective. If E234–2019 is incorporated into this agreement, the Owner and Construction Manager shall incorporate the completed E234–2019 into the agreements with the consultants and contractors performing services or Work in any way associated with the Sustainable Objective.

§ 1.1.7 Other Project information:
(Identify special characteristics or needs of the Project not provided elsewhere.)

§ 1.1.8 The Owner identifies the following representative in accordance with Section 4.2:
(List name, address, and other contact information.)

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§ 1.1.9 The persons or entities, in addition to the Owner's representative, who are required to review the Construction Manager's submittals to the Owner are as follows:
(List name, address and other contact information.)

§ 1.1.10 The Owner shall retain the following consultants and contractors:
(List name, legal status, address, and other contact information.)

.1 Geotechnical Engineer:

.2 Civil Engineer:

.3 Other, if any:
(List any other consultants retained by the Owner, such as a Project or Program Manager.)

§ 1.1.11 The Architect's representative:
(List name, address, and other contact information.)

§ 1.1.12 The Construction Manager identifies the following representative in accordance with Article 3:
(List name, address, and other contact information.)

§ 1.1.13 The Owner's requirements for the Construction Manager's staffing plan for Preconstruction Services, as required under Section 3.1.9:
(List any Owner-specific requirements to be included in the staffing plan.)

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§ 1.1.14 The Owner's requirements for subcontractor procurement for the performance of the Work:
(List any Owner-specific requirements for subcontractor procurement.)

§ 1.1.15 Other Initial Information on which this Agreement is based:

§ 1.2 The Owner and Construction Manager may rely on the Initial Information. Both parties, however, recognize that such information may materially change and, in that event, the Owner and the Construction Manager shall appropriately adjust the Project schedule, the Construction Manager's services, and the Construction Manager's compensation. The Owner shall adjust the Owner's budget for the Guaranteed Maximum Price and the Owner's anticipated design and construction milestones, as necessary, to accommodate material changes in the Initial Information.

§ 1.3 Neither the Owner's nor the Construction Manager's representative shall be changed without ten days' prior notice to the other party.

ARTICLE 2 GENERAL PROVISIONS

§ 2.1 The Contract Documents

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract and are as fully a part of the Contract as if attached to this Agreement or repeated herein. Upon the Owner's acceptance of the Construction Manager's Guaranteed Maximum Price proposal, the Contract Documents will also include the documents described in Section 3.2.3 and identified in the Guaranteed Maximum Price Amendment and revisions prepared by the Architect and furnished by the Owner as described in Section 3.2.8. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. If anything in the other Contract Documents, other than a Modification, is inconsistent with this Agreement, this Agreement shall govern. An enumeration of the Contract Documents, other than a Modification, appears in Article 15.

§ 2.2 Relationship of the Parties

The Construction Manager accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Construction Manager's skill and judgment in furthering the interests of the Owner to furnish efficient construction administration, management services, and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish or approve, in a timely manner, information required by the Construction Manager and to make payments to the Construction Manager in accordance with the requirements of the Contract Documents.

§ 2.3 General Conditions

§ 2.3.1 For the Preconstruction Phase, AIA Document A201®–2017, General Conditions of the Contract for Construction, shall apply as follows: Section 1.5, Ownership and Use of Documents; Section 1.7, Digital Data Use and Transmission; Section 1.8, Building Information Model Use and Reliance; Section 2.2.4, Confidential Information; Section 3.12.10, Professional Services; Section 10.3, Hazardous Materials; Section 13.1, Governing Law. The term "Contractor" as used in A201–2017 shall mean the Construction Manager.

§ 2.3.2 For the Construction Phase, the general conditions of the contract shall be as set forth in A201–2017, which document is incorporated herein by reference. The term "Contractor" as used in A201–2017 shall mean the Construction Manager.

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ARTICLE 3 CONSTRUCTION MANAGER'S RESPONSIBILITIES

The Construction Manager's Preconstruction Phase responsibilities are set forth in Sections 3.1 and 3.2, and in the applicable provisions of A201-2017 referenced in Section 2.3.1. The Construction Manager's Construction Phase responsibilities are set forth in Section 3.3. The Owner and Construction Manager may agree, in consultation with the Architect, for the Construction Phase to commence prior to completion of the Preconstruction Phase, in which case, both phases will proceed concurrently. The Construction Manager shall identify a representative authorized to act on behalf of the Construction Manager with respect to the Project.

§ 3.1 Preconstruction Phase

§ 3.1.1 Extent of Responsibility

The Construction Manager shall exercise reasonable care in performing its Preconstruction Services. The Owner and Architect shall be entitled to rely on, and shall not be responsible for, the accuracy, completeness, and timeliness of services and information furnished by the Construction Manager. The Construction Manager, however, does not warrant or guarantee estimates and schedules except as may be included as part of the Guaranteed Maximum Price. The Construction Manager is not required to ascertain that the Drawings and Specifications are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Construction Manager shall promptly report to the Architect and Owner any nonconformity discovered by or made known to the Construction Manager as a request for information in such form as the Architect may require.

§ 3.1.2 The Construction Manager shall provide a preliminary evaluation of the Owner's program, schedule and construction budget requirements, each in terms of the other.

§ 3.1.3 Consultation

§ 3.1.3.1 The Construction Manager shall schedule and conduct meetings with the Architect and Owner to discuss such matters as procedures, progress, coordination, and scheduling of the Work.

§ 3.1.3.2 The Construction Manager shall advise the Owner and Architect on proposed site use and improvements, selection of materials, building systems, and equipment. The Construction Manager shall also provide recommendations to the Owner and Architect, consistent with the Project requirements, on constructability; availability of materials and labor; time requirements for procurement, installation and construction; prefabrication; and factors related to construction cost including, but not limited to, costs of alternative designs or materials, preliminary budgets, life-cycle data, and possible cost reductions. The Construction Manager shall consult with the Architect regarding professional services to be provided by the Construction Manager during the Construction Phase.

§ 3.1.3.3 The Construction Manager shall assist the Owner and Architect in establishing written protocols for the development, use, transmission, reliance, and exchange of digital data, including building information models for the Project.

§ 3.1.4 Project Schedule

When Project requirements in Section 4.1.1 have been sufficiently identified, the Construction Manager shall prepare and periodically update a Project schedule for the Architect's review and the Owner's acceptance. The Construction Manager shall obtain the Architect's approval for the portion of the Project schedule relating to the performance of the Architect's services. The Project schedule shall coordinate and integrate the Construction Manager's services, the Architect's services, other Owner consultants' services, and the Owner's responsibilities; and identify items that affect the Project's timely completion. The updated Project schedule shall include the following: submission of the Guaranteed Maximum Price proposal; components of the Work; times of commencement and completion required of each Subcontractor; ordering and delivery of products, including those that must be ordered in advance of construction; and the occupancy requirements of the Owner.

§ 3.1.5 Phased Construction

The Construction Manager, in consultation with the Architect, shall provide recommendations with regard to accelerated or fast-track scheduling, procurement, and sequencing for phased construction. The Construction Manager shall take into consideration cost reductions, cost information, constructability, provisions for temporary facilities, and procurement and construction scheduling issues.

§ 3.1.6 Cost Estimates

§ 3.1.6.1 Based on the preliminary design and other design criteria prepared by the Architect, the Construction Manager shall prepare, for the Architect's review and the Owner's approval, preliminary estimates of the Cost of the Work or the

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cost of program requirements using area, volume, or similar conceptual estimating techniques. If the Architect or Construction Manager suggests alternative materials and systems, the Construction Manager shall provide cost evaluations of those alternative materials and systems.

§ 3.1.6.2 As the Architect progresses with the preparation of the Schematic Design, Design Development and Construction Documents, the Construction Manager shall prepare and update, at appropriate intervals agreed to by the Owner, Construction Manager and Architect, an estimate of the Cost of the Work with increasing detail and refinement. The Construction Manager shall include in the estimate those costs to allow for the further development of the design, price escalation, and market conditions, until such time as the Owner and Construction Manager agree on a Guaranteed Maximum Price for the Work. The estimate shall be provided for the Architect's review and the Owner's approval. The Construction Manager shall inform the Owner and Architect in the event that the estimate of the Cost of the Work exceeds the latest approved Project budget, and make recommendations for corrective action.

§ 3.1.6.3 If the Architect is providing cost estimating services as a Supplemental Service, and a discrepancy exists between the Construction Manager's cost estimates and the Architect's cost estimates, the Construction Manager and the Architect shall work together to reconcile the cost estimates.

§ 3.1.7 As the Architect progresses with the preparation of the Schematic Design, Design Development and Construction Documents, the Construction Manager shall consult with the Owner and Architect and make recommendations regarding constructability and schedules, for the Architect's review and the Owner's approval.

§ 3.1.8 The Construction Manager shall provide recommendations and information to the Owner and Architect regarding equipment, materials, services, and temporary Project facilities.

§ 3.1.9 The Construction Manager shall provide a staffing plan for Preconstruction Phase services for the Owner's review and approval.

§ 3.1.10 If the Owner identified a Sustainable Objective in Article 1, the Construction Manager shall fulfill its Preconstruction Phase responsibilities as required in AIA Document E234™–2019, Sustainable Projects Exhibit, Construction Manager as Constructor Edition, attached to this Agreement.

§ 3.1.11 Subcontractors and Suppliers

§ 3.1.11.1 If the Owner has provided requirements for subcontractor procurement in section 1.1.14, the Construction Manager shall provide a subcontracting plan, addressing the Owner's requirements, for the Owner's review and approval.

§ 3.1.11.2 The Construction Manager shall develop bidders' interest in the Project.

§ 3.1.11.3 The processes described in Article 9 shall apply if bid packages will be issued during the Preconstruction Phase.

§ 3.1.12 Procurement

The Construction Manager shall prepare, for the Architect's review and the Owner's acceptance, a procurement schedule for items that must be ordered in advance of construction. The Construction Manager shall expedite and coordinate the ordering and delivery of materials that must be ordered in advance of construction. If the Owner agrees to procure any items prior to the establishment of the Guaranteed Maximum Price, the Owner shall procure the items on terms and conditions acceptable to the Construction Manager. Upon the establishment of the Guaranteed Maximum Price, the Owner shall assign all contracts for these items to the Construction Manager and the Construction Manager shall thereafter accept responsibility for them.

§ 3.1.13 Compliance with Laws

The Construction Manager shall comply with applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to its performance under this Contract, and with equal employment opportunity programs, and other programs as may be required by governmental and quasi-governmental authorities.

§ 3.1.14 Other Preconstruction Services

Insert a description of any other Preconstruction Phase services to be provided by the Construction Manager, or reference an exhibit attached to this document

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(Describe any other Preconstruction Phase services, such as providing cash flow projections, development of a project information management system, early selection or procurement of subcontractors, etc.)

§ 3.2 Guaranteed Maximum Price Proposal

§ 3.2.1 At a time to be mutually agreed upon by the Owner and the Construction Manager, the Construction Manager shall prepare a Guaranteed Maximum Price proposal for the Owner's and Architect's review, and the Owner's acceptance. The Guaranteed Maximum Price in the proposal shall be the sum of the Construction Manager's estimate of the Cost of the Work, the Construction Manager's contingency described in Section 3.2.4, and the Construction Manager's Fee described in Section 6.1.2.

§ 3.2.2 To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes, or equipment, all of which, if required, shall be incorporated by Change Order.

§ 3.2.3 The Construction Manager shall include with the Guaranteed Maximum Price proposal a written statement of its basis, which shall include the following:

.1 A list of the Drawings and Specifications, including all Addenda thereto, and the Conditions of the Contract;

.2 A list of the clarifications and assumptions made by the Construction Manager in the preparation of the Guaranteed Maximum Price proposal, including assumptions under Section 3.2.2;

.3 A statement of the proposed Guaranteed Maximum Price, including a statement of the estimated Cost of the Work organized by trade categories or systems, including allowances; the Construction Manager's contingency set forth in Section 3.2.4; and the Construction Manager's Fee;

.4 The anticipated date of Substantial Completion upon which the proposed Guaranteed Maximum Price is based; and

.5 A date by which the Owner must accept the Guaranteed Maximum Price.

§ 3.2.4 In preparing the Construction Manager's Guaranteed Maximum Price proposal, the Construction Manager shall include a contingency for the Construction Manager's exclusive use to cover those costs that are included in the Guaranteed Maximum Price but not otherwise allocated to another line item or included in a Change Order.

§ 3.2.5 The Construction Manager shall meet with the Owner and Architect to review the Guaranteed Maximum Price proposal. In the event that the Owner or Architect discover any inconsistencies or inaccuracies in the information presented, they shall promptly notify the Construction Manager, who shall make appropriate adjustments to the Guaranteed Maximum Price proposal, its basis, or both.

§ 3.2.6 If the Owner notifies the Construction Manager that the Owner has accepted the Guaranteed Maximum Price proposal in writing before the date specified in the Guaranteed Maximum Price proposal, the Guaranteed Maximum Price proposal shall be deemed effective without further acceptance from the Construction Manager. Following acceptance of a Guaranteed Maximum Price, the Owner and Construction Manager shall execute the Guaranteed Maximum Price Amendment amending this Agreement, a copy of which the Owner shall provide to the Architect. The Guaranteed Maximum Price Amendment shall set forth the agreed upon Guaranteed Maximum Price with the information and assumptions upon which it is based.

§ 3.2.7 The Construction Manager shall not incur any cost to be reimbursed as part of the Cost of the Work prior to the execution of the Guaranteed Maximum Price Amendment, unless the Owner provides prior written authorization for such costs.

§ 3.2.8 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions and clarifications contained in the Guaranteed Maximum Price Amendment. The Owner shall promptly furnish such revised Contract Documents to the Construction Manager. The Construction Manager shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions and clarifications contained in the Guaranteed Maximum Price Amendment and the revised Contract Documents.

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§ 3.2.9 The Construction Manager shall include in the Guaranteed Maximum Price all sales, consumer, use and similar taxes for the Work provided by the Construction Manager that are legally enacted, whether or not yet effective, at the time the Guaranteed Maximum Price Amendment is executed.

§ 3.3 Construction Phase

§ 3.3.1 General

§ 3.3.1.1 For purposes of Section 8.1.2 of A201–2017, the date of commencement of the Work shall mean the date of commencement of the Construction Phase.

§ 3.3.1.2 The Construction Phase shall commence upon the Owner's execution of the Guaranteed Maximum Price Amendment or, prior to acceptance of the Guaranteed Maximum Price proposal, by written agreement of the parties. The written agreement shall set forth a description of the Work to be performed by the Construction Manager, and any insurance and bond requirements for Work performed prior to execution of the Guaranteed Maximum Price Amendment.

§ 3.3.2 Administration

§ 3.3.2.1 The Construction Manager shall schedule and conduct meetings to discuss such matters as procedures, progress, coordination, scheduling, and status of the Work. The Construction Manager shall prepare and promptly distribute minutes of the meetings to the Owner and Architect.

§ 3.3.2.2 Upon the execution of the Guaranteed Maximum Price Amendment, the Construction Manager shall prepare and submit to the Owner and Architect a construction schedule for the Work and a submittal schedule in accordance with Section 3.10 of A201–2017.

§ 3.3.2.3 Monthly Report

The Construction Manager shall record the progress of the Project. On a monthly basis, or otherwise as agreed to by the Owner, the Construction Manager shall submit written progress reports to the Owner and Architect, showing percentages of completion and other information required by the Owner.

§ 3.3.2.4 Daily Logs

The Construction Manager shall keep, and make available to the Owner and Architect, a daily log containing a record for each day of weather, portions of the Work in progress, number of workers on site, identification of equipment on site, problems that might affect progress of the work, accidents, injuries, and other information required by the Owner.

§ 3.3.2.5 Cost Control

The Construction Manager shall develop a system of cost control for the Work, including regular monitoring of actual costs for activities in progress and estimates for uncompleted tasks and proposed changes. The Construction Manager shall identify variances between actual and estimated costs and report the variances to the Owner and Architect, and shall provide this information in its monthly reports to the Owner and Architect, in accordance with Section 3.3.2.3 above.

ARTICLE 4 OWNER'S RESPONSIBILITIES

§ 4.1 Information and Services Required of the Owner

§ 4.1.1 The Owner shall provide information with reasonable promptness, regarding requirements for and limitations on the Project, including a written program which shall set forth the Owner's objectives, constraints, and criteria, including schedule, space requirements and relationships, flexibility and expandability, special equipment, systems, sustainability and site requirements.

§ 4.1.2 Prior to the execution of the Guaranteed Maximum Price Amendment, the Construction Manager may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. After execution of the Guaranteed Maximum Price Amendment, the Construction Manager may request such information as set forth in A201-2017 Section 2.2.

§ 4.1.3 The Owner shall establish and periodically update the Owner's budget for the Project, including (1) the budget for the Cost of the Work as defined in Article 7, (2) the Owner's other costs, and (3) reasonable contingencies related to all of these costs. If the Owner significantly increases or decreases the Owner's budget for the Cost of the Work, the Owner shall notify the Construction Manager and Architect. The Owner and the Architect, in consultation with the Construction Manager, shall thereafter agree to a corresponding change in the Project's scope and quality.

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§ 4.1.4 Structural and Environmental Tests, Surveys and Reports. During the Preconstruction Phase, the Owner shall furnish the following information or services with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Construction Manager's performance of the Work with reasonable promptness after receiving the Construction Manager's written request for such information or services. The Construction Manager shall be entitled to rely on the accuracy of information and services furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 4.1.4.1 The Owner shall furnish tests, inspections, and reports, required by law and as otherwise agreed to by the parties, such as structural, mechanical, and chemical tests, tests for air and water pollution, and tests for hazardous materials.

§ 4.1.4.2 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a written legal description of the site. The surveys and legal information shall include, as applicable, grades and lines of streets, alleys, pavements and adjoining property and structures; designated wetlands; adjacent drainage; rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, boundaries and contours of the site; locations, dimensions and other necessary data with respect to existing buildings, other improvements and trees; and information concerning available utility services and lines, both public and private, above and below grade, including inverts and depths. All the information on the survey shall be referenced to a Project benchmark.

§ 4.1.4.3 The Owner, when such services are requested, shall furnish services of geotechnical engineers, which may include test borings, test pits, determinations of soil bearing values, percolation tests, evaluations of hazardous materials, seismic evaluation, ground corrosion tests and resistivity tests, including necessary operations for anticipating subsoil conditions, with written reports and appropriate recommendations.

§ 4.1.5 During the Construction Phase, the Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Construction Manager's performance of the Work with reasonable promptness after receiving the Construction Manager's written request for such information or services.

§ 4.1.6 If the Owner identified a Sustainable Objective in Article 1, the Owner shall fulfill its responsibilities as required in AIA Document E234™–2019, Sustainable Projects Exhibit, Construction Manager as Constructor Edition, attached to this Agreement.

§ 4.2 Owner's Designated Representative

The Owner shall identify a representative authorized to act on behalf of the Owner with respect to the Project. The Owner's representative shall render decisions promptly and furnish information expeditiously, so as to avoid unreasonable delay in the services or Work of the Construction Manager. Except as otherwise provided in Section 4.2.1 of A201–2017, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 4.2.1 Legal Requirements. The Owner shall furnish all legal, insurance and accounting services, including auditing services, that may be reasonably necessary at any time for the Project to meet the Owner's needs and interests.

§ 4.3 Architect

The Owner shall retain an Architect to provide services, duties and responsibilities as described in AIA Document B133®–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Constructor Edition, including any additional services requested by the Construction Manager that are necessary for the Preconstruction and Construction Phase services under this Agreement. The Owner shall provide the Construction Manager with a copy of the scope of services in the executed agreement between the Owner and the Architect, and any further modifications to the Architect's scope of services in the agreement.

ARTICLE 5 COMPENSATION AND PAYMENTS FOR PRECONSTRUCTION PHASE SERVICES

§ 5.1 Compensation

§ 5.1.1 For the Construction Manager's Preconstruction Phase services described in Sections 3.1 and 3.2, the Owner shall compensate the Construction Manager as follows:

(Insert amount of, or basis for, compensation and include a list of reimbursable cost items, as applicable.)

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§ 5.1.2 The hourly billing rates for Preconstruction Phase services of the Construction Manager and the Construction Manager's Consultants and Subcontractors, if any, are set forth below.
(If applicable, attach an exhibit of hourly billing rates or insert them below.)

Individual or Position	Rate

§ 5.1.2.1 Hourly billing rates for Preconstruction Phase services include all costs to be paid or incurred by the Construction Manager, as required by law or collective bargaining agreements, for taxes, insurance, contributions, assessments and benefits and, for personnel not covered by collective bargaining agreements, customary benefits such as sick leave, medical and health benefits, holidays, vacations and pensions, and shall remain unchanged unless the parties execute a Modification.

§ 5.1.3 If the Preconstruction Phase services covered by this Agreement have not been completed within _____ (___) months of the date of this Agreement, through no fault of the Construction Manager, the Construction Manager's compensation for Preconstruction Phase services shall be equitably adjusted.

§ 5.2 Payments
§ 5.2.1 Unless otherwise agreed, payments for services shall be made monthly in proportion to services performed.

§ 5.2.2 Payments are due and payable upon presentation of the Construction Manager's invoice. Amounts unpaid _____ (___) days after the invoice date shall bear interest at the rate entered below, or in the absence thereof at the legal rate prevailing from time to time at the principal place of business of the Construction Manager.
(Insert rate of monthly or annual interest agreed upon.)

_____ % _____

ARTICLE 6 COMPENSATION FOR CONSTRUCTION PHASE SERVICES
§ 6.1 Contract Sum
§ 6.1.1 The Owner shall pay the Construction Manager the Contract Sum in current funds for the Construction Manager's performance of the Contract after execution of the Guaranteed Maximum Price Amendment. The Contract Sum is the Cost of the Work as defined in Article 7 plus the Construction Manager's Fee.

§ 6.1.2 The Construction Manager's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Construction Manager's Fee.)

§ 6.1.3 The method of adjustment of the Construction Manager's Fee for changes in the Work:

§ 6.1.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

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§ 6.1.5 Rental rates for Construction Manager-owned equipment shall not exceed _____ percent (_____ %) of the standard rental rate paid at the place of the Project.

§ 6.1.6 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

§ 6.1.7 Other:
(Insert provisions for bonus, cost savings or other incentives, if any, that might result in a change to the Contract Sum.)

§ 6.2 Guaranteed Maximum Price

The Construction Manager guarantees that the Contract Sum shall not exceed the Guaranteed Maximum Price set forth in the Guaranteed Maximum Price Amendment, subject to additions and deductions by Change Order as provided in the Contract Documents. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Construction Manager without reimbursement by the Owner.

§ 6.3 Changes in the Work

§ 6.3.1 The Owner may, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions. The Owner shall issue such changes in writing. The Construction Manager may be entitled to an equitable adjustment in the Contract Time as a result of changes in the Work.

§ 6.3.1.1 The Architect may order minor changes in the Work as provided in Article 7 of AIA Document A201–2017, General Conditions of the Contract for Construction.

§ 6.3.2 Adjustments to the Guaranteed Maximum Price on account of changes in the Work subsequent to the execution of the Guaranteed Maximum Price Amendment may be determined by any of the methods listed in Article 7 of AIA Document A201–2017, General Conditions of the Contract for Construction.

§ 6.3.3 Adjustments to subcontracts awarded on the basis of a stipulated sum shall be determined in accordance with Article 7 of A201–2017, as they refer to "cost" and "fee," and not by Articles 6 and 7 of this Agreement. Adjustments to subcontracts awarded with the Owner's prior written consent on the basis of cost plus a fee shall be calculated in accordance with the terms of those subcontracts.

§ 6.3.4 In calculating adjustments to the Guaranteed Maximum Price, the terms "cost" and "costs" as used in Article 7 of AIA Document A201–2017 shall mean the Cost of the Work as defined in Article 7 of this Agreement and the term "fee" shall mean the Construction Manager's Fee as defined in Section 6.1.2 of this Agreement.

§ 6.3.5 If no specific provision is made in Section 6.1.3 for adjustment of the Construction Manager's Fee in the case of changes in the Work, or if the extent of such changes is such, in the aggregate, that application of the adjustment provisions of Section 6.1.3 will cause substantial inequity to the Owner or Construction Manager, the Construction Manager's Fee shall be equitably adjusted on the same basis that was used to establish the Fee for the original Work, and the Guaranteed Maximum Price shall be adjusted accordingly.

ARTICLE 7 COST OF THE WORK FOR CONSTRUCTION PHASE

§ 7.1 Costs to Be Reimbursed

§ 7.1.1 The term Cost of the Work shall mean costs necessarily incurred by the Construction Manager in the proper performance of the Work. The Cost of the Work shall include only the items set forth in Sections 7.1 through 7.7.

§ 7.1.2 Where, pursuant to the Contract Documents, any cost is subject to the Owner's prior approval, the Construction Manager shall obtain such approval in writing prior to incurring the cost.

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§ 7.1.3 Costs shall be at rates not higher than the standard rates paid at the place of the Project, except with prior approval of the Owner.

§ 7.2 Labor Costs

§ 7.2.1 Wages or salaries of construction workers directly employed by the Construction Manager to perform the construction of the Work at the site or, with the Owner's prior approval, at off-site workshops.

§ 7.2.2 Wages or salaries of the Construction Manager's supervisory and administrative personnel when stationed at the site and performing Work, with the Owner's prior approval.

§ 7.2.2.1 Wages or salaries of the Construction Manager's supervisory and administrative personnel when performing Work and stationed at a location other than the site, but only for that portion of time required for the Work, and limited to the personnel and activities listed below:
(Identify the personnel, type of activity and, if applicable, any agreed upon percentage of time to be devoted to the Work.)

§ 7.2.3 Wages and salaries of the Construction Manager's supervisory or administrative personnel engaged at factories, workshops or while traveling, in expediting the production or transportation of materials or equipment required for the Work, but only for that portion of their time required for the Work.

§ 7.2.4 Costs paid or incurred by the Construction Manager, as required by law or collective bargaining agreements, for taxes, insurance, contributions, assessments and benefits and, for personnel not covered by collective bargaining agreements, customary benefits such as sick leave, medical and health benefits, holidays, vacations and pensions, provided such costs are based on wages and salaries included in the Cost of the Work under Sections 7.2.1 through 7.2.3.

§ 7.2.5 If agreed rates for labor costs, in lieu of actual costs, are provided in this Agreement, the rates shall remain unchanged throughout the duration of this Agreement, unless the parties execute a Modification.

§ 7.3 Subcontract Costs

Payments made by the Construction Manager to Subcontractors in accordance with the requirements of the subcontracts and this Agreement.

§ 7.4 Costs of Materials and Equipment Incorporated in the Completed Construction

§ 7.4.1 Costs, including transportation and storage at the site, of materials and equipment incorporated, or to be incorporated, in the completed construction.

§ 7.4.2 Costs of materials described in the preceding Section 7.4.1 in excess of those actually installed to allow for reasonable waste and spoilage. Unused excess materials, if any, shall become the Owner's property at the completion of the Work or, at the Owner's option, shall be sold by the Construction Manager. Any amounts realized from such sales shall be credited to the Owner as a deduction from the Cost of the Work.

§ 7.5 Costs of Other Materials and Equipment, Temporary Facilities and Related Items

§ 7.5.1 Costs of transportation, storage, installation, dismantling, maintenance, and removal of materials, supplies, temporary facilities, machinery, equipment and hand tools not customarily owned by construction workers that are provided by the Construction Manager at the site and fully consumed in the performance of the Work. Costs of materials, supplies, temporary facilities, machinery, equipment, and tools, that are not fully consumed, shall be based on the cost or value of the item at the time it is first used on the Project site less the value of the item when it is no longer used at the Project site. Costs for items not fully consumed by the Construction Manager shall mean fair market value.

§ 7.5.2 Rental charges for temporary facilities, machinery, equipment, and hand tools not customarily owned by construction workers that are provided by the Construction Manager at the site, and the costs of transportation, installation, dismantling, minor repairs, and removal of such temporary facilities, machinery, equipment, and hand tools. Rates and quantities of equipment owned by the Construction Manager, or a related party as defined in Section 7.8,

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shall be subject to the Owner's prior approval. The total rental cost of any such equipment may not exceed the purchase price of any comparable item.

§ 7.5.3 Costs of removal of debris from the site of the Work and its proper and legal disposal.

§ 7.5.4 Costs of the Construction Manager's site office, including general office equipment and supplies.

§ 7.5.5 Costs of materials and equipment suitably stored off the site at a mutually acceptable location, subject to the Owner's prior approval.

§ 7.6 Miscellaneous Costs

§ 7.6.1 Premiums for that portion of insurance and bonds required by the Contract Documents that can be directly attributed to this Contract.

§ 7.6.1.1 Costs for self-insurance, for either full or partial amounts of the coverages required by the Contract Documents, with the Owner's prior approval.

§ 7.6.1.2 Costs for insurance through a captive insurer owned or controlled by the Construction Manager, with the Owner's prior approval.

§ 7.6.2 Sales, use, or similar taxes, imposed by a governmental authority, that are related to the Work and for which the Construction Manager is liable.

§ 7.6.3 Fees and assessments for the building permit, and for other permits, licenses, and inspections, for which the Construction Manager is required by the Contract Documents to pay.

§ 7.6.4 Fees of laboratories for tests required by the Contract Documents; except those related to defective or nonconforming Work for which reimbursement is excluded under Article 13 of AIA Document A201–2017 or by other provisions of the Contract Documents, and which do not fall within the scope of Section 7.7.3.

§ 7.6.5 Royalties and license fees paid for the use of a particular design, process, or product, required by the Contract Documents.

§ 7.6.5.1 The cost of defending suits or claims for infringement of patent rights arising from requirements of the Contract Documents, payments made in accordance with legal judgments against the Construction Manager resulting from such suits or claims, and payments of settlements made with the Owner's consent, unless the Construction Manager had reason to believe that the required design, process, or product was an infringement of a copyright or a patent, and the Construction Manager failed to promptly furnish such information to the Architect as required by Article 3 of AIA Document A201–2017. The costs of legal defenses, judgments, and settlements shall not be included in the Cost of the Work used to calculate the Construction Manager's Fee or subject to the Guaranteed Maximum Price.

§ 7.6.6 Costs for communications services, electronic equipment, and software, directly related to the Work and located at the site, with the Owner's prior approval.

§ 7.6.7 Costs of document reproductions and delivery charges.

§ 7.6.8 Deposits lost for causes other than the Construction Manager's negligence or failure to fulfill a specific responsibility in the Contract Documents.

§ 7.6.9 Legal, mediation and arbitration costs, including attorneys' fees, other than those arising from disputes between the Owner and Construction Manager, reasonably incurred by the Construction Manager after the execution of this Agreement in the performance of the Work and with the Owner's prior approval, which shall not be unreasonably withheld.

§ 7.6.10 Expenses incurred in accordance with the Construction Manager's standard written personnel policy for relocation and temporary living allowances of the Construction Manager's personnel required for the Work, with the Owner's prior approval.

§ 7.6.11 That portion of the reasonable expenses of the Construction Manager's supervisory or administrative personnel incurred while traveling in discharge of duties connected with the Work.

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§ 7.7 Other Costs and Emergencies

§ 7.7.1 Other costs incurred in the performance of the Work, with the Owner's prior approval.

§ 7.7.2 Costs incurred in taking action to prevent threatened damage, injury, or loss, in case of an emergency affecting the safety of persons and property, as provided in Article 10 of AIA Document A201–2017.

§ 7.7.3 Costs of repairing or correcting damaged or nonconforming Work executed by the Construction Manager, Subcontractors, or suppliers, provided that such damaged or nonconforming Work was not caused by the negligence of, or failure to fulfill a specific responsibility by, the Construction Manager, and only to the extent that the cost of repair or correction is not recovered by the Construction Manager from insurance, sureties, Subcontractors, suppliers, or others.

§ 7.7.4 The costs described in Sections 7.1 through 7.7 shall be included in the Cost of the Work, notwithstanding any provision of AIA Document A201–2017 or other Conditions of the Contract which may require the Construction Manager to pay such costs, unless such costs are excluded by the provisions of Section 7.9.

§ 7.8 Related Party Transactions

§ 7.8.1 For purposes of this Section 7.8, the term "related party" shall mean (1) a parent, subsidiary, affiliate, or other entity having common ownership of, or sharing common management with, the Construction Manager; (2) any entity in which any stockholder in, or management employee of, the Construction Manager holds an equity interest in excess of ten percent in the aggregate; (3) any entity which has the right to control the business or affairs of the Construction Manager; or (4) any person, or any member of the immediate family of any person, who has the right to control the business or affairs of the Construction Manager.

§ 7.8.2 If any of the costs to be reimbursed arise from a transaction between the Construction Manager and a related party, the Construction Manager shall notify the Owner of the specific nature of the contemplated transaction, including the identity of the related party and the anticipated cost to be incurred, before any such transaction is consummated or cost incurred. If the Owner, after such notification, authorizes the proposed transaction in writing, then the cost incurred shall be included as a cost to be reimbursed, and the Construction Manager shall procure the Work, equipment, goods, or service, from the related party, as a Subcontractor, according to the terms of Article 9. If the Owner fails to authorize the transaction in writing, the Construction Manager shall procure the Work, equipment, goods, or service from some person or entity other than a related party according to the terms of Article 9.

§ 7.9 Costs Not To Be Reimbursed

§ 7.9.1 The Cost of the Work shall not include the items listed below:

.1 Salaries and other compensation of the Construction Manager's personnel stationed at the Construction Manager's principal office or offices other than the site office, except as specifically provided in Section 7.2, or as may be provided in Article 14;

.2 Bonuses, profit sharing, incentive compensation, and any other discretionary payments, paid to anyone hired by the Construction Manager or paid to any Subcontractor or vendor, unless the Owner has provided prior approval;

.3 Expenses of the Construction Manager's principal office and offices other than the site office;

.4 Overhead and general expenses, except as may be expressly included in Sections 7.1 to 7.7;

.5 The Construction Manager's capital expenses, including interest on the Construction Manager's capital employed for the Work;

.6 Except as provided in Section 7.7.3 of this Agreement, costs due to the negligence of, or failure to fulfill a specific responsibility of the Contract by, the Construction Manager, Subcontractors, and suppliers, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable;

.7 Any cost not specifically and expressly described in Sections 7.1 to 7.7;

.8 Costs, other than costs included in Change Orders approved by the Owner, that would cause the Guaranteed Maximum Price to be exceeded; and

.9 Costs for services incurred during the Preconstruction Phase.

ARTICLE 8 DISCOUNTS, REBATES, AND REFUNDS

§ 8.1 Cash discounts obtained on payments made by the Construction Manager shall accrue to the Owner if (1) before making the payment, the Construction Manager included the amount to be paid, less such discount, in an Application for Payment and received payment from the Owner, or (2) the Owner has deposited funds with the Construction Manager with which to make payments; otherwise, cash discounts shall accrue to the Construction Manager. Trade discounts, rebates, refunds, and amounts received from sales of surplus materials and equipment shall accrue to the Owner, and the Construction Manager shall make provisions so that they can be obtained.

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§ 8.2 Amounts that accrue to the Owner in accordance with the provisions of Section 8.1 shall be credited to the Owner as a deduction from the Cost of the Work.

ARTICLE 9 SUBCONTRACTS AND OTHER AGREEMENTS

§ 9.1 Those portions of the Work that the Construction Manager does not customarily perform with the Construction Manager's own personnel shall be performed under subcontracts or other appropriate agreements with the Construction Manager. The Owner may designate specific persons from whom, or entities from which, the Construction Manager shall obtain bids. The Construction Manager shall obtain bids from Subcontractors, and from suppliers of materials or equipment fabricated especially for the Work, who are qualified to perform that portion of the Work in accordance with the requirements of the Contract Documents. The Construction Manager shall deliver such bids to the Architect and Owner with an indication as to which bids the Construction Manager intends to accept. The Owner then has the right to review the Construction Manager's list of proposed subcontractors and suppliers in consultation with the Architect and, subject to Section 9.1.1, to object to any subcontractor or supplier. Any advice of the Architect, or approval or objection by the Owner, shall not relieve the Construction Manager of its responsibility to perform the Work in accordance with the Contract Documents. The Construction Manager shall not be required to contract with anyone to whom the Construction Manager has reasonable objection.

§ 9.1.1 When a specific subcontractor or supplier (1) is recommended to the Owner by the Construction Manager; (2) is qualified to perform that portion of the Work; and (3) has submitted a bid that conforms to the requirements of the Contract Documents without reservations or exceptions, but the Owner requires that another bid be accepted, then the Construction Manager may require that a Change Order be issued to adjust the Guaranteed Maximum Price by the difference between the bid of the person or entity recommended to the Owner by the Construction Manager and the amount of the subcontract or other agreement actually signed with the person or entity designated by the Owner.

§ 9.2 Subcontracts or other agreements shall conform to the applicable payment provisions of this Agreement, and shall not be awarded on the basis of cost plus a fee without the Owner's prior written approval. If a subcontract is awarded on the basis of cost plus a fee, the Construction Manager shall provide in the subcontract for the Owner to receive the same audit rights with regard to the Subcontractor as the Owner receives with regard to the Construction Manager in Article 10.

ARTICLE 10 ACCOUNTING RECORDS

The Construction Manager shall keep full and detailed records and accounts related to the Cost of the Work, and exercise such controls, as may be necessary for proper financial management under this Contract and to substantiate all costs incurred. The accounting and control systems shall be satisfactory to the Owner. The Owner and the Owner's auditors shall, during regular business hours and upon reasonable notice, be afforded access to, and shall be permitted to audit and copy, the Construction Manager's records and accounts, including complete documentation supporting accounting entries, books, job cost reports, correspondence, instructions, drawings, receipts, subcontracts, Subcontractor's proposals, Subcontractor's invoices, purchase orders, vouchers, memoranda, and other data relating to this Contract. The Construction Manager shall preserve these records for a period of three years after final payment, or for such longer period as may be required by law.

ARTICLE 11 PAYMENTS FOR CONSTRUCTION PHASE SERVICES

§ 11.1 Progress Payments

§ 11.1.1 Based upon Applications for Payment submitted to the Architect by the Construction Manager, and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum, to the Construction Manager, as provided below and elsewhere in the Contract Documents.

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

§ 11.1.3 Provided that an Application for Payment is received by the Architect not later than the _____ day of a month, the Owner shall make payment of the amount certified to the Construction Manager not later than the _____ day of the _____ month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than _____ (___) days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

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§ 11.1.4 With each Application for Payment, the Construction Manager shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner or Architect to demonstrate that payments already made by the Construction Manager on account of the Cost of the Work equal or exceed progress payments already received by the Construction Manager, plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Construction Manager's Fee.

§ 11.1.5 Each Application for Payment shall be based on the most recent schedule of values submitted by the Construction Manager in accordance with the Contract Documents. The schedule of values shall allocate the entire Guaranteed Maximum Price among: (1) the various portions of the Work; (2) any contingency for costs that are included in the Guaranteed Maximum Price but not otherwise allocated to another line item or included in a Change Order; and (3) the Construction Manager's Fee.

§ 11.1.5.1 The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. The schedule of values shall be used as a basis for reviewing the Construction Manager's Applications for Payment.

§ 11.1.5.2 The allocation of the Guaranteed Maximum Price under this Section 11.1.5 shall not constitute a separate guaranteed maximum price for the Cost of the Work of each individual line item in the schedule of values.

§ 11.1.5.3 When the Construction Manager allocates costs from a contingency to another line item in the schedule of values, the Construction Manager shall submit supporting documentation to the Architect.

§ 11.1.6 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. The percentage of completion shall be the lesser of (1) the percentage of that portion of the Work which has actually been completed, or (2) the percentage obtained by dividing (a) the expense that has actually been incurred by the Construction Manager on account of that portion of the Work and for which the Construction Manager has made payment or intends to make payment prior to the next Application for Payment, by (b) the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values.

§ 11.1.7 In accordance with AIA Document A201–2017 and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

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

.1 That portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the most recent schedule of values;

.2 That portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction or, if approved in writing in advance by the Owner, suitably stored off the site at a location agreed upon in writing;

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and

.4 The Construction Manager's Fee, computed upon the Cost of the Work described in the preceding Sections 11.1.7.1.1 and 11.1.7.1.2 at the rate stated in Section 6.1.2 or, if the Construction Manager's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work included in Sections 11.1.7.1.1 and 11.1.7.1.2 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

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

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;

.3 Any amount for which the Construction Manager does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Construction Manager intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017;

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.5 The shortfall, if any, indicated by the Construction Manager in the documentation required by Section 11.1.4 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.6 Retainage withheld pursuant to Section 11.1.8.

§ 11.1.8 Retainage

§ 11.1.8.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

§ 11.1.8.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

§ 11.1.8.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 11.1.8.1 is to be modified prior to Substantial Completion of the entire Work, insert provisions for such modification.)

§ 11.1.8.3 Except as set forth in this Section 11.1.8.3, upon Substantial Completion of the Work, the Construction Manager may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 11.1.8. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage, such as upon completion of the Owner's audit and reconciliation, upon Substantial Completion.)

§ 11.1.9 If final completion of the Work is materially delayed through no fault of the Construction Manager, the Owner shall pay the Construction Manager any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 11.1.10 Except with the Owner's prior written approval, the Construction Manager shall not make advance payments to suppliers for materials or equipment which have not been delivered and suitably stored at the site.

§ 11.1.11 The Owner and the Construction Manager shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors, and the percentage of retainage held on Subcontracts, and the Construction Manager shall execute subcontracts in accordance with those agreements.

§ 11.1.12 In taking action on the Construction Manager's Applications for Payment the Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Construction Manager, and such action shall not be deemed to be a representation that (1) the Architect has made a detailed examination, audit, or arithmetic verification, of the documentation submitted in accordance with Section 11.1.4 or other supporting data; (2) that the Architect has made exhaustive or continuous on-site inspections; or (3) that the Architect has made examinations to ascertain how or for what purposes the Construction Manager has used amounts previously paid on account of the Contract. Such examinations, audits, and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

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§ 11.2 Final Payment

§ 11.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Construction Manager when

.1 the Construction Manager has fully performed the Contract, except for the Construction Manager's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment;

.2 the Construction Manager has submitted a final accounting for the Cost of the Work and a final Application for Payment; and

.3 a final Certificate for Payment has been issued by the Architect in accordance with Section 11.2.2.2.

§ 11.2.2 Within 30 days of the Owner's receipt of the Construction Manager's final accounting for the Cost of the Work, the Owner shall conduct an audit of the Cost of the Work or notify the Architect that it will not conduct an audit.

§ 11.2.2.1 If the Owner conducts an audit of the Cost of the Work, the Owner shall, within 10 days after completion of the audit, submit a written report based upon the auditors' findings to the Architect.

§ 11.2.2.2 Within seven days after receipt of the written report described in Section 11.2.2.1, or receipt of notice that the Owner will not conduct an audit, and provided that the other conditions of Section 11.2.1 have been met, the Architect will either issue to the Owner a final Certificate for Payment with a copy to the Construction Manager, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding a certificate as provided in Article 9 of AIA Document A201–2017. The time periods stated in this Section 11.2.2 supersede those stated in Article 9 of AIA Document A201–2017. The Architect is not responsible for verifying the accuracy of the Construction Manager's final accounting.

§ 11.2.2.3 If the Owner's auditors' report concludes that the Cost of the Work, as substantiated by the Construction Manager's final accounting, is less than claimed by the Construction Manager, the Construction Manager shall be entitled to request mediation of the disputed amount without seeking an initial decision pursuant to Article 15 of AIA Document A201–2017. A request for mediation shall be made by the Construction Manager within 30 days after the Construction Manager's receipt of a copy of the Architect's final Certificate for Payment. Failure to request mediation within this 30-day period shall result in the substantiated amount reported by the Owner's auditors becoming binding on the Construction Manager. Pending a final resolution of the disputed amount, the Owner shall pay the Construction Manager the amount certified in the Architect's final Certificate for Payment.

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

§ 11.2.4 If, subsequent to final payment, and at the Owner's request, the Construction Manager incurs costs, described in Sections 7.1 through 7.7, and not excluded by Section 7.9, to correct defective or nonconforming Work, the Owner shall reimburse the Construction Manager for such costs, and the Construction Manager's Fee applicable thereto, on the same basis as if such costs had been incurred prior to final payment, but not in excess of the Guaranteed Maximum Price. If adjustments to the Contract Sum are provided for in Section 6.1.7, the amount of those adjustments shall be recalculated, taking into account any reimbursements made pursuant to this Section 11.2.4 in determining the net amount to be paid by the Owner to the Construction Manager.

§ 11.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

_____ % _____

ARTICLE 12 DISPUTE RESOLUTION

§ 12.1 Initial Decision Maker

§ 12.1.1 Any Claim between the Owner and Construction Manager shall be resolved in accordance with the provisions set forth in this Article 12 and Article 15 of A201–2017. However, for Claims arising from or relating to the

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Construction Manager's Preconstruction Phase services, no decision by the Initial Decision Maker shall be required as a condition precedent to mediation or binding dispute resolution, and Section 12.1.2 of this Agreement shall not apply.

§ 12.1.2 The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017 for Claims arising from or relating to the Construction Manager's Construction Phase services, unless the parties appoint below another individual, not a party to the Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 12.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[ ] Arbitration pursuant to Article 15 of AIA Document A201–2017

[ ] Litigation in a court of competent jurisdiction

[ ] Other: *(Specify)*

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

ARTICLE 13 TERMINATION OR SUSPENSION

§ 13.1 Termination Prior to Execution of the Guaranteed Maximum Price Amendment

§ 13.1.1 If the Owner and the Construction Manager do not reach an agreement on the Guaranteed Maximum Price, the Owner may terminate this Agreement upon not less than seven days' written notice to the Construction Manager, and the Construction Manager may terminate this Agreement, upon not less than seven days' written notice to the Owner.

§ 13.1.2 In the event of termination of this Agreement pursuant to Section 13.1.1, the Construction Manager shall be compensated for Preconstruction Phase services and Work performed prior to receipt of a notice of termination, in accordance with the terms of this Agreement. In no event shall the Construction Manager's compensation under this Section exceed the compensation set forth in Section 5.1.

§ 13.1.3 Prior to the execution of the Guaranteed Maximum Price Amendment, the Owner may terminate this Agreement upon not less than seven days' written notice to the Construction Manager for the Owner's convenience and without cause, and the Construction Manager may terminate this Agreement, upon not less than seven days' written notice to the Owner, for the reasons set forth in Article 14 of A201–2017.

§ 13.1.4 In the event of termination of this Agreement pursuant to Section 13.1.3, the Construction Manager shall be equitably compensated for Preconstruction Phase services and Work performed prior to receipt of a notice of termination. In no event shall the Construction Manager's compensation under this Section exceed the compensation set forth in Section 5.1.

§ 13.1.5 If the Owner terminates the Contract pursuant to Section 13.1.3 after the commencement of the Construction Phase but prior to the execution of the Guaranteed Maximum Price Amendment, the Owner shall pay to the Construction Manager an amount calculated as follows, which amount shall be in addition to any compensation paid to the Construction Manager under Section 13.1.4:

.1 Take the Cost of the Work incurred by the Construction Manager to the date of termination;

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.2 Add the Construction Manager's Fee computed upon the Cost of the Work to the date of termination at the rate stated in Section 6.1 or, if the Construction Manager's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion; and

.3 Subtract the aggregate of previous payments made by the Owner for Construction Phase services.

§ 13.1.6 The Owner shall also pay the Construction Manager fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Construction Manager that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 13.1.5.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Construction Manager shall, as a condition of receiving the payments referred to in this Article 13, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Construction Manager, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Construction Manager under such subcontracts or purchase orders. All Subcontracts, purchase orders and rental agreements entered into by the Construction Manager will contain provisions allowing for assignment to the Owner as described above.

§ 13.1.6.1 If the Owner accepts assignment of subcontracts, purchase orders or rental agreements as described above, the Owner will reimburse or indemnify the Construction Manager for all costs arising under the subcontract, purchase order or rental agreement, if those costs would have been reimbursable as Cost of the Work if the contract had not been terminated. If the Owner chooses not to accept assignment of any subcontract, purchase order or rental agreement that would have constituted a Cost of the Work had this agreement not been terminated, the Construction Manager will terminate the subcontract, purchase order or rental agreement and the Owner will pay the Construction Manager the costs necessarily incurred by the Construction Manager because of such termination.

§ 13.2 Termination or Suspension Following Execution of the Guaranteed Maximum Price Amendment

§ 13.2.1 Termination

The Contract may be terminated by the Owner or the Construction Manager as provided in Article 14 of AIA Document A201–2017.

§ 13.2.2 Termination by the Owner for Cause

§ 13.2.2.1 If the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A201–2017, the amount, if any, to be paid to the Construction Manager under Article 14 of AIA Document A201–2017 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed an amount calculated as follows:

.1 Take the Cost of the Work incurred by the Construction Manager to the date of termination;

.2 Add the Construction Manager's Fee, computed upon the Cost of the Work to the date of termination at the rate stated in Section 6.1 or, if the Construction Manager' Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion;

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract the costs and damages incurred, or to be incurred, by the Owner under Article 14 of AIA Document A201–2017.

§ 13.2.2.2 The Owner shall also pay the Construction Manager fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Construction Manager that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 13.2.2.1.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Construction Manager shall, as a condition of receiving the payments referred to in this Article 13, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Construction Manager, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Construction Manager under such subcontracts or purchase orders.

§ 13.2.3 Termination by the Owner for Convenience

If the Owner terminates the Contract for convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Construction Manager a termination fee as follows:

(Insert the amount of or method for determining the fee, if any, payable to the Construction Manager following a termination for the Owner's convenience.)

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§ 13.3 Suspension
The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017; in such case, the Guaranteed Maximum Price and Contract Time shall be increased as provided in Article 14 of AIA Document A201–2017, except that the term "profit" shall be understood to mean the Construction Manager's Fee as described in Sections 6.1 and 6.3.5 of this Agreement.

ARTICLE 14 MISCELLANEOUS PROVISIONS
§ 14.1 Terms in this Agreement shall have the same meaning as those in A201–2017. Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 14.2 Successors and Assigns
§ 14.2.1 The Owner and Construction Manager, respectively, bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 14.2.2 of this Agreement, and in Section 13.2.2 of A201–2017, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

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

§ 14.3 Insurance and Bonds
§ 14.3.1 Preconstruction Phase
The Construction Manager shall maintain the following insurance for the duration of the Preconstruction Services performed under this Agreement. If any of the requirements set forth below exceed the types and limits the Construction Manager normally maintains, the Owner shall reimburse the Construction Manager for any additional cost.

§ 14.3.1.1 Commercial General Liability with policy limits of not less than _____ ($ ___) for each occurrence and _____ ($ ___) in the aggregate for bodily injury and property damage.

§ 14.3.1.2 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Construction Manager with policy limits of not less than _____ ($ ___) per accident for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles, along with any other statutorily required automobile coverage.

§ 14.3.1.3 The Construction Manager may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided that such primary and excess or umbrella liability insurance policies result in the same or greater coverage as the coverages required under Sections 14.3.1.1 and 14.3.1.2, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ 14.3.1.4 Workers' Compensation at statutory limits and Employers Liability with policy limits not less than _____ ($ ___) each accident, _____ ($ ___) each employee, and _____ ($ ___) policy limit.

§ 14.3.1.5 Professional Liability covering negligent acts, errors and omissions in the performance of professional services, with policy limits of not less than _____ ($ ___) per claim and _____ ($ ___) in the aggregate

§ 14.3.1.6 Other Insurance
(List below any other insurance coverage to be provided by the Construction Manager and any applicable limits.)

Coverage	Limits

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§ 14.3.1.7 Additional Insured Obligations. To the fullest extent permitted by law, the Construction Manager shall cause the primary and excess or umbrella policies for Commercial General Liability and Automobile Liability to include the Owner as an additional insured for claims caused in whole or in part by the Construction Manager's negligent acts or omissions. The additional insured coverage shall be primary and non-contributory to any of the Owner's insurance policies and shall apply to both ongoing and completed operations.

§ 14.3.1.8 The Construction Manager shall provide certificates of insurance to the Owner that evidence compliance with the requirements in this Section 14.3.1.

§ 14.3.2 Construction Phase

After execution of the Guaranteed Maximum Price Amendment, the Owner and the Construction Manager shall purchase and maintain insurance as set forth in AIA Document A133®–2019, Standard Form of Agreement Between Owner and Construction Manager as Constructor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price, Exhibit B, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 14.3.2.1 The Construction Manager shall provide bonds as set forth in AIA Document A133®–2019 Exhibit B, and elsewhere in the Contract Documents.

§ 14.4 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 14.5 Other provisions:

ARTICLE 15 SCOPE OF THE AGREEMENT

§ 15.1 This Agreement represents the entire and integrated agreement between the Owner and the Construction Manager and supersedes all prior negotiations, representations or agreements, either written or oral. This Agreement may be amended only by written instrument signed by both Owner and Construction Manager.

§ 15.2 The following documents comprise the Agreement:

.1 AIA Document A133®–2019, Standard Form of Agreement Between Owner and Construction Manager as Constructor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price

.2 AIA Document A133®-2019, Exhibit A, Guaranteed Maximum Price Amendment, if executed

.3 AIA Document A133®–2019, Exhibit B, Insurance and Bonds

.4 AIA Document A201®–2017, General Conditions of the Contract for Construction

.5 Building Information Modeling Exhibit, if completed:

.6 Other Exhibits:
(Check all boxes that apply.)

[ ] AIA Document E234™–2019, Sustainable Projects Exhibit, Construction Manager as Constructor Edition, dated as indicated below:
(Insert the date of the E234-2019 incorporated into this Agreement.)

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[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.7 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Construction Manager's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

Sample

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

OWNER *(Signature)*	**CONSTRUCTION MANAGER** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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AIA® Document A133® – 2019 Exhibit A

Guaranteed Maximum Price Amendment

This Amendment dated the _____ day of _____ in the year _____, is incorporated into the accompanying AIA Document A133™–2019, Standard Form of Agreement Between Owner and Construction Manager as Constructor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price dated the _____ day of _____ in the year _____ (the "Agreement")
(In words, indicate day, month, and year.)

for the following **PROJECT**:
(Name and address or location)

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

AIA Document A201™–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

THE OWNER:
(Name, legal status, and address)

THE CONSTRUCTION MANAGER:
(Name, legal status, and address)

Sample

TABLE OF ARTICLES

A.1 GUARANTEED MAXIMUM PRICE

A.2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

A.3 INFORMATION UPON WHICH AMENDMENT IS BASED

A.4 CONSTRUCTION MANAGER'S CONSULTANTS, CONTRACTORS, DESIGN PROFESSIONALS, AND SUPPLIERS

ARTICLE A.1 GUARANTEED MAXIMUM PRICE

§ A.1.1 Guaranteed Maximum Price

Pursuant to Section 3.2.6 of the Agreement, the Owner and Construction Manager hereby amend the Agreement to establish a Guaranteed Maximum Price. As agreed by the Owner and Construction Manager, the Guaranteed Maximum Price is an amount that the Contract Sum shall not exceed. The Contract Sum consists of the Construction Manager's Fee plus the Cost of the Work, as that term is defined in Article 6 of the Agreement.

§ A.1.1.1 The Contract Sum is guaranteed by the Construction Manager not to exceed _____ ($ ___), subject to additions and deductions by Change Order as provided in the Contract Documents.

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§ A.1.1.2 Itemized Statement of the Guaranteed Maximum Price. Provided below is an itemized statement of the Guaranteed Maximum Price organized by trade categories, including allowances; the Construction Manager's contingency; alternates; the Construction Manager's Fee; and other items that comprise the Guaranteed Maximum Price as defined in Section 3.2.1 of the Agreement.
(Provide itemized statement below or reference an attachment.)

§ A.1.1.3 The Construction Manager's Fee is set forth in Section 6.1.2 of the Agreement.

§ A.1.1.4 The method of adjustment of the Construction Manager's Fee for changes in the Work is set forth in Section 6.1.3 of the Agreement.

§ A.1.1.5 Alternates
§ A.1.1.5.1 Alternates, if any, included in the Guaranteed Maximum Price:

Item	Price

§ A.1.1.5.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Exhibit A. Upon acceptance, the Owner shall issue a Modification to the Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ A.1.1.6 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

ARTICLE A.2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
§ A.2.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

☐ The date of execution of this Amendment.

☐ Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

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

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§ A.2.2 Unless otherwise provided, the Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work. The Contract Time shall be measured from the date of commencement of the Work.

§ A.2.3 Substantial Completion

§ A.2.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Construction Manager shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

☐ Not later than _____ (___) calendar days from the date of commencement of the Work.

☐ By the following date:

§ A.2.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Construction Manager shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ A.2.3.3 If the Construction Manager fails to achieve Substantial Completion as provided in this Section A.2.3, liquidated damages, if any, shall be assessed as set forth in Section 6.1.6 of the Agreement.

ARTICLE A.3 INFORMATION UPON WHICH AMENDMENT IS BASED

§ A.3.1 The Guaranteed Maximum Price and Contract Time set forth in this Amendment are based on the Contract Documents and the following:

§ A.3.1.1 The following Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

§ A.3.1.2 The following Specifications:

(Either list the Specifications here, or refer to an exhibit attached to this Amendment.)

Section	Title	Date	Pages

§ A.3.1.3 The following Drawings:

(Either list the Drawings here, or refer to an exhibit attached to this Amendment.)

Number	Title	Date

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§ A.3.1.4 The Sustainability Plan, if any:
(If the Owner identified a Sustainable Objective in the Owner's Criteria, identify the document or documents that comprise the Sustainability Plan by title, date and number of pages, and include other identifying information. The Sustainability Plan identifies and describes the Sustainable Objective; the targeted Sustainable Measures; implementation strategies selected to achieve the Sustainable Measures; the Owner's and Construction Manager's roles and responsibilities associated with achieving the Sustainable Measures; the specific details about design reviews, testing or metrics to verify achievement of each Sustainable Measure; and the Sustainability Documentation required for the Project, as those terms are defined in Exhibit C to the Agreement.)

Title	Date	Pages

Other identifying information:

§ A.3.1.5 Allowances, if any, included in the Guaranteed Maximum Price:
(Identify each allowance.)

Item	Price

§ A.3.1.6 Assumptions and clarifications, if any, upon which the Guaranteed Maximum Price is based:
(Identify each assumption and clarification.)

§ A.3.1.7 The Guaranteed Maximum Price is based upon the following other documents and information:
(List any other documents or information here, or refer to an exhibit attached to this Amendment.)

ARTICLE A.4 CONSTRUCTION MANAGER'S CONSULTANTS, CONTRACTORS, DESIGN PROFESSIONALS, AND SUPPLIERS

§ A.4.1 The Construction Manager shall retain the consultants, contractors, design professionals, and suppliers, identified below:
(List name, discipline, address, and other information.)

This Amendment to the Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONSTRUCTION MANAGER** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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AIA® Document A133® – 2019 Exhibit B

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Construction Manager, dated the _____ day of _____ in the year _____
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name and location or address)

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

This document is intended to be used in conjunction with AIA Document A201™–2017, General Conditions of the Contract for Construction. Article 11 of A201™–2017 contains additional insurance provisions.

THE OWNER:
(Name, legal status, and address)

THE CONSTRUCTION MANAGER:
(Name, legal status, and address)

TABLE OF ARTICLES

B.1 GENERAL

B.2 OWNER'S INSURANCE

B.3 CONSTRUCTION MANAGER'S INSURANCE AND BONDS

B.4 SPECIAL TERMS AND CONDITIONS

ARTICLE B.1 GENERAL

The Owner and Construction Manager shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE B.2 OWNER'S INSURANCE

§ B.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article B.2 and, upon the Construction Manager's request, provide a copy of the property insurance policy or policies required by Section B.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ B.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

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§ B.2.3 Required Property Insurance

§ B.2.3.1 Unless this obligation is placed on the Construction Manager pursuant to Section B.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section B.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Construction Manager, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ B.2.3.1.1 Causes of Loss. The insurance required by this Section B.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Cause of Loss	Sub-Limit

§ B.2.3.1.2 Specific Required Coverages. The insurance required by this Section B.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Construction Manager's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ B.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section B.2.3.1 or, if necessary, replace the insurance policy required under Section B.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ B.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section B.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ B.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section B.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Construction Manager shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ B.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section B.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

Sample

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§ B.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

☐ **§ B.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

☐ **§ B.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

☐ **§ B.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

☐ **§ B.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

☐ **§ B.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

☐ **§ B.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

☐ **§ B.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

Sample

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§ B.2.5 Other Optional Insurance.
The Owner shall purchase and maintain the insurance selected below.
(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

☐ **§ B.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

☐ **§ B.2.5.2 Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	Limits

ARTICLE B.3 CONSTRUCTION MANAGER'S INSURANCE AND BONDS
§ B.3.1 General
§ B.3.1.1 Certificates of Insurance. The Construction Manager shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article B.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section B.3.2.1 and Section B.3.3.1. The certificates will show the Owner as an additional insured on the Construction Manager's Commercial General Liability and excess or umbrella liability policy or policies.

§ B.3.1.2 Deductibles and Self-Insured Retentions. The Construction Manager shall disclose to the Owner any deductible or self- insured retentions applicable to any insurance required to be provided by the Construction Manager.

§ B.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Construction Manager shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Construction Manager's negligent acts or omissions during the Construction Manager's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Construction Manager's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ B.3.2 Construction Manager's Required Insurance Coverage
§ B.3.2.1 The Construction Manager shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Construction Manager shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Construction Manager is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

Sample

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§ B.3.2.2 Commercial General Liability

§ B.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than _____ ($__) each occurrence, _____ ($__) general aggregate, and _____ ($__) aggregate for products-completed operations hazard, providing coverage for claims including

.1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;

.2 personal injury and advertising injury;

.3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;

.4 bodily injury or property damage arising out of completed operations; and

.5 the Construction Manager's indemnity obligations under Section 3.18 of the General Conditions.

§ B.3.2.2.2 The Construction Manager's Commercial General Liability policy under this Section B.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.

.2 Claims for property damage to the Construction Manager's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.

.3 Claims for bodily injury other than to employees of the insured.

.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured

.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.

.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.

.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.

.8 Claims related to roofing, if the Work involves roofing.

.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.

.10 Claims related to earth subsidence or movement, where the Work involves such hazards.

.11 Claims related to explosion, collapse, and underground hazards, where the Work involves such hazards.

§ B.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Construction Manager, with policy limits of not less than _____ ($__) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ B.3.2.4 The Construction Manager may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section B.3.2.2 and B.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ B.3.2.5 Workers' Compensation at statutory limits.

§ B.3.2.6 Employers' Liability with policy limits not less than _____ ($__) each accident, _____ ($__) each employee, and _____ ($__) policy limit.

§ B.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ B.3.2.8 If the Construction Manager is required to furnish professional services as part of the Work, the Construction Manager shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than _____ ($__) per claim and _____ ($__) in the aggregate.

Sample

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§ B.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Construction Manager shall procure Pollution Liability insurance, with policy limits of not less than _____ ($__) per claim and _____ ($__) in the aggregate.

§ B.3.2.10 Coverage under Sections B.3.2.8 and B.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than _____ ($__) per claim and _____ ($__) in the aggregate.

§ B.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than _____ ($__) per claim and _____ ($__) in the aggregate.

§ B.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than _____ ($__) per claim and _____ ($__) in the aggregate.

§ B.3.3 Construction Manager's Other Insurance Coverage

§ B.3.3.1 Insurance selected and described in this Section B.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The

Construction Manager shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Construction Manager is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ B.3.3.2 The Construction Manager shall purchase and maintain the following types and limits of insurance in accordance with Section B.3.3.1.
(Select the types of insurance the Construction Manager is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

☐ **§ B.3.3.2.1** Property insurance of the same type and scope satisfying the requirements identified in Section B.2.3, which, if selected in this section B.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section B.2.3.1.3 and Section B.2.3.3. The Construction Manager shall comply with all obligations of the Owner under Section B.2.3 except to the extent provided below. The Construction Manager shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Construction Manager shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
(Where the Construction Manager's obligation to provide property insurance differs from the Owner's obligations as described under Section B.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

☐ **§ B.3.3.2.2 Railroad Protective Liability Insurance**, with policy limits of not less than _____ ($__) per claim and _____ ($__) in the aggregate, for Work within fifty (50) feet of railroad property.

☐ **§ B.3.3.2.3 Asbestos Abatement Liability Insurance**, with policy limits of not less than _____ ($__) per claim and _____ ($__) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

Sample

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☐ **§ B.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

☐ **§ B.3.3.2.5** Property insurance on an "all-risks" completed value form, covering property owned by the Construction Manager and used on the Project, including scaffolding and other equipment.

☐ **§ B.3.3.2.6 Other Insurance**
(List below any other insurance coverage to be provided by the Construction Manager and any applicable limits.)

Coverage	Limits

§ B.3.4 Performance Bond and Payment Bond
The Construction Manager shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	
Performance Bond	

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE B.4 SPECIAL TERMS AND CONDITIONS
Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

Sample

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ATTACHMENT 5.E
INSURANCE AND BOND REQUIREMENTS

Project Name: Nova Classical Academy Building Improvements and Expansion Project

AIA DOCUMENT A133 – 2019 STANDART FORM OF AGRFEEMENT BETWEEN OWNER AND CONSTRUCTION MANAGER AS CONSTRUCTOR

ARTICLE 14 MISCELLANEOUS PROVISIONS; SUB-ARTICLE 14.3 INSURANCE AND BONDS

Modify the following Sub-Article/Sub-Sections to read as indicated below:

§ 14.3.1 PRECONSTRUCTION PHASE

These are minimum insurance requirements. It is the sole responsibility of the Construction Manager (CMAR) to determine the need for and to procure additional insurance which may be needed in connection with this Agreement.

The Construction Manager shall provide, to the Owner, a certificate of insurance and other documents evidencing such insurance as required by the Contract Documents prior to execution of the Agreement. The insurance coverage shall be as required by Article 11 of the General Conditions or as Indicated in AIA Document A133, Exhibit B, Insurance and Bonds, except as modified by the requirements herein.

Prior to execution of the Guaranteed Maximum Price Agreement, the Construction Manager shall purchase and maintain insurance as set forth in AIA Document A133®-2019 Standard Form of Agreement Between Owner and Construction Manager as Constructor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price, Exhibit B. Insurance and Bonds, and elsewhere in the Contract Documents. Insurance Policies shall become valid upon Execution of the Agreement. All required Preconstruction Phase Insurance and Bonds are also required during the Construction Phase, and shall be maintained throughout the entire Project.

Certificates shall specifically indicate that the policy is written with an admitted carrier (in MN). Best's Rating for the insurer shall be noted on the Certificate and shall not be less than an A-. NAIC Numbers shall be provided for all Carriers, and policy numbers shall be provided, applicable to the Insured and Project.

The Construction Manager (CMAR) is required to add the Owner (The Friends of Nova Classical Academy) and Nova Classical Academy, its officials, employees, volunteers and agents and the Architect and their subconsultants and employees as Additional Insured to the Construction Manager (CMAR)'s Commercial General Liability, Auto Liability, Pollution and Umbrella policies with respect to liabilities caused in whole or part by Construction Manager (CMAR)'s acts or omissions, or the acts or omissions of those acting on Construction Manager (CMAR)'s behalf in the performance of the ongoing operations, services and completed operations of the Construction Manager (CMAR) under this Agreement. The coverage shall be primary and non-contributory.

Copies of policies and/or certificates of insurance shall be submitted to the Owner (The Friends of Nova Classical Academy) and Nova Classical Academy upon written request and within 10 business days.

§ 14.3.1.1
Commercial General Liability Insurance with Policy limits of no less than One Million Dollars ($1,000,000) for each occurrence, Two Million Dollars ($2,000,000) in aggregate for bodily injury and property

damage, Two Million Dollars ($2,000,000) products/completed operations total limit, One Million Dollars ($1,000,000) personal injury and advertising liability, and Ten Thousand Dollars ($10,000) Medical Expenses.

All policies shall be written on an occurrence basis using ISO form CG 00 01 or its equivalent. Coverage shall include contractual liability and XCU. Construction Manager (CMAR) will be required to provide proof of completed operations coverage for 2 years after Substantial Completion.

The Construction Manager (CMAR) waives all rights against Owner (The Friends of Nova Classical Academy) and Nova Classical Academy, its officials, employees, volunteers, or agents for recovery of damages to the extent these damages are covered by the general liability, worker's compensation, and employers' liability, automobile liability, professional liability and umbrella liability insurance required of the Construction Manager (CMAR) under this Agreement.

The Construction Manager (CMAR) shall not commence work until it has obtained the required insurance and if required by this Agreement, provided an acceptable Certificate of Insurance to the Owner (The Friends of Nova Classical Academy) and Nova Classical Academy.

All Certificates of Insurance shall provide that the insurer gives the Owner (The Friends of Nova Classical Academy) and Nova Classical Academy prior written notice of cancellation or non-renewal of the policy as required by the policy provisions of Minn. Stat. Ch. 60A, as applicable. Further, all Certificates of Insurance to evidence that insurer will provide at least ten (10) days written notice to Owner (The Friends of Nova Classical Academy) and Nova Classical Academy for cancellation due to non-payment of premium.

Nothing in these insurance requirements shall constitute a waiver by the Owner (The Friends of Nova Classical Academy) and Nova Classical Academy of any statutory or common law immunities, defenses, limits, or exceptions on liability.

§ 14.3.1.2
Automobile Liability covering vehicles owned, and non-owned vehicles used. by the Construction Manager One Million Dollars ($1,000,000) per accident for bodily injury, death of any person, and property damage arising out of the ownership, maintenance, and use of those motor vehicles, along with any other statutory.

§ 14.3.1.3
The Construction Manager may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided that such primary and excess or umbrella liability insurance policies result in the same or greater coverage as the coverages required under Sections 14.3.1.1 and 14.3.1.2, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ 14.3.1.4
Workers' Compensation at statutory limits and Employers Liability with policy limits not less than One Million Dollars ($1,000,000) each accident, One Million Dollars ($1,000,000) each employee, and One Million Dollars ($1,000,000) policy limit.

ATTACHMENT 5.E
INSURANCE AND BOND REQUIREMENTS

Note: Any claims that may arise under Minnesota Statutes Ch. 176 on behalf of the Construction Manager's (CMAR's) employees, agents, and any claims made by any third party as a consequence of any act or omission on the part of these employees, Contractor, Subcontractor, or Sub-Consultant, or agents are in no way the obligation or responsibility of the Owner (The Friends of Nova Classical Academy) nor Nova Classical Academy's.

§ 14.3.1.5
Professional Liability Insurance Construction Manager shall, from the date of this Agreement and for a period of at least two (2) years from the date of Final Completion of the entire Work, maintain Professional Liability insurance for claims arising out of the negligent performance of Construction Manager's Preconstruction Phase Services. The liability limits under such policy shall not be less than One Million Dollars ($1,000,000) per occurrence and One Million Dollars ($1,000,000) aggregate.

§ 14.3.1.6 Other Insurance

The Construction Manager (CMAR) shall provide Payment and Performance Bonds, as set forth in AIA Document A133 – 2019 Exhibit B, for the entire duration of the project, in the full value of the GMP. These are to be maintained throughout the Preconstruction and Construction Phases.

§ 14.3.2 CONSTRUCTION PHASE

§ 14.3.2.1
The Construction Manager shall maintain all Insurance secured at the commencement of the Preconstruction Phase during the Construction Phase and shall secure from the commencement of the Construction Phase for such periods of time as set forth below, additional insurance of such types and in such amounts specified below as set forth in the Contract Documents, including Article 11 of the General Conditions. All insurance required in the Preconstruction Phase is also required of the Construction Manager during the Construction Phase.

The Construction Manager (CMAR) shall purchase and maintain such insurance as will protect the Construction Manager (CMAR) from claims which may arise out of, or result from, the Construction Manager (CMAR)'s operations under this Agreement, whether such operations are by the Construction Manager (CMAR) or by any Subconsultant, Contractor, Subcontractor, or by anyone directly employed by them, or by anyone for whose acts or omissions anyone of them may be liable.

§ 14.3.2.2 Other Insurance

Pursuant to AIA Document A133 – 2019 Exhibit B, § B.3.2.2.1: Construction Manager to provide Builder's Risk Property Insurance meeting all requirements of § B.2.3 Required Property Insurance, on an "all risks" basis, in the full value of the GMP.

Pollution Liability Insurance (CPL) with policy limits of not less than Two Million Dollars ($2,000,000) per occurrence and Four Million Dollars ($4,000,000) aggregate.

In the event the Construction Manager intends to either bond their Subcontractors or purchase Subcontractor default insurance, the Owner shall reimburse actual cost not exceeding 1% of the Subcontract value. Any costs exceeding the 1% shall be paid by the Construction Manager.

END OF ATTACHMENT 5.E

NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION

ST. PAUL, MINNESOTA

SITE MAP

DRAWING INDEX

GENERAL INFORMATION

G000 TITLE SHEET

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C200 GRADING, DRAINAGE, AND EROSION CONTROL PLAN
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C501 CIVIL DETAILS
C502 CIVIL DETAILS
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C601 STORM WATER POLLUTION PREVENTION PLAN

LANDSCAPE

L100 LANDSCAPE PLAN

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A100 ARCHITECTURAL SITE PLAN
A200 SELECTIVE DEMOLITION PLANS
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A210A FIRST FLOOR PLAN - SHELTER
A210B FIRST FLOOR PLAN - EXISTING BUILDING
A211 OVERALL PLAN - SECOND FLOOR
A211A SECOND FLOOR PLAN - SHELTER
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A221A SECOND FLOOR REFLECTED CEILING PLAN - SHELTER
A240 FURNITURE PLAN - FIRST & SECOND FLOOR
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A311 WINDOW TYPES
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A501 BUILDING ELEVATIONS- NORTHEAST
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A806 INTERIOR ELEVATIONS - SHELTER
A807 INTERIOR ELEVATIONS

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S210B FIRST FLOOR FOUNDATION PLAN - SKYWAY
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E503 ELECTRICAL DETAILS
E504 ELECTRICAL DETAILS

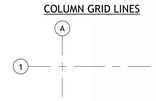
ARCHITECTURAL ABBREVIATIONS

ABV	ABOVE
ACP	ACOUSTICAL PANEL
ACT	ACOUSTICAL CEILING TILE
ADJ	ADJUSTABLE
ADJ	ADJACENT
AFF	ABOVE FINISH FLOOR
AHJ	AUTHORITIES HAVING JURISDICTION
ALT	ALTERNATIVE
ALUM	ALUMINUM
ANOD	ANODIZED
AP	ACCESS PANEL
APPROX	APPROXIMATE(LY)
ARCH	ARCHITECT(URAL)
AUTO	AUTOMATIC
BD	BOARD
BIT	BITUMINOUS
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
B.O.	BOTTOM OF
BRG	BEARING
BSMT	BASEMENT
BTM	BOTTOM
BTWN	BETWEEN
CABT	CABINET
CEM	CEMENT(ITOUS)
CER	CERAMIC
CG	CORNER GUARD
CJ	CONTROL JOINT
CL	CENTER LINE
CLG	CEILING
CPT	CARPET
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONF	CONFERENCE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CORR	CORRIDOR
DETL	DETAIL
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DISP	DISPENSER
DS	DOWNSPOUT
DT	DRAIN TILE
DW	DISHWASHER
DWG	DRAWING
DWR	DRAWER
E	EAST
EA	EACH
ELEC	ELECTRIC(AL)
ELEV	ELEVATION
EMER	EMERGENCY
ENC	ENCLOSE(URE)
EQ	EQUAL
EQUIP	EQUIPMENT
EST	ESTIMATED
ETC	ETCETERA
EWC	ELEC WATER COOLER
EXH	EXHAUST
EXIST	EXISTING
EXPN JT	EXPANSION JOINT
EXP	EXPANSION
EXT	EXTERIOR
FAF	FLUID APPLIED FLOOR
FB	FACE BRICK
FD	FLOOR DRAIN
FE	FIRE EXTINGUSHER
FFE	FINISHED FLOOR ELEVATION
FIN	FINISH(ED)
FLR	FLOOR(ING)
FND	FOUNDATION
FOS	FACE OF STEEL
FR	FRAME
FTG	FOOTING
FV	FIELD VERIFY
GA	GAUGE
GALV	GALVANIZED
GB	GRAB BAR
GC	GENERAL CONTRACTOR
GL	GLASS
GYP	GYPSUM
GYP BD	GYPSUM BOARD
HD	HEAD
HDR	HEADER
HM	HOLLOW METAL
HOR	HORIZONTAL
HSS	HOLLOW STEEL SECTION
HT	HEIGHT
HTG	HEATING
HVAC	HEATING/AIR CONDITIONING
ID	INSIDE DIAMETER
INT	INTERIOR
INSUL	INSULATE(ION)
JC	JANITOR'S CLOSET
JT	JOINT
LAV	LAVATORY
LT	LIGHT
LWC	LIGHT WEIGHT CONCRETE
LVT	LUXURAL VINYL TILE
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MC	METAL CHANNEL
MDF	MEDIUM DENSITY FIBERBOARD
MECH	MECHANICAL
MED	MEDIUM
MFR	MANUFACTURER
MIC	MICROWAVE
MIN	MINIMUM
MIR	MIRROR
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MP	METAL PANEL
MR	MOISTURE RESISTENT
MTD	MOUNTED
MTL	METAL
MULL	MULLION
N	NORTH
NIC	NOT IN CONTRACT
NOM	NOMINAL
NRC	NOISE REDUCTION COEFFICIENT
NTS	NOT TO SCALE
OA	OVERALL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPG	OPENING
OVHD	OVERHEAD
PLAM	PLASTIC LAMINATE
PLYWD	PLYWOOD
PNL	PANEL
PR	PAIR
PRTN	PARTITION
PT	PAINT
RAD	RADIUS
RD	ROOF DRAIN
REF	REFERENCE
REINF	REINFORCE(D)
REQD	REQUIRED
RES	RESISTIVE
REV	REVERSE
RF	ROOF
RM	ROOM
RO	ROUGH OPENING
ROH	ROUGH OPENING HEIGHT
ROW	ROUGH OPENING WIDTH
RWL	RAIN WATER LEADER
S	SOUTH
SCHED	SCHEDULE
SF	SQUARE FOOT
SHT	SHEET
SIM	SIMILAR
SIM REV	SIMILAR REVERSED
SLNT	SEALANT
SPEC	SPECIFICATION(S)
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STL	STL
STOR	STORAGE
SUSP	SUSPENDED
SYST	SYSTEM
TBD	TO BE DETERMINED
T.O.	TOP OF
TPD	TOILET PAPER DISPENSER
TPTN	TOILET PARTITION
TRTD	TREATED
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VB	VINYL BASE
VCT	VINYL COMPOSITION TILE
VER	VERIFY
VERT	VERTICAL
VEST	VESTIBULE
VR	VAPOR RETARDER
W	WEST
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WD	WOOD
WDW	WINDOW
WF	WIDE FLANGE
WP	WORK POINT
WWF	WELDED WIRE FABRIC

GENERAL SYMBOLS

DRAWING SHEET NUMBERS

COLUMN GRID LINES



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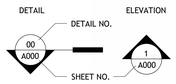

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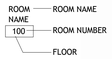

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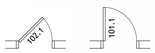

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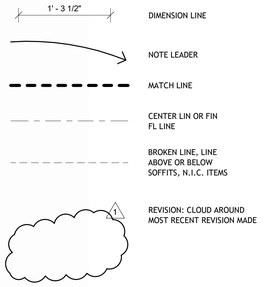

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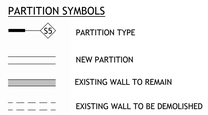
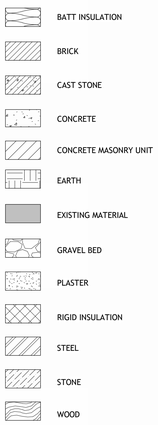


MATERIALS



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CONSULTANT

FOR REVIEW ONLY, NOT FOR CONSTRUCTION

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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 ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME

SIGNATURE

LICENSE NO.

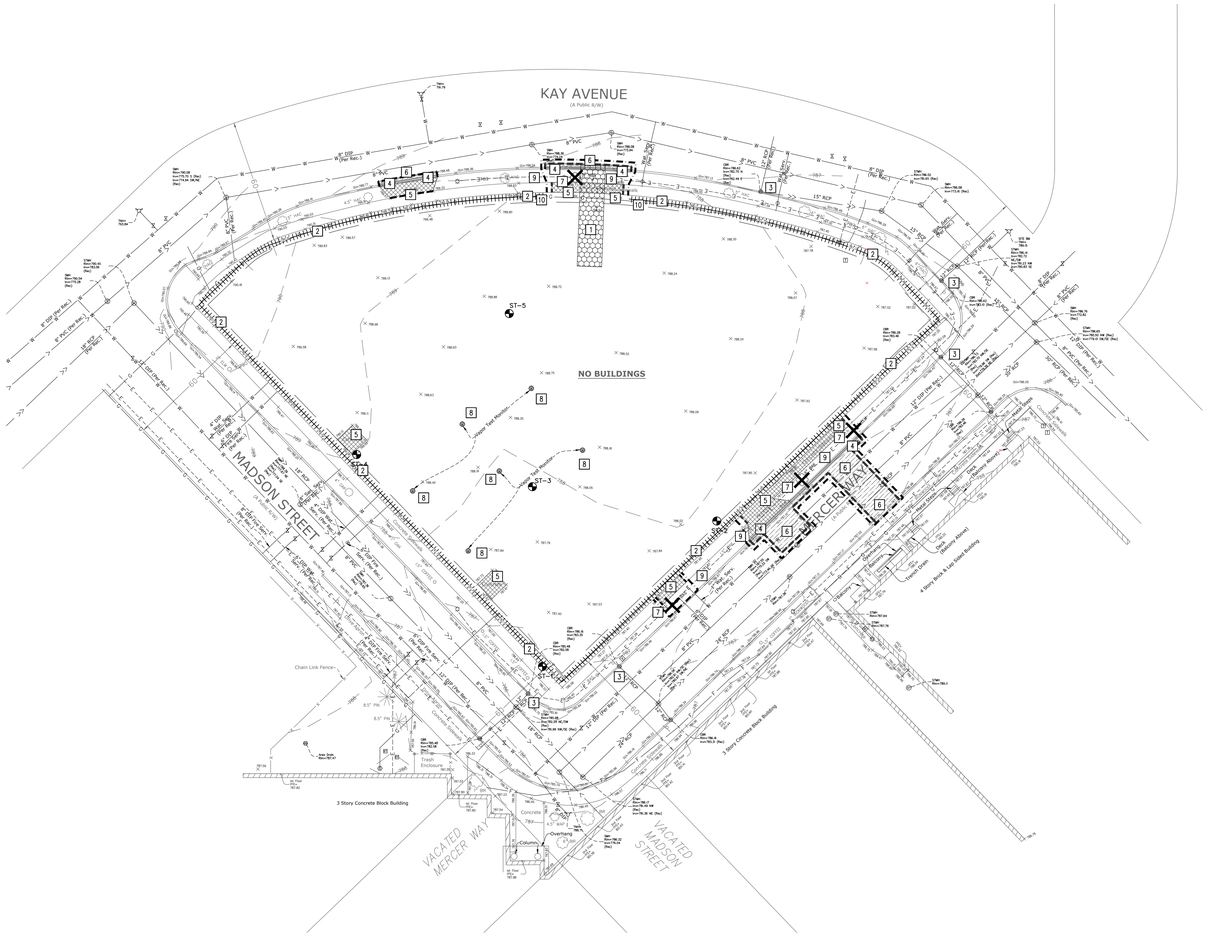
05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
TITLE SHEET

SHEET NUMBER:

G000



1 C100 SELECTIVE SITE DEMOLITION AND EROSION CONTROL PLAN
1" = 30'

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

1. INSTALL ROCK CONSTRUCTION ENTRANCE. REFER TO DETAIL 1/C500.
2. INSTALL PERIMETER EROSION CONTROL. REFER TO DETAILS 2/C500 AND 3/C500.
3. INSTALL INLET SEDIMENT PROTECTION. REFER TO DETAIL 4/C500.
4. REMOVE CURB AND GUTTER IN ITS ENTIRETY TO THE APPROXIMATE EXTENTS SHOWN. SAWCUT AND REMOVE AT NEAREST JOINT.
5. REMOVE CONCRETE PAVEMENT IN ITS ENTIRETY TO THE APPROXIMATE EXTENTS SHOWN.
6. SAWCUT AND REMOVE BITUMINOUS PAVEMENT IN ITS ENTIRETY TO THE EXTENTS SHOWN.
7. REMOVE TREE IN ITS ENTIRETY INCLUDING STUMP.
8. **REMOVE VAPOR TEST MONITOR. CONTRACTOR SHALL FOLLOW ALL MPCA AND MN DEPARTMENT OF HEALTH RULES AND REGULATIONS.**
9. EXISTING ELECTRICAL LINE TO REMAIN. PROTECT AT ALL TIMES.
10. EXISTING GAS LINE TO REMAIN. PROTECT AT ALL TIMES.

PROPOSED PLAN SYMBOLS

- CONSTRUCTION LIMITS
- SEDIMENT CONTROL LOG
- PROPERTY LINE
- SAWCUT LINE (APPROX.)
- CONSTRUCTION ENTRANCE
- BITUMINOUS REMOVAL
- CONCRETE REMOVAL
- CURB REMOVAL
- TREE REMOVAL

ABBREVIATIONS

BLDG	Building
BM	Benchmark
BS	Bottom of Step
BW	Bottom of Wall
CB	Catch Basin
CONC	Concrete
ELEV	Elevation
EX	Existing
FFE	Finished Floor Elevation
HWL	High Water Level
INV	Invert
LFE	Lower Floor Elevation
MAX	Maximum
MH	Manhole
MIN	Minimum
NWL	Normal Water Level
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe
STRM	Storm Sewer Structure
TC	Top of Curb
TS	Top of Step
TW	Top of Wall
W.O.	Washout
WQE	Water Quality Elevation

NOTE:
STORM SEWER INLETS NOT SHOWN ON PLAN MAY RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. INSTALL INLET SEDIMENT PROTECTION PER DETAIL 4/C500 ON ALL STORM INLETS THAT MAY RECEIVE RUNOFF.

N

30' 15' 0 30' 60'
SCALE 1" = 30'

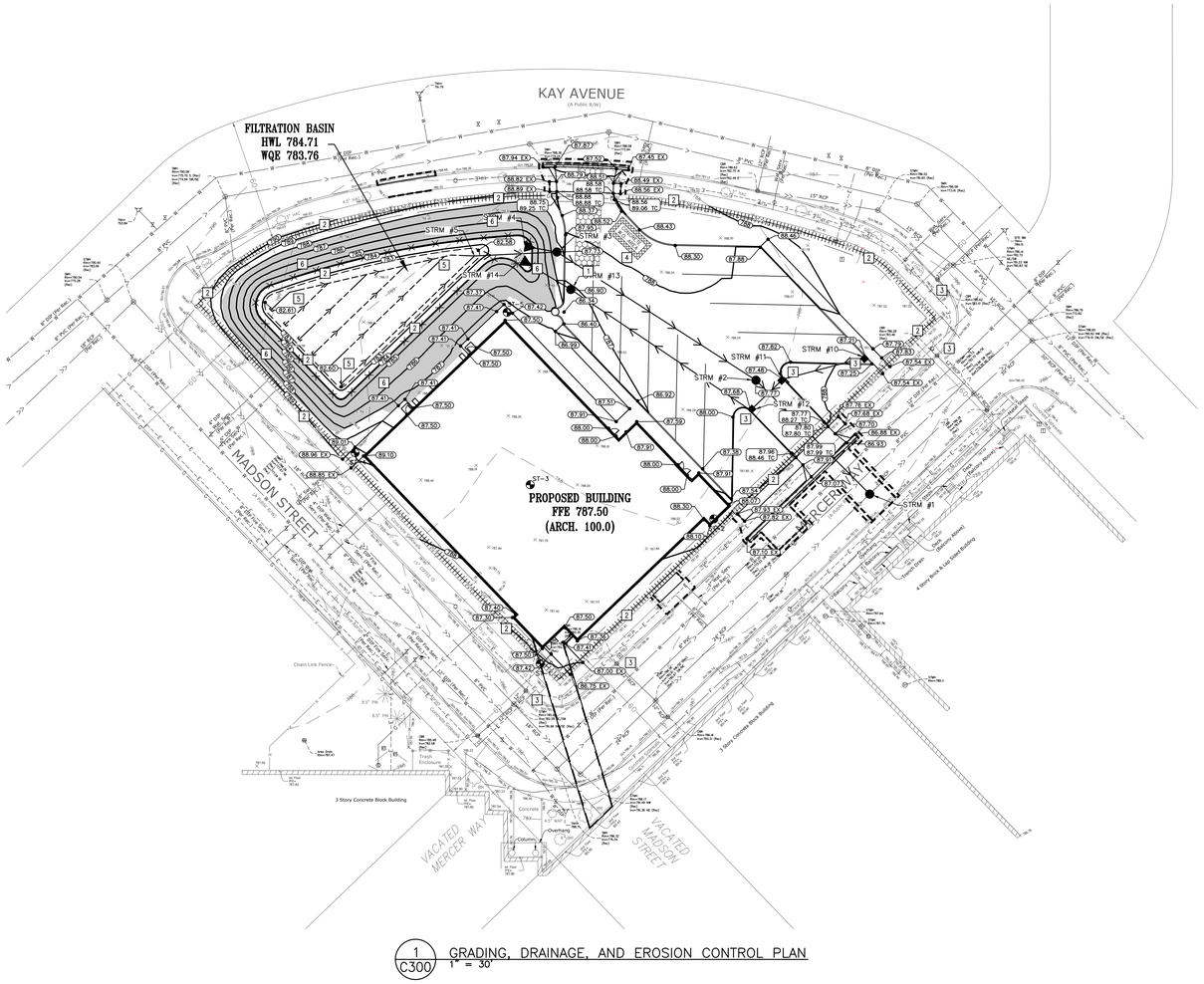
ST. PAUL'S NOTES:

1. INSPECTION CONTACT: THE DEVELOPER SHALL CONTACT THE RIGHT OF WAY INSPECTOR **DAN BRADY AT (651) 485-4398** (TWO WEEK PRIOR TO BEGINNING WORK) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY AND COORDINATION OF ALL WORK IN THE PUBLIC RIGHT OF WAY. NOTE: IF A TWO WEEK NOTICE IS NOT PROVIDED TO THE CITY, ANY RESULTING DELAYS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. SAFE WORK SITE REQUIREMENTS: THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD REQUIREMENTS FOR WORK IN THE PUBLIC RIGHT OF WAY.
3. NO PRIVATE FACILITIES IN THE RIGHT OF WAY: THE DEVELOPER IS STRICTLY PROHIBITED FROM INSTALLING PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES AND/OR LIGHTING IN THE CITY'S RIGHT OF WAY. THIS INCLUDES STUBBING CONDUIT OR CABLE INTO THE PUBLIC RIGHT OF WAY TO ACCOMMODATE UTILITY FEEDS TO THE SITE. COORDINATE WITH EACH UTILITY PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. UTILITIES ARE RESPONSIBLE FOR SECURING EXCAVATION PERMITS TO RUN THEIR SERVICE INTO A SITE, AND (WHERE REQUIRED) SUBMITTING PLANS FOR REVIEW BY THE PUBLIC WORKS UTILITY REVIEW COMMITTEE.
4. CITY OF ST. PAUL PERMIT REQUIREMENTS:
   - 4.1. ORDERING OBSTRUCTION AND EXCAVATION PERMITS: CONTACT **PUBLIC WORKS RIGHT OF WAY SERVICE DESK AT (651) 266-6151. IT IS STRONGLY RECOMMENDED THAT CONTRACTORS CALL FOR COST ESTIMATES PRIOR TO BIDDING TO OBTAIN ACCURATE COST ESTIMATES.**
   - 4.2. OBSTRUCTION PERMITS: THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION PERMIT IF CONSTRUCTION (INCLUDING SILT FENCES) WILL BLOCK CITY STREETS, SIDEWALKS OR ALLEYS, OR IF DRIVING OVER CURBS.
   - 4.3. EXCAVATION PERMITS: ALL DIGGING IN THE PUBLIC RIGHT OF WAY REQUIRES AN EXCAVATION PERMIT. IF THE PROPOSED BUILDING IS CLOSE TO THE RIGHT OF WAY, AND EXCAVATING INTO THE RIGHT OF WAY IS NEEDED TO FACILITATE CONSTRUCTION, CONTACT THE UTILITY INSPECTOR.
   - 4.4. FAILURE TO SECURE PERMITS: FAILURE TO SECURE OBSTRUCTION PERMITS OR EXCAVATION PERMITS WILL RESULT IN A DOUBLE-PERMIT FEE AND OTHER FEES REQUIRED UNDER CITY OF ST. PAUL LEGISLATIVE CODES.
   - 4.5. REQUIREMENTS TO WORK IN THE PUBLIC RIGHT OF WAY: ALL UTILITIES AND CONTRACTORS WORKING IN THE PUBLIC RIGHT OF WAY MUST TO BE REGISTERED, INSURED AND BONDED, AS RECOGNIZED BY THE **PUBLIC WORKS SERVICE DESK. (651) 266-6151.**
5. ALL WORK ON CURBS, DRIVEWAYS, AND SIDEWALKS WITHIN THE PUBLIC RIGHT OF WAY MUST BE DONE BY A LICENSED AND BONDED CONTRACTOR UNDER A PERMIT FROM **PUBLIC WORKS SIDEWALK SECTION (651) 266-9700.** SIDEWALK GRADES MUST BE CARRIED ACROSS DRIVEWAYS.
6. RESTORATION OF ASPHALT AND CONCRETE PAVEMENTS ARE PERFORMED BY THE PUBLIC WORKS STREET MAINTENANCE DIVISION. THE CONTRACTOR IS RESPONSIBLE FOR PAYMENT TO THE CITY FOR THE COST OF THESE RESTORATIONS. THE CONTRACTOR SHALL **CONTACT PUBLIC WORKS STREET MAINTENANCE TO SET UP A WORK ORDER PRIOR TO BEGINNING ANY REMOVALS IN THE STREET AT (651) 266-9700.** PROCEDURES AND UNIT COSTS ARE FOUND IN STREET MAINTENANCE'S "GENERAL REQUIREMENTS – ALL RESTORATIONS" AND ARE AVAILABLE AT THE PERMIT OFFICE.
7. SIGNS REGULATING PARKING AND/OR TRAFFIC ON PRIVATE PROPERTY (OUTSIDE OF THE PUBLIC RIGHT- OF-WAY ROW) SHALL BE FURNISHED AND INSTALLED BY THE PROPERTY OWNER OR CONTRACTOR AT NO COST TO THE CITY OF ST. PAUL DEPARTMENT OF PUBLIC WORKS. REMOVAL OF EXISTING SIGNS WITHIN THE PUBLIC ROW THAT REGULATE TRAFFIC AND OR PARKING SHALL BE COMPLETED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. NEW SIGNS OR THE REINSTALLATION OF EXISTING SIGNS, AS APPROVED BY PUBLIC WORKS TRAFFIC ENGINEERING, REGULATING PARKING AND/OR TRAFFIC IN THE PUBLIC ROW SHALL BE FURNISHED AND INSTALLED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. ALL EQUIPMENT, MATERIALS, AND LABOR COSTS ASSOCIATED WITH THE CITY AFFECTING A COMPLETE SIGN INSTALLATION SHALL BE THE RESPONSIBILITY OF THE DEVELOPMENT. CONTACT CHRIS GULDEN OF PUBLIC WORKS 651-266-9778 TWO WEEKS IN ADVANCE OF NEEDED SIGN WORK.
8. SEWER REMOVAL/ABANDONMENT PERMIT: LICENSE HOUSE DRAIN CONTRACTOR TO OBTAIN REMOVAL PERMITS FROM PUBLIC WORKS TO CUT OFF EXISTING SEWER CONNECTIONS SERVICES TO THE MAIN LINE. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
9. SEWER CONNECTION PERMIT: PLUMBING CONTRACTOR TO OBTAIN (SEWER CONNECTION PERMIT) TO CONSTRUCT NEW SANITARY AND STORM CONNECTION IN STREET FROM MAIN TO THE PROPERTY. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
10. ALL WATER MAIN AND SERVICES TO BE INSTALLED ACCORDING TO 'SPRWS STANDARDS FOR INSTALLATION OF WATER MAINS', AND 'SPRWS WATER CODE'.
11. SERVICES THAT ARE TO BECOME UNUSED UPON COMPLETION OF THE NEW SERVICE CONNECTION MUST BE CUT OFF BY THE CONTRACTOR AT THE MAIN PRIOR TO THE TURN ON OF THE NEW SERVICES. EXCAVATION AND RESTORATION BY CONTRACTOR.
12. THE CONTRACTOR SHALL CONTACT **MIKE LUSIAN, GENERAL FOREMAN, LIGHTING – SIGNAL MAINTENANCE, (651-266-9780),** IF REMOVAL OR RELOCATION OF EXISTING FACILITIES IS REQUIRED OR IN THE EVENT OF DAMAGE TO THE LIGHTING OR SIGNAL UTILITIES. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY (AND RELATED COSTS) FOR ANY DAMAGE OR RELOCATIONS. .

    12.1 THE INSTALLATION OF PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES AND/OR LIGHTING IS STRICTLY PROHIBITED IN THE CITY'S ROW (RIGHT OF WAY).
13. CONTRACTOR IS TO CONTACT **SAINT PAUL CITY FORESTER (651) 632-2436** PRIOR TO IMPACTING ANY BOULEVARD TREES.
    - 13.1 EXISTING PUBLIC PROPERTY TREES ARE TO BE PROTECTED AT ALL TIMES. PUBLIC TREES DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE RESTORED OR REPLACED TO THE SATISFACTION OF, AND AT NO COST TO THE CITY, AS DETERMINED BY THE FORESTRY MANAGER. THE CONTRACTOR IS ADVISED TO DOCUMENT PRE-EXISTING CONDITIONS OF PUBLIC TREES AS WELL AS THE SURROUNDING BOULEVARD PRIOR TO CONSTRUCTION ACTIVITIES.
    - 13.2 THE REMOVAL, PRUNING, AND/OR PLANTING OF TREES ON PUBLIC PROPERTY REQUIRES AN APPROVED FORESTRY TREE WORK PERMIT FROM THE CITY FORESTER (651-632-2436). ANY WORK MUST BE COMPLETED BY A LICENSED TREE CONTRACTOR.
    - 13.3 PUBLIC PROPERTY TREES SHALL BE PROTECTED BY ESTABLISHING A TREE PROTECTION ZONE USING A 4' TALL FENCING INSTALLED AT THE DRIP LINE OF THE TREE. TREE PROTECTION FENCING SHALL BE INSTALLED PRIOR TO THE START OF ANY SITE WORK AND MAINTAINED FOR THE DURATION OF THE PROJECT. PROPOSED WORK WITHIN, OR CHANGES TO THE LOCATION OF TREE PROTECTION FENCING SHALL BE REVIEWED BY THE CITY FORESTER PRIOR TO ALTERATION.
    - 13.4 CONSTRUCTION SUPPLIES, MATERIALS, SPOILS, EQUIPMENT, AND VEHICLES SHALL NOT BE STORED OR OPERATED WITHIN THE DRIP LINE OF ANY PUBLIC TREE OR WITHIN TREE PAVER AREA OF BOULEVARD WITHOUT PRIOR WRITTEN APPROVAL FROM THE CITY FORESTER. IF THE BOULEVARD MUST BE USED FOR CONSTRUCTION ACTIVITIES, SITE ACCESS ROUTES, MATERIAL STORAGE, OR OTHER RELATED ACTIVITIES, PROTECTIVE MEASURES APPROVED BY THE CITY FORESTER SHALL BE TAKEN TO REDUCE SOIL COMPACTION AND DAMAGE TO PUBLIC TREES.
    - 13.5 IN LOCATIONS WHERE PUBLIC TREES CANNOT BE PROTECTED TO THE DRIP LINE WITH TEMPORARY TREE PROTECTION FENCING, THE USE OF A 6" LAYER OF MULCH OR TRACK PADS WILL BE REQUIRED TO LIMIT SOIL COMPACTION AND PROTECT ROOT SYSTEMS WITHIN THE BOULEVARD WHEN ACCESS ROUTES OR MATERIAL STORAGE IS NECESSARY.
14. BUSINESS SIGNS WILL REQUIRE A SEPARATE REVIEW AND SIGN PERMIT FROM THE DEPARTMENT OF SAFETY AND INSPECTIONS. SITE PLAN APPROVAL DOES NOT CONSTITUTE APPROVAL OF BUSINESS SIGNS SHOWN ON THE SITE PLAN. CONTACT **YAYA DIATTA OF DSI ZONING (651) 266-9080** IF YOU HAVE ANY QUESTIONS ABOUT SIGNS.
15. CARE MUST BE TAKEN DURING CONSTRUCTION AND EXCAVATION TO PROTECT ANY SURVEY MONUMENTS AND/OR PROPERTY IRONS. **CALL SAM GIBSON OF PUBLIC WORKS SURVEYING (651-266-6075)** IF YOU HAVE ANY QUESTIONS.
16. AS PER THE CITY'S "STANDARD SPECIFICATION FOR STREET OPENINGS" POLICY, RESTORATION ON ROADWAY SURFACES LESS THAN 5 YEARS OLD WILL REQUIRE FULL WIDTH MILL AND OVERLAY OR ADDITIONAL DEGRADATION FEES. PAVEMENT RESTORATION SHALL BE COMPLETED BY THE ST. PAUL PUBLIC WORKS STREET MAINTENANCE DIVISION. ALL RELATED COSTS ARE THE RESPONSIBILITY OF THE DEVELOPER/CONTRACTOR. CONTACT KEVIN NELSON AT 651-266-9700 FOR ESTIMATE OF COSTS FOR PAVEMENT RESTORATION.
17. PIPE MUST BE MECHANICAL JOINT UNDERNEATH THE BUILDING FOOTPRINT AND UP TO TEN FEET OUTSIDE OF THE BUILDING FOOTPRINT.
18. A FOUR-SIDED TRENCH BOX IS REQUIRED ON ALL EXCAVATIONS DEEPER THAN 5 FEET WHERE UNDERGROUND WORK OR INSPECTION IS TO BE PERFORMED BY SPRWS. FOR ALL WET TAPS TO BE PERFORMED BY SPRWS, A MINIMUM TRENCH BOX SIZE OF 8 FEET HIGH X 8 FEET WIDE X 10 FEET LONG IS REQUIRED. LADDERS ARE REQUIRED AND MUST EXTEND 3 FEET ABOVE THE SURFACE OF THE TRENCH. SIDEWALKS, PAVEMENTS, DUCTS AND APPURTENANT STRUCTURES SHALL NOT BE UNDERMINED UNLESS A SUPPORT SYSTEM OR ANOTHER METHOD OF PROTECTION IS PROVIDED. TRENCHES IN EXCESS OF 20 FEET IN DEPTH MUST BE SIGNED OFF BY A REGISTERED PROFESSIONAL ENGINEER. EXCAVATED MATERIAL MUST BE KEPT A MINIMUM OF 2 FEET FROM THE EDGE OF THE TRENCH.
19. SERVICE CONNECTIONS SHALL BE INSTALLED WITH 8 FEET OF COVER AS PER THE ESTABLISHED GRADE FROM THE MAIN TO THE PROPERTY LINE OR, IF APPLICABLE, TO THE UTILITY EASEMENT LINE. WHEN SOLID ROCK CONDITIONS ARE ENCOUNTERED, WATER SERVICES MAY BE INSTALLED WITH 6.5 FEET OF COVER. AT THIS DEPTH, THE NEED FOR INSULATION WILL BE DETERMINED BY SPRWS INSPECTORS
20. PIPE MATERIAL FOR 8" DUCTILE IRON PIPE MUST BE CLASS 52, PIPE MATERIAL FOR 6" AND 4" DUCTILE IRON PIPE MUST BE CLASS 53. THE EXTERIOR OF DUCTILE IRON PIPE SHALL BE COATED WITH A LAYER OF ARC- SPRAYED ZINC PER ISO 8179. THE INTERIOR CEMENT MORTAR LINING SHALL BE APPLIED WITHOUT ASPHALT SEAL COAT. PIPE MUST BE WRAPPED IN V-BIO POLYWRAP ENCASEMENT AND SHALL BE INSTALLED UTILIZING MODIFIED METHOD A AS RECOMMENDED BY DIPRA. ENCASEMENT SHALL BE TAPED AT EACH JOINT AND AROUND THE MIDDLE OF THE PIPE.
21. MAINTAIN 3 FEET VERTICAL SEPARATION BETWEEN WATER AND SEWER PIPES OR A 18" SEPARATION WITH 4" OF INSULATION. WHERE A WATER SERVICE OR MAIN IS OFFSET OVER A STORM SEWER, INSULATION SHALL BE PLACED BOTH OVER THE TOP OF THE WATER PIPE AND BETWEEN THE WATER PIPE AND THE STORM SEWER. REFER TO STANDARD PLATE D-10. WHERE A WATER MAIN OR SERVICE IS WITHIN 6 FEET OF A CATCH BASIN, MANHOLE OR OTHER OUTLET THAT IS SUBJECT TO COLD, INSULATION SHALL BE PLACED BETWEEN THE STRUCTURE AND THE WATER PIPE. ABOVE OR BELOW A STORM SEWER, INSULATION SHALL BE PLACED BETWEEN THE WATER PIPE AND THE STORM PIPE. WHERE A WATER SERVICE OR MAIN IS OFFSET OVER A STORM SEWER, INSULATION SHALL BE PLACED BOTH OVER THE TOP OF THE WATER PIPE AND BETWEEN THE WATER PIPE AND THE STORM SEWER. REFER TO STANDARD PLATE D-10. WHERE A WATER MAIN OR SERVICE IS WITHIN 6 FEET OF A CATCH BASIN, MANHOLE OR OTHER OUTLET THAT IS SUBJECT TO COLD, INSULATION SHALL BE PLACED BETWEEN THE STRUCTURE AND THE WATER PIPE.
22. REFER TO SPRWS "STANDARDS FOR THE INSTALLATION OF WATER MAINS" STANDARD PLATE D-11 FOR RESTRAINED PIPE REQUIREMENT.
23. ALL WATER SERVICE VALVE BOXES WITHIN CONSTRUCTION AREA MUST BE EXPOSED AND BROUGHT TO GRADE UPON COMPLETION OF CONSTRUCTION.
24. ALL PIPE WORK INSIDE OF PROPERTY TO BE PERFORMED BY A PLUMBER LICENSED BY THE STATE OF MINNESOTA AND CERTIFIED BY THE CITY OF SAINT PAUL. SPRWS REQUIRES SEPARATE OUTSIDE AND INSIDE PLUMBING PERMITS FOR EACH NEW WATER SERVICE.
25. PIPES INSTALLED WITH LESS THAN 2% SLOPE SHALL BE INSTALLED UTILIZING LASER EQUIPMENT.
26. ALL STORM WATER PIPING INSTALLED BETWEEN THE BUILDING AND THE STORM WATER RETENTION SYSTEM SHALL BE INSPECTED AND TESTED PRIOR TO BACKFILLING. CONTACT THE DEPARTMENT OF SAFETY AND INSPECTIONS AT 651-266-9006 TO SCHEDULE AN INSPECTION WITH THE AREA PLUMBING INSPECTOR.
27. STRIPING UNRESOLVED GENERAL RESTORATION SHALL BE COMPLETED IMMEDIATELY FOLLOWING FINAL PAVEMENT RESTORATION. ROADWAY STRIPING IMPACTED BY WORK ZONE SHALL BE REPLACED IN-KIND AT NO COST TO THE ROAD AUTHORITY. IF THERE ARE QUESTIONS AS TO THE TYPE OF STRIPING MATERIAL TO BE USED, CONTACT CHRIS GULDEN (651) 266-9778 IN THE CITY'S TRAFFIC OPERATIONS SECTION. IF THERE IS A DESIRE FOR THE CITY OF ST. PAUL PUBLIC WORKS DEPARTMENT TO COMPLETE PAVEMENT MARKING RESTORATION WORK, CONTACT CHRIS GULDEN OF PUBLIC WORKS TRAFFIC OPERATIONS FOR AN ESTIMATE. AT A MINIMUM, TWO WEEKS ADVANCE NOTICE SHALL BE PROVIDE FOR ANY STRIPING REQUEST. IF ADVANCE NOTICE IS NOT PROVIDED, ANY ASSOCIATED PROJECT DELAYS, AND COSTS INCURRED FROM SAID DELAYS, SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
28. ADJACENT STREETS AND ALLEYS MUST BE SWEPT TO KEEP THEM FREE OF SEDIMENT. CONTRACTOR MUST MONITOR CONDITIONS AND SWEEP AS NEEDED OR WITHIN 24 HOURS OF NOTICE BY THE CITY. STREET SWEEPING IS AN IMPORTANT TEMPORARY EROSION CONTROL BEST MANAGEMENT PRACTICE AND SHALL BE PERFORMED WITH THE USE OF WATER. DRY SWEEPING IS PROHIBITED. ADDITIONALLY, TRUCKS HAULING IN AND OUT OF THE SITE, FOR ANY ACTIVITY INCLUDING BUT NOT NECESSARILY LIMITED TO PAVING, EXCAVATION, ETC., NEEDS TO ENSURE CLEAN OFF ALL MUD FLAPS TO AVOID ANY BUILDUP ON THE STREET PAVEMENT.
29. ANY PUBLIC INFRASTRUCTURE DAMAGE RESULTING FROM THE CONTRACTORS ACTIVITIES, INCIDENTAL OR OTHERWISE, SHALL BE REPAIRED/REPLACED TO THE SATISFACTION OF THE CITY AT NO COST TO THE CITY.
30. BOULEVARD RESTORATION SHALL INCLUDE THE FOLLOWING: ALL CONCRETE, ASPHALT, AND BASE MATERIALS SHALL BE REMOVED. BOULEVARD SOILS ARE TO BE PROTECTED DURING CONSTRUCTION BY USING PLYWOOD, A 6" LAYER OF MULCH, AND/OR TRACK PADS. SOIL COMPACTION DUE TO CONSTRUCTION ACTIVITIES SHALL BE CORRECTED TO THE SATISFACTION OF, AND AT NO COST TO THE CITY PRIOR TO FINAL GRADING. BOULEVARDS SHALL BE RESTORED WITH A MINIMUM OF 6" OF TOPSOIL.
31. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL EXCAVATION AND OBSTRUCTION PERMITS REQUIRED BY ANY GOVERNING AUTHORITY.
32. CONTRACTOR MUST MAINTAIN AS-BUILT PLANS THROUGHOUT CONSTRUCTION AND SUBMIT THESE PLANS TO SAINT PAUL REGIONAL WATER SERVICES ENGINEERING DEPARTMENT UPON COMPLETION OF WORK VIA EMAIL AT: WATER-PLUMBINGPERMITAPP@CI.STPAUL.MN.US.
33. CONTRACTOR TO MAINTAIN ACCESS TO THE FIRE DEPARTMENT CONNECTION FOR FIRE DEPARTMENT PERSONNEL AT ALL TIMES DURING THE CONSTRUCTION PERIOD.
34. ANY PUBLIC INFRASTRUCTURE DAMAGE RESULTING FROM THE CONTRACTORS ACTIVITIES, INCIDENTAL OR OTHERWISE, SHALL BE REPAIRED/REPLACED TO THE SATISFACTION OF THE CITY AT NO COST TO THE CITY.
35. NOTIFY **GRAEME CHAPLE AT 651-266-6882** A MINIMUM OF 2 WEEKS PRIOR TO SCHEDULING WORK BY SPRWS CONSTRUCTION CREW.
36. THE FOLLOWING WORK IN THE RIGHT-OF-WAY SHALL BE PERFORMED BY SPRWS ON AN ACTUAL COST BASIS: (1) CONNECTION TO THE PUBLIC MAIN FOR ANY INSTALLATION THAT IS OFF A PUBLIC MAIN LARGER THAN 12" OR OF MATERIAL NOT MADE OF IRON. (2) INSPECTION OF CONTRACTOR INSTALLED MAINS AND SERVICES. (3) CONSTRUCTION OF TEMPORARY SERVICES IF NECESSARY. AN ESTIMATE WILL BE PROVIDED FOR THIS WORK AND PAYMENT IN THE AMOUNT OF THE ESTIMATE MUST BE RECEIVED BEFORE THE WORK CAN BE SCHEDULED. ALL OTHER WORK, INCLUDING EXCAVATION, RESTORATION, CUTOFFS, AND PIPEWORK TO BE PERFORMED BY THE CONTRACTOR.
37. SANITARY AND/OR STORM SEWER SERVICE PASSING WITHIN 10 FEET OF THE BUILDING ARE GOVERNED BY THE MN PLUMBING CODE. SPECIFICATION FOR PIPE MATERIAL SELECTION AND NOTES FOR REQUIRED AIR TEST OF THE PIPING, COMPLIANT WITH THE MN STATE PLUMBING CODE, MUST BE SHOWN ON THE PLAN. IF UNDERGROUND INFILTRATION SYSTEM IS WITHIN 10 FEET, PROVIDE PLUMBING INSPECTOR APPROVAL.
38. SUBMIT MANHOLE SHOP DRAWINGS FOR REVIEW. THE SHOP DRAWINGS NEED TO BE SUBMITTED/APPROVED PRIOR TO ISSUING CONNECTION PERMITS.
39. ALL STORMWATER PIPING CONNECTIONS INSTALLED BWETEEN THE BUILDING AND THE STORM WATER RETENTION SYSTEM SHALL BE INSPECTED END TESTED PRIOR TO BACK FILLING. CONTACT THE DEPARTMENT OF SAFETY AND INSPECTIONS AT (651) 266-9009 TO SCHEDULE AN INSPECTION WITH THE AREA PLUMBING INSPECTOR.

DEMOLITION AND REMOVAL NOTES:

1. CONTRACTOR SHALL FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.
2. PRIOR TO START OF ANY CONSTRUCTION ACTIVITY, ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED BY THE CONTRACTOR AND INSPECTED BY THE CITY OF ST. PAUL AND CAPITOL REGION WATERSHED DISTRICT. PERIMETER SEDIMENT PROTECTION SHALL BE INSTALLED ALONG THE CONTOUR.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ASCERTAIN THE LOCATION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION AND MARK ALL EXISTING UTILITIES 48 HOURS BEFORE CONSTRUCTION STARTS. THE ENGINEER, ARCHITECT, OR OWNER DOES NOT GUARANTEE THAT ALL THE UTILITIES ARE MAPPED, OR, IF MAPPED, ARE SHOWN CORRECTLY. CONTACT GOPHER STATE ONE CALL AT 651-454-0002 FOR FIELD LOCATING EXISTING UTILITIES. CONTACT UTILITY OWNER IF DAMAGE OCCURS DUE TO CONSTRUCTION.
4. THERE MAY BE MISCELLANEOUS ITEMS TO BE REMOVED THAT ARE NOT IDENTIFIED ON THESE PLANS. THE CONTRACTOR SHALL VISIT THE SITE AND REVIEW THE DOCUMENTS TO OBTAIN A CLEAR UNDERSTANDING OF THE INTENDED SCOPE OF WORK.
5. REMOVE ALL GAS AND ELECTRIC LINES UNDER PROPOSED BUILDING FOOTPRINT. COORDINATE DISCONNECTION OF EACH UTILITY WITH THE UTILITY OWNER.
6. ANY UTILITIES NOT INDICATED FOR REMOVAL OR ABANDONMENT ARE TO BE PROTECTED AT ALL TIMES.
7. EXISTING CONCRETE PAVEMENT AND CURB AND GUTTER SHOWN TO BE REMOVED WITHIN THE SCOPE OF THE PROJECT SHALL BE REMOVED FROM THE SAW



1 GRADING, DRAINAGE, AND EROSION CONTROL PLAN
C300 1" = 30'

EROSION CONTROL NOTES:

1. ALL EROSION CONTROL FACILITIES SHALL BE INSTALLED PRIOR TO ANY SITE GRADING OPERATIONS. THE CITY ENGINEERING DEPARTMENT **AND CAPITOL REGION WATERSHED DISTRICT** MUST BE NOTIFIED UPON COMPLETION OF THE INSTALLATION OF THE REQUIRED EROSION CONTROL FACILITIES AND PRIOR TO ANY GRADING OPERATION BEING COMMENCED. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING A PRE-CONSTRUCTION GRADING MEETING ON-SITE WITH THE CITY **AND CAPITOL REGION WATERSHED DISTRICT**. IF DAMAGED OR REMOVED DURING CONSTRUCTION, ALL EROSION CONTROL FACILITIES SHALL BE RESTORED AND IN PLACE AT THE END OF EACH DAY.
2. ANY EROSION CONTROL FACILITIES DEEMED NECESSARY BY THE CITY **OR CAPITOL REGION WATERSHED DISTRICT**, BEFORE, DURING, OR AFTER THE GRADING ACTIVITIES, SHALL BE INSTALLED AT THEIR REQUEST.
3. NO DEVIATIONS SHALL BE MADE FROM THE ELEVATIONS SHOWN ON THE APPROVED GRADING PLAN WITHOUT PRIOR APPROVAL FROM THE CIVIL ENGINEER.
4. FOR SITES GREATER THAN 1.0 ACRE, AS REQUIRED BY THE MPCA PERMIT REQUIREMENTS, THE PERMIT APPLICANT MUST KEEP AN EROSION CONTROL INSPECTION LOG. INSPECTION MUST BE MADE ONCE EVERY SEVEN DAYS AND WITHIN 24 HOURS AFTER EVERY RAIN EVENT. THE INSPECTION RECORD MUST BE MADE AVAILABLE TO THE CITY **AND CAPITOL REGION WATERSHED DISTRICT** WITHIN 24 HOURS OF REQUEST.
5. FLOWS FROM DIVERSION CHANNELS OR PIPES (TEMPORARY OR PERMANENT) SHALL BE ROUTED TO SEDIMENTATION BASINS OR APPROPRIATE ENERGY DISSIPATERS TO PREVENT TRANSPORT OF SEDIMENT TO OUTFLOW TO LATERAL CONVEYORS AND TO PREVENT EROSION AND SEDIMENTATION WHEN RUNOFF FLOWS INTO THESE CONVEYORS.
6. SITE ACCESS ROADS SHALL BE GRADED OR OTHERWISE PROTECTED WITH SILT FENCES, DIVERSION CHANNELS, OR DIKES AND PIPES TO PREVENT SEDIMENT FROM EXITING THE SITE VIA THE ACCESS ROADS. SITE-ACCESS ROADS/DRIVEWAYS SHALL BE SURFACED WITH CRUSHED ROCK WHERE THEY ADJOIN EXISTING PAVED ROADWAYS.
7. SOILS TRACKED FROM THE SITE BY MOTOR VEHICLES OR EQUIPMENT SHALL BE CLEANED DAILY FROM PAVED ROADWAY SURFACES, OR MORE FREQUENTLY IF REQUESTED BY THE CITY **OR CAPITOL REGION WATERSHED DISTRICT,** THROUGHOUT THE DURATION OF CONSTRUCTION.
8. DUST CONTROL MEASURES SHALL BE PERFORMED PERIODICALLY WHEN CONDITIONS REQUIRE AND/OR AS DIRECTED BY THE CITY **OR CAPITOL REGION WATERSHED DISTRICT.**
9. ALL EROSION CONTROL MEASURES SHALL BE USED AND MAINTAINED FOR THE DURATION OF SITE CONSTRUCTION. IF CONSTRUCTION OPERATIONS OR NATURAL EVENTS DAMAGE OR INTERFERE WITH THESE EROSION CONTROL MEASURES, THEY SHALL BE RESTORED TO SERVE THEIR INTENDED FUNCTION AT THE END OF EACH DAY OR AS SOON AS FIELD CONDITIONS ALLOW ACCESS.
10. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED AS SOON AS POSSIBLE. ANY AREAS WHICH HAVE BEEN FINISHED GRADED OR AREAS THAT HAVE BEEN DISTURBED AND FOR WHICH GRADING OR SITE BUILDING CONSTRUCTION OPERATIONS ARE NOT ACTIVELY UNDERWAY SHALL BE SEEDED AND MULCHED AS SET FORTH IN THE FOLLOWING PARAGRAPHS WITHIN 7 DAYS:
    - A. ALL SEEDED AREAS SHALL BE EITHER MULCHED AND DISC-ANCHORED OR COVERED BY FIBROUS BLANKETS TO PROTECT SEEDS AND LIMIT EROSION. TEMPORARY STRAW MULCH SHALL BE DISC-ANCHORED AND APPLIED AT A UNIFORM RATE OF NOT LESS THAN TWO TONS PER ACRE AND NOT LESS THAN 80% COVERAGE.
    - B. IF THE GRADED AREA IS ANTICIPATED TO BE RE-DISTURBED/DEVELOPED WITHIN SIX MONTHS, PROVIDE A TEMPORARY VEGETATIVE COVER CONSISTING OF MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) SEED MIXTURE 21-111 (OATS), OR 21-112 (WINTER WHEAT), AT A RATE OF 100 POUNDS PER ACRE.
    - C. IF GRADED AREA WILL NOT BE DEVELOPED FOR A PERIOD GREATER THAN SIX MONTHS, PROVIDE A SEMI-PERMANENT VEGETATIVE COVER OF SEED MIXTURE MNDOT 22-112 AT A RATE OF 40 POUNDS PER ACRE.
    - D. GRADING BONDS OR THE EQUIVALENT SECURITIES SHALL BE RETAINED UNTIL TURF HAS GERMINATED AND SURVIVED A 60-DAY GROWING PERIOD.
    - E. UNLESS SPECIFIED ELSEWHERE WITHIN THE CONSTRUCTION DOCUMENTS **(I.E. ARCHITECTURAL SITE PLAN OR LANDSCAPE PLAN)**, PERMANENT TURF RESTORATION SHALL CONSIST OF **MN/DOT SEED MIXTURE 25-131 (COMMERCIAL TURF GRASS) AT A RATE OF 220 POUNDS PER ACRE.**
    - F. WHENEVER OTHER EROSION AND SEDIMENT CONTROL PRACTICES ARE INADEQUATE, TEMPORARY ON-SITE SEDIMENT BASINS THAT CONFORM TO THE CRITERIA FOR ON-SITE DETENTION BASINS SHALL BE PROVIDED.
    - G. MULCH, HYDROMULCH, AND TACKIFIERS MAY NOT BE USED FOR STABILIZATION IN SWALES OR DRAINAGE DITCHES UNLESS THE LONGITUDINAL SLOPE IS LESS THAN 2 PERCENT.
    - H. RUNOFF SHALL BE PREVENTED FROM ENTERING ALL STORM SEWER CATCH BASINS PROVIDING THEY ARE NOT NEEDED DURING CONSTRUCTION. WHERE STORM SEWER CATCH BASINS ARE NECESSARY FOR SITE DRAINAGE DURING CONSTRUCTION, SEDIMENT PROTECTION DEVICES AS DETAILED SHALL BE INSTALLED AND MAINTAINED AROUND ALL CATCH BASINS UNTIL THE TRIBUTARY AREA TO THE CATCH BASIN IS RESTORED.
11. GRADING ACTIVITIES PROPOSED TO BEGIN AFTER OCTOBER 15 WILL REQUIRE AN APPROVED PHASING SCHEDULE. THE AREA OF LAND THAT THE CITY WILL ALLOW TO BE DISTURBED AT THIS TIME OF YEAR WILL BE SEVERELY LIMITED. THE CITY WILL ALSO REQUIRE ADDITIONAL EROSION CONTROL DEVICES, I.E., TEMPORARY SEDIMENT BASINS, DORMANT SEEDING AND HIGH RATES OF APPLICATION OF BOTH SEED AND MULCH.
12. FILTER BLANKET AND RIPRAP SHALL BE INSTALLED ON THE DOWNSTREAM SIDES OF ALL STORM SEWER OUTLETS WITHIN 24 HOURS AFTER CONSTRUCTION AS INDICATED AND DETAILED. ALL RIPRAP SHALL BE INSTALLED WITH A FILTER MATERIAL MEETING THE MNDOT SPECIFICATIONS FOR RIPRAP AND FILTER MATERIAL.
13. TO MINIMIZE EROSION, ALL 3:1 SLOPES SHALL BE COVERED WITH A MN/DOT 3885 CATEGORY 20 STRAW EROSION CONTROL BLANKETS OR STAKED SOD.
14. ACCUMULATION OF ALL SEDIMENT OCCURRING IN STORM SEWERS AND CURB LINE SHALL BE REMOVED PRIOR TO, DURING, AND AFTER COMPLETION OF GRADING ACTIVITIES.
15. EROSION CONTROL ITEMS AND DEVICES SHALL BE REMOVED ONLY AFTER THE AREA HAS RECEIVED FINAL STABILIZATION OR AS DIRECTED BY THE CITY **AND/OR CAPITOL REGION WATERSHED DISTRICT.**

GRADING NOTES:

1. THE CONTRACTOR SHALL VISIT THE SITE, REVIEW ALL CONSTRUCTION DOCUMENTS, AND FIELD VERIFY THE EXISTING CONDITIONS PRIOR TO BIDDING. NO ADDITIONAL COMPENSATION WILL BE GIVEN FOR WORK THAT COULD HAVE BEEN IDENTIFIED BY A SITE VISIT OR CONSTRUCTION DOCUMENT REVIEW.
2. THE BACKGROUND INFORMATION WAS PREPARED BY CIVIL SITE GROUP, (612) 615-0060.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ASCERTAIN THE LOCATION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION AND MARK ALL EXISTING UTILITIES 48 HOURS BEFORE CONSTRUCTION STARTS. THE ENGINEER, ARCHITECT, OR OWNER DOES NOT GUARANTEE THAT ALL THE UTILITIES ARE MAPPED, OR, IF MAPPED, ARE SHOWN CORRECTLY. CONTACT GOPHER STATE ONE CALL AT 651-454-0002 FOR FIELD LOCATING EXISTING UTILITIES. CONTACT UTILITY OWNER IF DAMAGE OCCURS DUE TO CONSTRUCTION.
4. PROTECT ALL EXISTING STRUCTURES AND UTILITIES WHICH ARE NOT SCHEDULED FOR REMOVAL.
5. NOTIFY CITY BUILDING INSPECTOR BEFORE TRENCHING AND EXCAVATION WORK COMMENCES. THE CONTRACTOR SHALL OBTAIN ALL APPLICABLE PERMITS PRIOR TO START OF CONSTRUCTION.
6. ALL SPOT ELEVATIONS SHOWN AS 88.30, FOR EXAMPLE, ARE TO BE UNDERSTOOD TO MEAN 788.30.
7. ALL SPOT ELEVATIONS ALONG THE CURB-LINE INDICATE THE ELEVATION OF THE GUTTER UNLESS NOTED OTHERWISE.
8. NO LANDSCAPED SLOPES ARE TO EXCEED 3:1 (3 FEET HORIZONTAL TO 1 FOOT VERTICAL) UNLESS NOTED OTHERWISE.
9. ACCESSIBLE PARKING AREAS SHALL NOT HAVE SLOPES IN ANY DIRECTION THAT EXCEED 2%.
10. PROVIDE POSITIVE DRAINAGE FROM BUILDINGS AT ALL TIMES.
11. **UPON COMPLETION OF THE GRADING AND UTILITY WORK, THE CONTRACTOR SHALL CERTIFY THAT ALL GRADING AND UTILITY WORK WAS PERFORMED IN ACCORDANCE WITH THE APPROVED GRADING AND UTILITY PERMITS. AN AS-BUILT GRADING AND UTILITY PLAN FOR THE STORMWATER BASIN SHALL BE PERFORMED BY A REGISTERED LAND SURVEYOR HIRED BY THE CONTRACTOR. SURVEY SHALL BE PROVIDED TO CAPITOL REGION WATERSHED DISTRICT AND CIVIL ENGINEER.**
12. PRIOR TO ISSUANCE OF BUILDING PERMITS, ALL NECESSARY EROSION CONTROL DEVICES MUST BE IN PLACE AND FUNCTIONING. THE CITY **AND CAPITOL REGION WATERSHED DISTRICT** WILL INSPECT THE SITE TO DETERMINE IT'S SUITABILITY FOR BUILDING ACTIVITIES. IF THE PUBLIC UTILITIES HAVE NOT BEEN INSTALLED AT THIS POINT, IT MAY BE NECESSARY TO WITHHOLD BUILDING PERMITS FOR VARIOUS LOTS TO ALLOW THE CONTRACTOR ADEQUATE SPACE TO PERFORM THIS WORK.
13. ALL DEBRIS CREATED IN THE PROCESS OF CLEARING AND GRADING THE SITE SHALL BE REMOVED FROM THE SITE. THIS INCLUDES TREES AND SHRUBS. UNDER NO CIRCUMSTANCES SHALL THIS TYPE OF MATERIAL BE BURIED OR BURNED ON THE SITE.
14. THE CONTRACTOR MAY STRIP AND SALVAGE TOPSOIL FOR POTENTIAL RE-SPREADING ON THE SITE, IF APPROVED BY THE LANDSCAPE ARCHITECT AND/OR SPECIFICATIONS. SIX INCHES OF TOPSOIL - AFTER COMPACTION - SHALL BE RE-SPREAD PRIOR TO SEEDING AND MULCHING. EXCESS TOPSOIL MAY BE REMOVED FROM THE SITE PROVIDED THERE IS ADEQUATE TOPSOIL REMAINING TO PROPERLY FINISH THE SITE AS NOTED ABOVE. THE TOPSOIL STRIPPING, STOCKPILING, AND RE-SPREADING SHALL BE DONE IN ACCORDANCE WITH, AND NOTED ON, THE APPROVED GRADING PLAN AND SPECIFICATIONS. THE CONTRACTOR SHALL REFER TO THE LANDSCAPE DRAWINGS AND SPECIFICATIONS FOR ANY SPECIAL TOPSOIL OR PLANTING REQUIREMENTS.
15. ALL GRADING OPERATIONS SHALL BE CONDUCTED IN A MANNER TO MINIMIZE THE POTENTIAL FOR SITE EROSION. EROSION CONTROL MEASURES SHALL BE INSTALLED TO PREVENT SEDIMENT FROM RUNNING OFF ONTO ADJACENT PROPERTIES. ANY DAMAGE TO ADJACENT PROPERTIES MUST BE CORRECTED AND RESTORED AS SOON AS PERMISSION IS GRANTED FROM THE ADJACENT PROPERTY OWNER(S).
16. IF CONSTRUCTION OF THE SITE WORK PROCEEDS THROUGH THE WINTER MONTHS, ANY DISTURBED AREAS OUTSIDE THE BUILDING FOOTPRINTS ARE TO BE MINIMALLY STABILIZED PRIOR TO MARCH 1 AS FOLLOWS: AREAS PLANNED TO RECEIVE PAVEMENTS ARE TO HAVE CLASS 5 BASE INSTALLED; ALL OTHER DISTURBED AREAS ARE TO BE SEEDED, STRAW MULCH PLACED, AND DISC-ANCHORED.
17. WINTER MULCHING:
    - 17.A. SNOW MULCHING SHALL BE DEFINED AS MULCH MATERIAL SPREAD OVER THE TOP OF SNOW SO THAT THE MULCH MELTS THROUGH THE SNOW AND STICKS TO THE EXPOSED SOILS.
    - 17.B. FROZEN GROUND MULCHING SHALL BE DEFINED AS MULCH MATERIAL SPREAD OVER FROZEN GROUND. MULCH MATERIALS THAT DO NOT REQUIRE DISC-ANCHORING INTO THE SOIL MAY BE PLACED WITHOUT MODIFICATION. MULCH MATERIALS THAT REQUIRE DISC-ANCHORING MAY BE ANCHORED WITH HYDRAULIC SOIL STABILIZERS OR MAY BE FROZEN TO THE SOIL BY APPLYING WATER AT A RATE OF 2000 GALLONS PER ACRE OVER THE MULCH AS A SUBSTITUTION FOR DISC-ANCHORING.
18. THE CONTRACTOR SHALL LIMIT THE DISTURBED AREA AS MUCH AS POSSIBLE.

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

1. INSTALL ROCK CONSTRUCTION ENTRANCE. REFER TO DETAIL 1/C500.
2. INSTALL PERIMETER EROSION CONTROL. REFER TO DETAILS 2/C500 AND 3/C500.
3. INSTALL INLET SEDIMENT PROTECTION. REFER TO DETAIL 4/C500.
4. APPROXIMATE LOCATION OF TEMPORARY CONTAINED CONCRETE WASH OUT BIN. REFER TO THE MINNESOTA'S NPDES/SDS GENERAL STORMWATER PERMIT FOR CONSTRUCTION ACTIVITY FOR MORE DETAILS. SELF CONTAINED CONCRETE WASHOUTS ON CONCRETE DELIVERY TRUCKS IS AN ACCEPTABLE ALTERNATIVE TO ON-SITE CONTAINMENT.
5. BIOFILTRATION BASIN AND WATER QUALITY TREATMENT POND(S) ARE TO BE CONSTRUCTED AT THE END OF GRADING OPERATIONS ONCE THE TRIBUTARY AREA'S FINAL STABILIZATION HAS BEEN INSTALLED. REFER TO DETAIL 1/C501 FOR BIOFILTRATION BASIN CROSS SECTION. **CONSTRUCTION TRAFFIC IN FILTRATION AREA(S) IS NOT ALLOWED AFTER AREA HAS BEEN EXCAVATED. PRIOR TO FINAL STABILIZATION, LOOSEN SOIL WITH MECHANICAL TILLER. FILTRATION AREA(S) ARE NOT APPROVED BORROW SITES AND ARE NOT TO BE USED FOR TEMPORARY SEDIMENT BASIN(S) ONCE BASIN(S) SUBGRADE ELEVATION HAS BEEN EXCAVATED. CONTRACTOR SHALL ENSURE THAT BASIN(S) FILTRATE AT A MINIMUM RATE OF 1-INCH PER HOUR USING A DOUBLE RING INFILTROMETER TEST BEFORE FINAL ACCEPTANCE. DOUBLE RING INFILTROMETER TEST SHALL BE SIGNED BY A REGISTERED GEOTECHNICAL ENGINEER AND SUBMITTED TO THE CITY AND ENGINEER FOR REVIEW BEFORE FINAL APPROVAL.**
6. INSTALL MN/DOT 3885 CATEGORY 20 TEMPORARY STRAW FIBER EROSION CONTROL BLANKET.

PROPOSED PLAN SYMBOLS

- CONSTRUCTION LIMITS
- SILTATION FENCE
- SEDIMENT CONTROL LOG
- PROPERTY LINE
- SAWCUT LINE (APPROX.)
- PROPOSED CONTOUR (787)
- DRAIN TILE
- STORM SEWER
- CATCH BASIN
- MANHOLE
- EROSION CONTROL BLANKET (TEMPORARY)
- ROCK CONSTRUCTION ENTRANCE
- SPOT ELEVATION (87.50)
- SOIL BORING SB-1
- CONCRETE WASHOUT AREA (CONCRETE WASHOUT SIGN)

*NOTE: CONSTRUCTION LIMITS ARE ANTICIPATED TO BE PROPERTY LINE UNLESS OTHERWISE SHOWN.

ABBREVIATIONS

BLDG	Building
BM	Benchmark
BS	Bottom of Step
BW	Bottom of Wall
CB	Catch Basin
CONC	Concrete
ELEV	Elevation
EX	Existing
FFE	Finished Floor Elevation
HWL	High Water Level
INV	Invert
LFE	Lower Floor Elevation
MAX	Maximum
MH	Manhole
MIN	Minimum
NWL	Normal Water Level
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe
STRM	Storm Sewer Structure
TC	Top of Curb
TS	Top of Step
TW	Top of Wall
W.O.	Washout
WQE	Water Quality Elevation

APPROXIMATE DISTURBED AREA IS 1.20 ACRES

NOTE:
STORM SEWER INLETS NOT SHOWN ON PLAN MAY RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. INSTALL INLET SEDIMENT PROTECTION PER DETAIL 4/C500 ON ALL STORM INLETS THAT MAY RECEIVE RUNOFF.

WALKWAY NOTES:

1. GRADING CONTRACTOR IS TO COORDINATE WITH PAVING CONTRACTOR SO THAT ALL WALKS AND LANDINGS ARE SLOPED PER CODE.
2. ALL SIDEWALK LONGITUDINAL AND TRANSVERSE SLOPES ARE TO BE PER CODE.

N

30' 15' 0 30' 60'

SCALE 1" = 30'

ST. PAUL'S NOTES:

1. INSPECTION CONTACT: THE DEVELOPER SHALL CONTACT THE RIGHT OF WAY INSPECTOR **DAN BRADY AT (651) 485-4398** (TWO WEEK PRIOR TO BEGINNING WORK) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY AND COORDINATION OF ALL WORK IN THE PUBLIC RIGHT OF WAY. NOTE: IF A TWO WEEK NOTICE IS NOT PROVIDED TO THE CITY, ANY RESULTING DELAYS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. SAFE WORK SITE REQUIREMENTS: THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD REQUIREMENTS FOR WORK IN THE PUBLIC RIGHT OF WAY.
3. NO PRIVATE FACILITIES IN THE RIGHT OF WAY: THE DEVELOPER IS STRICTLY PROHIBITED FROM INSTALLING PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES AND/OR LIGHTING IN THE CITY'S RIGHT OF WAY. THIS INCLUDES STUBBING CONDUIT OR CABLE INTO THE PUBLIC RIGHT OF WAY TO ACCOMMODATE UTILITY FEEDS TO THE SITE. COORDINATE WITH EACH UTILITY PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. UTILITIES ARE RESPONSIBLE FOR SECURING EXCAVATION PERMITS TO RUN THEIR SERVICE INTO A SITE, AND (WHERE REQUIRED) SUBMITTING PLANS FOR REVIEW BY THE PUBLIC WORKS UTILITY REVIEW COMMITTEE.
4. CITY OF ST. PAUL PERMIT REQUIREMENTS:
    - 4.1. ORDERING OBSTRUCTION AND EXCAVATION PERMITS: CONTACT **PUBLIC WORKS RIGHT OF WAY SERVICE DESK AT (651) 266-6151. IT IS STRONGLY RECOMMENDED THAT CONTRACTORS CALL FOR COST ESTIMATES PRIOR TO BIDDING TO OBTAIN ACCURATE COST ESTIMATES.**
    - 4.2. OBSTRUCTION PERMITS: THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION PERMIT IF CONSTRUCTION (INCLUDING SILT FENCES) WILL BLOCK CITY STREETS, SIDEWALKS OR ALLEYS, OR IF DRIVING OVER CURBS.
    - 4.3. EXCAVATION PERMITS: ALL DIGGING IN THE PUBLIC RIGHT OF WAY REQUIRES AN EXCAVATION PERMIT. IF THE PROPOSED BUILDING IS CLOSE TO THE RIGHT OF WAY, AND EXCAVATING INTO THE RIGHT OF WAY IS NEEDED TO FACILITATE CONSTRUCTION, CONTACT THE UTILITY INSPECTOR.
    - 4.4. FAILURE TO SECURE PERMITS: FAILURE TO SECURE OBSTRUCTION PERMITS OR EXCAVATION PERMITS WILL RESULT IN A DOUBLE-PERMIT FEE AND OTHER FEES REQUIRED UNDER CITY OF ST. PAUL LEGISLATIVE CODES.
    - 4.5. REQUIREMENTS TO WORK IN THE PUBLIC RIGHT OF WAY: ALL UTILITIES AND CONTRACTORS WORKING IN THE PUBLIC RIGHT OF WAY MUST TO BE REGISTERED, INSURED AND BONDED, AS RECOGNIZED BY THE **PUBLIC WORKS SERVICE DESK. (651) 266-6151**.
5. ALL WORK ON CURBS, DRIVEWAYS, AND SIDEWALKS WITHIN THE PUBLIC RIGHT OF WAY MUST BE DONE BY A LICENSED AND BONDED CONTRACTOR UNDER A PERMIT FROM **PUBLIC WORKS SIDEWALK SECTION (651) 266-9700.** SIDEWALK GRADES MUST BE CARRIED ACROSS DRIVEWAYS.
6. RESTORATION OF ASPHALT AND CONCRETE PAVEMENTS ARE PERFORMED BY THE PUBLIC WORKS STREET MAINTENANCE DIVISION. THE CONTRACTOR IS RESPONSIBLE FOR PAYMENT TO THE CITY FOR THE COST OF THESE RESTORATIONS. THE CONTRACTOR SHALL **CONTACT PUBLIC WORKS STREET MAINTENANCE TO SET UP A WORK ORDER PRIOR TO BEGINNING ANY REMOVALS IN THE STREET AT (651) 266-9700.** PROCEDURES AND UNIT COSTS ARE FOUND IN STREET MAINTENANCE'S "GENERAL REQUIREMENTS - ALL RESTORATIONS" AND ARE AVAILABLE AT THE PERMIT OFFICE.
7. SIGNS REGULATING PARKING AND/OR TRAFFIC ON PRIVATE PROPERTY (OUTSIDE OF THE PUBLIC RIGHT- OF-WAY ROW) SHALL BE FURNISHED AND INSTALLED BY THE PROPERTY OWNER OR CONTRACTOR AT NO COST TO THE CITY OF ST. PAUL DEPARTMENT OF PUBLIC WORKS. REMOVAL OF EXISTING SIGNS WITHIN THE PUBLIC ROW THAT REGULATE TRAFFIC AND OR PARKING SHALL BE COMPLETED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. NEW SIGNS OR THE REINSTALLATION OF EXISTING SIGNS, AS APPROVED BY PUBLIC WORKS TRAFFIC ENGINEERING, REGULATING PARKING AND/OR TRAFFIC IN THE PUBLIC ROW SHALL BE FURNISHED AND INSTALLED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. ALL EQUIPMENT, MATERIALS, AND LABOR COSTS ASSOCIATED WITH THE CITY AFFECTING A COMPLETE SIGN INSTALLATION SHALL BE THE RESPONSIBILITY OF THE DEVELOPMENT. CONTACT CHRIS GULDEN OF PUBLIC WORKS 651-266-9778 TWO WEEKS IN ADVANCE OF NEEDED SIGN WORK.
8. SEWER REMOVAL/ABANDONMENT PERMIT: LICENSE HOUSE DRAIN CONTRACTOR TO OBTAIN REMOVAL PERMITS FROM PUBLIC WORKS TO CUT OFF EXISTING SEWER CONNECTIONS SERVICES TO THE MAIN LINE. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
9. SEWER CONNECTION PERMIT: PLUMBING CONTRACTOR TO OBTAIN (SEWER CONNECTION PERMIT) TO CONSTRUCT NEW SANITARY AND STORM CONNECTION IN STREET FROM MAIN TO THE PROPERTY. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
10. ALL WATER MAIN AND SERVICES TO BE INSTALLED ACCORDING TO 'SPRWS STANDARDS FOR INSTALLATION OF WATER MAINS', AND 'SPRWS WATER CODE'.
11. SERVICES THAT ARE TO BECOME UNUSED UPON COMPLETION OF THE NEW SERVICE CONNECTION MUST BE CUT OFF BY THE CONTRACTOR AT THE MAIN PRIOR TO THE TURN ON OF THE NEW SERVICES. EXCAVATION AND RESTORATION BY CONTRACTOR.
12. THE CONTRACTOR SHALL CONTACT **MIKE LUSIAN, GENERAL FOREMAN, LIGHTING - SIGNAL MAINTENANCE, (651-266-9780),** IF REMOVAL OR RELOCATION OF EXISTING FACILITIES IS REQUIRED OR IN THE EVENT OF DAMAGE TO THE LIGHTING OR SIGNAL UTILITIES. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY (AND RELATED COSTS) FOR ANY DAMAGE OR RELOCATIONS. .
    - 12.1 THE INSTALLATION OF PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES AND/OR LIGHTING IS STRICTLY PROHIBITED IN THE CITY'S ROW (RIGHT OF WAY).
13. CONTRACTOR IS TO CONTACT **SAINT PAUL CITY FORESTER (651) 632-2436** PRIOR TO IMPACTING ANY BOULEVARD TREES.
    - 13.1 EXISTING PUBLIC PROPERTY TREES ARE TO BE PROTECTED AT ALL TIMES. PUBLIC TREES DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE RESTORED OR REPLACED TO THE SATISFACTION OF, AND AT NO COST TO THE CITY AS DETERMINED BY THE CITY FORESTRY MANAGER. THE CONTRACTOR IS ADVISED TO DOCUMENT PRE-EXISTING CONDITIONS OF PUBLIC TREES AS WELL AS THE SURROUNDING BOULEVARD PRIOR TO CONSTRUCTION ACTIVITIES.
    - 13.2 THE REMOVAL, PRUNING, AND/OR PLANTING OF TREES ON PUBLIC PROPERTY REQUIRES AN APPROVED FORESTRY TREE WORK PERMIT FROM THE CITY FORESTER (651-632-2436). ANY WORK MUST BE COMPLETED BY A LICENSED TREE CONTRACTOR.
    - 13.3 PUBLIC PROPERTY TREES SHALL BE PROTECTED BY ESTABLISHING A TREE PROTECTION ZONE USING A 4' TALL FENCING INSTALLED AT THE DRIP LINE OF THE TREE. TREE PROTECTION FENCING SHALL BE INSTALLED PRIOR TO THE START OF ANY SITE WORK AND MAINTAINED FOR THE DURATION OF THE PROJECT. PROPOSED WORK WITHIN, OR CHANGES TO THE LOCATION OF TREE PROTECTION FENCING SHALL BE REVIEWED BY THE CITY FORESTER PRIOR TO ALTERATION.
    - 13.4 CONSTRUCTION SUPPLIES, MATERIALS, SPOILS, EQUIPMENT, AND VEHICLES SHALL NOT BE STORED OR OPERATED WITHIN THE DRIP LINE OF ANY PUBLIC TREE OR WITHIN TREE PAVER AREA OF BOULEVARD WITHOUT PRIOR WRITTEN APPROVAL FROM THE CITY FORESTER. IF THE BOULEVARD MUST BE USED FOR CONSTRUCTION ACTIVITIES, SITE ACCESS ROUTES, MATERIAL STORAGE, OR OTHER RELATED ACTIVITIES, PROTECTIVE MEASURES APPROVED BY THE CITY SHALL BE TAKEN TO REDUCE SOIL COMPACTION AND DAMAGE TO PUBLIC TREES.
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17. PIPE MUST BE MECHANICAL JOINT UNDERNEATH THE BUILDING FOOTPRINT AND UP TO TEN FEET OUTSIDE OF THE BUILDING FOOTPRINT.
18. A FOUR-SIDED TRENCH BOX IS REQUIRED ON ALL EXCAVATIONS DEEPER THAN 5 FEET WHERE UNDERGROUND WORK OR INSPECTION IS TO BE PERFORMED BY SPRWS. FOR ALL WET TAPS TO BE PERFORMED BY SPRWS, A MINIMUM TRENCH BOX SIZE OF 8 FEET HIGH X 8 FEET WIDE X 10 FEET LONG IS REQUIRED. LADDERS ARE REQUIRED AND MUST EXTEND 3 FEET ABOVE THE SURFACE OF THE TRENCH. SIDEWALKS, PAVEMENTS, DUCTS AND APPURTENANT STRUCTURES SHALL NOT BE UNDERMINED UNLESS A SUPPORT SYSTEM OR ANOTHER METHOD OF PROTECTION IS PROVIDED. TRENCHES IN EXCESS OF 20 FEET IN DEPTH MUST BE SIGNED OFF BY A REGISTERED PROFESSIONAL ENGINEER. EXCAVATED MATERIAL MUST BE KEPT A MINIMUM OF 2 FEET FROM THE EDGE OF THE TRENCH.
19. SERVICE CONNECTIONS SHALL BE INSTALLED WITH 8 FEET OF COVER AS PER THE ESTABLISHED GRADE FROM THE MAIN TO THE PROPERTY LINE OR, IF APPLICABLE, TO THE UTILITY EASEMENT LINE. WHEN SOLID ROCK CONDITIONS ARE ENCOUNTERED, WATER SERVICES MAY BE INSTALLED WITH 6.5 FEET OF COVER. AT THIS DEPTH, THE NEED FOR INSULATION WILL BE DETERMINED BY SPRWS INSPECTORS
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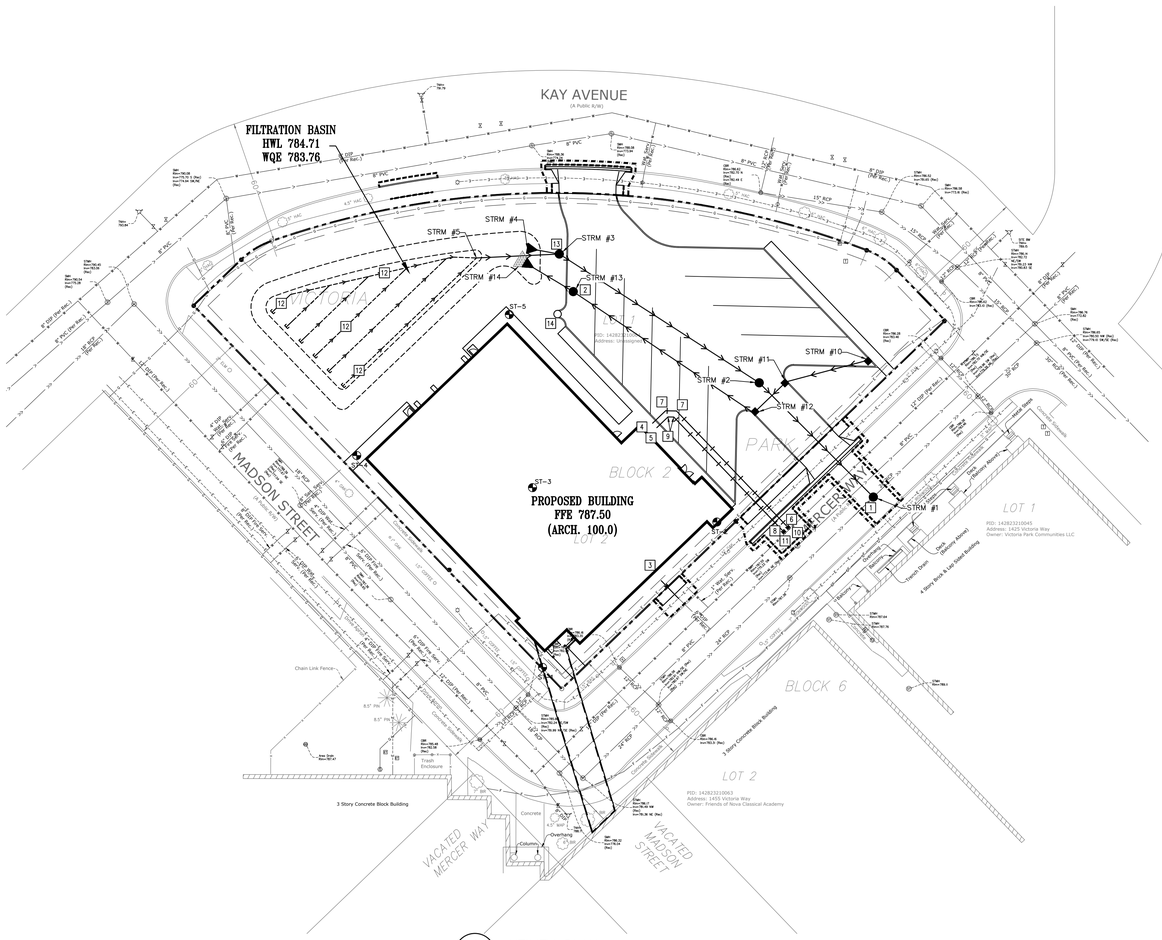
21. MAINTAIN 3 FEET VERTICAL SEPARATION BETWEEN WATER AND SEWER PIPES OR A 18" SEPARATION WITH 4" OF INSULATION. WHERE A WATER SERVICE OR MAIN IS OFFSET OVER A STOR



1 C3.0 UTILITY PLAN
1"=30'

STORM SEWER TABLE					
STRUCTURE ID	STRUCTURE DIMENSION (INCHES)	NEENAH CASTING TYPE	RIM ELEVATION	INVERT ELEVATION(S)	PIPE LENGTH, DIAMETER, SLOPE & NEXT UPSTREAM STRUCTURE
STRM #1	48" MH	EX.	792.37	NE = 780.29 SW = 780.29 NW = 780.40	--------- --------- 79 L.F. OF 12" PVC @ 0.28%, STRM #2
STRM #2	48" MH	R-1678-A	787.77	SE = 780.62 NW = 780.62	--------- 116 L.F. OF 12" PVC @ 0.29%, STRM #3
STRM #3	48" MH	R-1678-A	787.73	SE = 780.96 W = 783.68 W = 780.96	--------- 16 L.F. OF 12" RCP @ 0.50%, STRM #4 41 L.F. OF 4" PVC @ 0.30%, STRM #5
STRM #4	12" FES	NA		E = 783.76	---------
STRM #5	DRAIN TILE CONNECTION	NA		E = 781.08	---------
STRM #10	24"x36" CB	R-3067	787.21	W = 784.37	---------
STRM #11	48" CB MH	R-3067	787.48	SW = 784.26 E = 784.26	--------- 42 L.F. OF 10" PVC @ 0.26%, STRM #10
STRM #12	48" CB MH	R-3067	787.68	NW = 784.20 NE = 784.20	--------- 22 L.F. OF 10" PVC @ 0.26%, STRM #11
STRM #13	48" SUMP MH	R-1678-A	786.90	NW = 783.87 SE = 783.87	--------- 106 L.F. OF 12" RCP @ 0.31%, STRM #12
STRM #14	12" FES	NA		SE = 783.77	28 L.F. OF 12" RCP @ 0.36%, STRM #13

UTILITY NOTES:

1. CONTRACTOR SHALL FOLLOW ALL CITY OF SAINT PAUL STANDARDS AND SPECIFICATIONS.
2. COORDINATE SERVICE CONNECTION LOCATIONS, SIZES, AND INVERTS AT THE BUILDING WITH THE MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION, NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR UNCOORDINATED WORK.
3. COORDINATE UTILITY INSTALLATION WITH STRUCTURAL PRIOR TO START OF CONSTRUCTION. UTILITIES SHALL NOT BE INSTALLED WITHIN THE ZONE OF INFLUENCE OF ANY STRUCTURAL ELEMENTS. NO ADDITIONAL COMPENSATION WILL BE PROVIDED FOR UNCOORDINATED WORK.
4. ALL SEWER SERVICE CONNECTIONS WITH LESS THAN 5 FEET OF COVER OVER THE TOP OF PIPE SHALL BE INSULATED. INSULATION SHALL BE INSTALLED FROM THE CONNECTION OF THE SERVICE AT THE BUILDING TO THE POINT WHICH THE SERVICE ATTAINS 5 FEET OF COVER. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FROM ARCHITECT OR ENGINEER PRIOR TO INSTALLATION OF INSULATION.
5. PROTECT ALL EXISTING STRUCTURES AND UTILITIES WHICH ARE NOT SCHEDULED TO BE REMOVED.
6. SANITARY SEWER PIPING SHALL BE DUCTILE IRON PIPE UNLESS NOTED OTHERWISE.
7. STORM SEWER PIPING SHALL BE REINFORCED CONCRETE PIPE (RCP), UNLESS NOTED OTHERWISE. ALL 12-INCH THROUGH 18-INCH RCP STORM SEWER PIPE SHALL BE CLASS 5. ALL STORM SEWER PIPE THAT IS EXTENDED TO THE BUILDING FOR ROOF DRAIN SERVICES SHALL BE ASTM D1785 OR ASTM D2665 SCHEDULE 40 PVC.
8. ALL FLARED END SECTIONS SHALL HAVE TRASH GUARDS. ALL DOWNSTREAM FLARED END SECTIONS SHALL HAVE GEOTEXTILE FABRIC AND RIPRAP PER MNDOT STANDARDS, AS DETAILED.
9. CONTRACTOR SHALL COORDINATE ALL WORK WITH GAS, ELECTRIC, TELEVISION, AND TELEPHONE COMPANIES PRIOR TO START OF CONSTRUCTION.
10. WHERE PROPOSED GRADE OVER EXISTING SMALL UTILITIES IS PROPOSED TO BE LOWERED, CONTRACTOR SHALL COORDINATE WITH UTILITY OWNER FOR THE LOWERING OF THE EXISTING UTILITY TO PROVIDE THE MINIMUM COVER REQUIRED AT NO ADDITIONAL COST TO THE OWNER.
11. ALL PORTIONS OF THE STORM AND SANITARY SEWER SYSTEMS LOCATED WITHIN 10-FEET OF THE BUILDING OR WATER SERVICE LINE SHALL BE AIR TESTED IN ACCORDANCE WITH MN PLUMBING CODE. PIPING MATERIAL SHALL BE ASTM D1785 OR ASTM D2665 SCHEDULE 40 PVC.
12. ALL JOINTS AND CONNECTIONS IN THE STORM SEWER SYSTEM SHALL BE GAS TIGHT OR WATER TIGHT IN ACCORDANCE TO MN PLUMBING CODE. APPROVED RESILIENT RUBBER JOINTS MUST BE USED TO MAKE WATER TIGHT CONNECTIONS TO MANHOLES, CATCH BASINS, AND OTHER STRUCTURES. RESILIENT WATER-STOP GROUTING RINGS ARE AN ACCEPTABLE ALTERNATIVE. CEMENT MORTAR JOINTS ARE PERMITTED ONLY FOR REPAIRS AND CONNECTIONS OF EXISTING LINES CONSTRUCTED WITH SUCH JOINTS.

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

1. CONTRACTOR SHALL INSTALL MANHOLE IN LINE WITH EXISTING 24-INCH RCP PIPE. APPROXIMATE INVERT OF EXISTING PIPE IS 780.29. PRIOR TO INSTALLATION OF MANHOLE, CONTRACTOR SHALL CONTACT CIVIL ENGINEER WITH EXACT INVERT ELEVATION.
2. INSTALL SUMP MANHOLE WITH SNOUT, ENVIROHOOD, OR APPROVED EQUAL. REFER TO DETAIL 6/C501.
3. CONNECT TO EXISTING SERVICE STUB AND INSTALL APPROXIMATELY 12-FEET OF 6-INCH DUCTILE IRON PIPE AT MINIMUM 2.0% SLOPE TO INVERT OF 782.00. STUB TO WITHIN 5-FEET OF PROPOSED BUILDING. **COORDINATE EXACT LOCATION, SIZE, AND INVERT ELEVATION WITH MECHANICAL CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.**
4. STUB 6-INCH FIRE PROTECTION LINE TO WITHIN 5-FEET OF THE PROPOSED BUILDING. TOP OF WATER SERVICE SHALL BE 8 FEET BELOW FINISHED GRADE AT THE PROPOSED CONNECTION POINT. COORDINATE EXACT LOCATION WITH MECHANICAL AND STRUCTURAL PLANS PRIOR TO THE START OF CONSTRUCTION.
5. STUB 4-INCH DOMESTIC WATERLINE TO WITHIN 5-FEET OF THE PROPOSED BUILDING. TOP OF WATER SERVICE SHALL BE 8 FEET BELOW FINISHED GRADE AT THE PROPOSED CONNECTION POINT. COORDINATE EXACT LOCATION WITH MECHANICAL AND STRUCTURAL PLANS PRIOR TO THE START OF CONSTRUCTION.
6. INSTALL 6-INCH GATE VALVE.
7. INSTALL 6-INCH 45-DEGREE BEND WITH THRUST BLOCKING.
8. INSTALL 4-INCH GATE VALVE.
9. INSTALL 4-INCH 45-DEGREE BEND WITH THRUST BLOCKING.
10. INSTALL 6-INCH WET TAP.
11. INSTALL 4-INCH WET TAP.
12. INSTALL FILTRATION BASIN DRAIN TILE. REFER TO DETAIL 1/C501.
13. INSTALL WEIR MANHOLE. REFER TO DETAIL 2/C501.
14. INSTALL RAIN GUARDIAN TURRET. REFER TO DETAIL 7/C502.

PROPOSED PLAN SYMBOLS

- CONSTRUCTION LIMITS
- PROPERTY LINE
- SAWCUT LINE (APPROX.)
- SANITARY SEWER
- WATER PIPE
- DRAIN TILE
- STORM SEWER
- GATE VALVE
- CATCH BASIN
- MANHOLE
- FLARED END SECTION
- FLARED END SECTION WITH RIPRAP

*NOTE: CONSTRUCTION LIMITS ARE ANTICIPATED TO BE PROPERTY LINE UNLESS OTHERWISE SHOWN.

NOTE:
THE CONTRACTOR IS RESPONSIBLE FOR AN AS-BUILT SURVEY OF ALL STORMWATER BMPS (FILTRATION BASIN, OUTLET STRUCTURES, DRAIN TILE, SUMP CATCH BASINS, ETC..). THE AS-BUILT SHALL BE SUBMITTED TO CAPITOL REGION WATERSHED DISTRICT PRIOR TO PROJECT CLOSEOUT. THE AS-BUILT SURVEY SHALL INCLUDE THE FILTRATION BASIN DRAIN TILE INVERTS AND LAYOUT FOR VERIFICATION THAT THE SYSTEM WAS INSTALLED PROPERLY AND THAT 23-INCHES OF SAND/FILTRATION MIX OVER THE TOP OF THE DRAIN TILE HAS BEEN PROVIDED.
THE OWNER'S SURETY MONEY FOR THE WATERSHED'S PERMIT WILL NOT BE RETURNED UNTIL THE CONTRACTOR PROVIDES THIS INFORMATION TO THE WATERSHED DISTRICT.

ABBREVIATIONS

BLDG	Building
BM	Benchmark
CB	Catch Basin
CONC	Concrete
DIP	Ductile Iron Pipe
ELEV	Elevation
EX	Existing
FFE	Finished Floor Elevation
HDPE	High Density Polyethylene
INV	Invert
MAX	Maximum
MH	Manhole
MIN	Minimum
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe
RD	Roof Drain
WQE	Water Quality Elevation

NOTE:
WHERE PROPOSED GRADE OVER EXISTING SMALL UTILITIES IS PROPOSED TO BE LOWERED, CONTRACTOR SHALL COORDINATE WITH UTILITY OWNER FOR THE LOWERING OF THE EXISTING UTILITY TO PROVIDE THE MINIMUM COVER REQUIRED AT NO ADDITIONAL COST TO THE OWNER.

NOTE:
PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL POTHOLE AND DETERMINE THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES. CONTACT CIVIL ENGINEER IF EXISTING UTILITIES TO REMAIN WILL BE IMPACTED BY PROPOSED WORK.

N

30' 15' 0 30' 60'

SCALE 1" = 30'

UTILITY NOTES FOR WORK IN PUBLIC RIGHT-OF-WAY:

1. FOLLOW ALL CITY OF SAINT PAUL STANDARDS AND SPECIFICATIONS.
2. PRIOR TO CONSTRUCTION, CONTRACTORS ARE TO COORDINATE ALL WORK WITHIN RIGHT-OF-WAY AND OBTAIN ALL APPLICABLE PERMITS.

ST. PAUL'S NOTES:

1. INSPECTION CONTACT: THE DEVELOPER SHALL CONTACT THE RIGHT OF WAY INSPECTOR **DAN BRADY AT (651) 485-4398** (TWO WEEK PRIOR TO BEGINNING WORK) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY AND COORDINATION OF ALL WORK IN THE PUBLIC RIGHT OF WAY. NOTE: IF A TWO WEEK NOTICE IS NOT PROVIDED TO THE CITY, ANY RESULTING DELAYS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. SAFE WORK SITE REQUIREMENTS: THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD REQUIREMENTS FOR WORK IN THE PUBLIC RIGHT OF WAY.
3. NO PRIVATE FACILITIES IN THE RIGHT OF WAY: THE DEVELOPER IS STRICTLY PROHIBITED FROM INSTALLING PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES AND/OR LIGHTING IN THE CITY'S RIGHT OF WAY. THIS INCLUDES STUBBING CONDUIT OR CABLE INTO THE PUBLIC RIGHT OF WAY TO ACCOMMODATE UTILITY FEEDS TO THE SITE. COORDINATE WITH EACH UTILITY PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. UTILITIES ARE RESPONSIBLE FOR SECURING EXCAVATION PERMITS TO RUN THEIR SERVICE INTO A SITE, AND (WHERE REQUIRED) SUBMITTING PLANS FOR REVIEW BY THE PUBLIC WORKS UTILITY REVIEW COMMITTEE.
4. CITY OF ST. PAUL PERMIT REQUIREMENTS:
   - 4.1. ORDERING OBSTRUCTION AND EXCAVATION PERMITS: CONTACT **PUBLIC WORKS RIGHT OF WAY SERVICE DESK AT (651) 266-6151. IT IS STRONGLY RECOMMENDED THAT CONTRACTORS CALL FOR COST ESTIMATES PRIOR TO BIDDING TO OBTAIN ACCURATE COST ESTIMATES.**
   - 4.2. OBSTRUCTION PERMITS: THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION PERMIT IF CONSTRUCTION (INCLUDING SILT FENCES) WILL BLOCK CITY STREETS, SIDEWALKS OR ALLEYS, OR IF DRIVING OVER CURBS.
   - 4.3. EXCAVATION PERMITS: ALL DIGGING IN THE PUBLIC RIGHT OF WAY REQUIRES AN EXCAVATION PERMIT. IF THE PROPOSED BUILDING IS CLOSE TO THE RIGHT OF WAY, AND EXCAVATING INTO THE RIGHT OF WAY IS NEEDED TO FACILITATE CONSTRUCTION, CONTACT THE UTILITY INSPECTOR.
   - 4.4. FAILURE TO SECURE PERMITS: FAILURE TO SECURE OBSTRUCTION PERMITS OR EXCAVATION PERMITS WILL RESULT IN A DOUBLE-PERMIT FEE AND OTHER FEES REQUIRED UNDER CITY OF ST. PAUL LEGISLATIVE CODES.
   - 4.5. REQUIREMENTS TO WORK IN THE PUBLIC RIGHT OF WAY: ALL UTILITIES AND CONTRACTORS WORKING IN THE PUBLIC RIGHT OF WAY MUST TO BE REGISTERED, INSURED AND BONDED, AS RECOGNIZED BY THE **PUBLIC WORKS SERVICE DESK. (651) 266-6151.**
5. ALL WORK ON CURBS, DRIVEWAYS, AND SIDEWALKS WITHIN THE PUBLIC RIGHT OF WAY MUST BE DONE BY A LICENSED AND BONDED CONTRACTOR UNDER A PERMIT FROM **PUBLIC WORKS SIDEWALK SECTION (651) 266-9700.** SIDEWALK GRADES MUST BE CARRIED ACROSS DRIVEWAYS.
6. RESTORATION OF ASPHALT AND CONCRETE PAVEMENTS ARE PERFORMED BY THE PUBLIC WORKS STREET MAINTENANCE DIVISION. THE CONTRACTOR IS RESPONSIBLE FOR PAYMENT TO THE CITY FOR THE COST OF THESE RESTORATIONS. THE CONTRACTOR SHALL **CONTACT PUBLIC WORKS STREET MAINTENANCE TO SET UP A WORK ORDER PRIOR TO BEGINNING ANY REMOVALS IN THE STREET AT (651) 266-9700.** PROCEDURES AND UNIT COSTS ARE FOUND IN STREET MAINTENANCE'S "GENERAL REQUIREMENTS – ALL RESTORATIONS" AND ARE AVAILABLE AT THE PERMIT OFFICE.
7. SIGNS REGULATING PARKING AND/OR TRAFFIC ON PRIVATE PROPERTY (OUTSIDE OF THE PUBLIC RIGHT- OF-WAY ROW) SHALL BE FURNISHED AND INSTALLED BY THE PROPERTY OWNER OR CONTRACTOR AT NO COST TO THE CITY OF ST. PAUL DEPARTMENT OF PUBLIC WORKS. REMOVAL OF EXISTING SIGNS WITHIN THE PUBLIC ROW THAT REGULATE TRAFFIC AND OR PARKING SHALL BE COMPLETED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. NEW SIGNS OR THE REINSTALLATION OF EXISTING SIGNS, AS APPROVED BY PUBLIC WORKS TRAFFIC ENGINEERING, REGULATING PARKING AND/OR TRAFFIC IN THE PUBLIC ROW SHALL BE FURNISHED AND INSTALLED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. ALL EQUIPMENT, MATERIALS, AND LABOR COSTS ASSOCIATED WITH THE CITY AFFECTING A COMPLETE SIGN INSTALLATION SHALL BE THE RESPONSIBILITY OF THE DEVELOPMENT. CONTACT CHRIS GULDEN OF PUBLIC WORKS 651-266-9778 TWO WEEKS IN ADVANCE OF NEEDED SIGN WORK.
8. SEWER REMOVAL/ABANDONMENT PERMIT: LICENSE HOUSE DRAIN CONTRACTOR TO OBTAIN REMOVAL PERMITS FROM PUBLIC WORKS TO CUT OFF EXISTING SEWER CONNECTIONS SERVICES TO THE MAIN LINE. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
9. SEWER CONNECTION PERMIT: PLUMBING CONTRACTOR TO OBTAIN (SEWER CONNECTION PERMIT) TO CONSTRUCT NEW SANITARY AND STORM CONNECTION IN STREET FROM MAIN TO THE PROPERTY. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
10. ALL WATER MAIN AND SERVICES TO BE INSTALLED ACCORDING TO 'SPRWS STANDARDS FOR INSTALLATION OF WATER MAINS', AND 'SPRWS WATER CODE'.
11. SERVICES THAT ARE TO BECOME UNUSED UPON COMPLETION OF THE NEW SERVICE CONNECTION MUST BE CUT OFF BY THE CONTRACTOR AT THE MAIN PRIOR TO THE TURN ON OF THE NEW SERVICES. EXCAVATION AND RESTORATION BY CONTRACTOR.
12. THE CONTRACTOR SHALL CONTACT **MIKE LUSIAN, GENERAL FOREMAN, LIGHTING – SIGNAL MAINTENANCE, (651-266-9780).** IF REMOVAL OR RELOCATION OF EXISTING FACILITIES IS REQUIRED OR IN THE EVENT OF DAMAGE TO THE LIGHTING OR SIGNAL UTILITIES. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY (AND RELATED COSTS) FOR ANY DAMAGE OR RELOCATIONS. .
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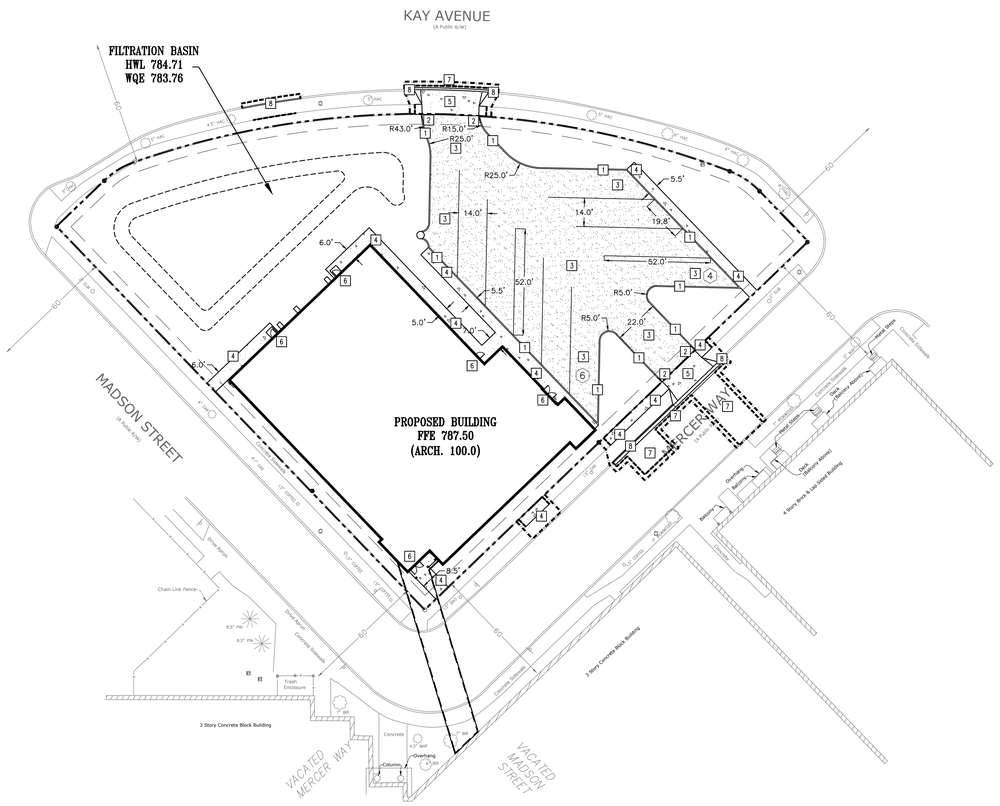
20. PIPE MATERIAL FOR 8" DUCTILE IRON PIPE MUST BE CLASS 52, PIPE MATERIAL FOR 6" AND 4" DUCTILE IRON PIPE MUST BE CLASS 53. THE EXTERIOR OF DUCTILE IRON PIPE SHALL BE COATED WITH A LAYER OF ARC- SPRAYED ZINC PER ISO 8179. THE INTERIOR CEMENT MORTAR LINING SHALL BE APPLIED WITHOUT ASPHALT SEAL COAT. PIPE MUST BE WRAPPED IN V-BIO POLYWRAP ENCASEMENT AND SHALL BE INSTALLED UTILIZING MODIFIED METHOD A AS RECOMMENDED BY DIPRA. ENCASEMENT SHALL BE TAPED AT EACH JOINT AND AROUND THE MIDDLE OF THE PIPE.
21. MAINTAIN 3 FEET VERTICAL SEPARATION BETWEEN WATER AND SEWER PIPES OR A 18" SEPARATION WITH 4" OF INSULATION. WHERE A WATER SERVICE OR MAIN IS OFFSET OVER A STORM SEWER, INSULATION SHALL BE PLACED BOTH OVER THE TOP OF THE WATER PIPE AND BETWEEN THE WATER PIPE AND THE STORM SEWER. REFER TO STANDARD PLATE D-10. WHERE A WATER MAIN OR SERVICE IS WITHIN 6 FEET OF A CATCH BASIN, MANHOLE OR OTHER OUTLET THAT IS SUBJECT TO COLD, INSULATION SHALL BE PLACED BETWEEN THE STRUCTURE AND THE WATER PIPE. ABOVE OR BELOW A STORM SEWER, INSULATION SHALL BE PLACED BETWEEN THE WATER PIPE AND THE STORM PIPE. WHERE A WATER SERVICE OR MAIN IS OFFSET OVER A STORM SEWER, INSULATION SHALL BE PLACED BOTH OVER THE TOP OF THE WATER PIPE AND BETWEEN THE WATER PIPE AND THE STORM SEWER. REFER TO STANDARD PLATE D-10. WHERE A WATER MAIN OR SERVICE IS WITHIN 6 FEET OF A CATCH BASIN, MANHOLE OR OTHER OUTLET THAT IS SUBJECT TO COLD, INSULATION SHALL BE PLACED BETWEEN THE STRUCTURE AND THE WATER PIPE.
22. REFER TO SPRWS "STANDARDS FOR THE INSTALLATION OF WATER MAINS" STANDARD PLATE D-11 FOR RESTRAINED PIPE REQUIREMENT.
23. ALL WATER SERVICE VALVE BOXES WITHIN CONSTRUCTION AREA MUST BE EXPOSED AND BROUGHT TO GRADE UPON COMPLETION OF CONSTRUCTION.
24. ALL PIPE WORK INSIDE OF PROPERTY TO BE PERFORMED BY A PLUMBER LICENSED BY THE STATE OF MINNESOTA AND CERTIFIED BY THE CITY OF SAINT PAUL. SPRWS REQUIRES SEPARATE OUTSIDE AND INSIDE PLUMBING PERMITS FOR EACH NEW WATER SERVICE.
25. PIPES INSTALLED WITH LESS THAN 2% SLOPE SHALL BE INSTALLED UTILIZING LASER EQUIPMENT.
26. ALL STORM WATER PIPING INSTALLED BETWEEN THE BUILDING AND THE STORM WATER RETENTION SYSTEM SHALL BE INSPECTED AND TESTED PRIOR TO BACKFILLING. CONTACT THE DEPARTMENT OF SAFETY AND INSPECTIONS AT 651-266-9006 TO SCHEDULE AN INSPECTION WITH THE AREA PLUMBING INSPECTOR.
27. STRIPING UNRESOLVED GENERAL RESTORATION SHALL BE COMPLETED IMMEDIATELY FOLLOWING FINAL PAVEMENT RESTORATION. ROADWAY STRIPING IMPACTED BY WORK ZONE SHALL BE REPLACED IN-KIND AT NO COST TO THE ROAD AUTHORITY. IF THERE ARE QUESTIONS AS TO THE TYPE OF STRIPING MATERIAL TO BE USED, CONTACT CHRIS GULDEN (651) 266-9778 IN THE CITY'S TRAFFIC OPERATIONS SECTION. IF THERE IS A DESIRE FOR THE CITY OF ST. PAUL PUBLIC WORKS DEPARTMENT TO COMPLETE PAVEMENT MARKING RESTORATION WORK, CONTACT CHRIS GULDEN OF PUBLIC WORKS TRAFFIC OPERATIONS FOR AN ESTIMATE. AT A MINIMUM, TWO WEEKS ADVANCE NOTICE SHALL BE PROVIDE FOR ANY STRIPING REQUEST. IF ADVANCE NOTICE IS NOT PROVIDED, ANY ASSOCIATED PROJECT DELAYS, AND COSTS INCURRED FROM SAID DELAYS, SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
28. ADJACENT STREETS AND ALLEYS MUST BE SWEPT TO KEEP THEM FREE OF SEDIMENT. CONTRACTOR MUST MONITOR CONDITIONS AND SWEEP AS NEEDED OR WITHIN 24 HOURS OF NOTICE BY THE CITY. STREET SWEEPING IS AN IMPORTANT TEMPORARY EROSION CONTROL BEST MANAGEMENT PRACTICE AND SHALL BE PERFORMED WITH THE USE OF WATER. DRY SWEEPING IS PROHIBITED. ADDITIONALLY, TRUCKS HAULING IN AND OUT OF THE SITE, FOR ANY ACTIVITY INCLUDING BUT NOT NECESSARILY LIMITED TO PAVING, EXCAVATION, ETC., NEEDS TO ENSURE CLEAN OFF ALL MUD FLAPS TO AVOID ANY BUILDUP ON THE STREET PAVEMENT.
29. ANY PUBLIC INFRASTRUCTURE DAMAGE RESULTING FROM THE CONTRACTORS ACTIVITIES, INCIDENTAL OR OTHERWISE, SHALL BE REPAIRED/REPLACED TO THE SATISFACTION OF THE CITY AT NO COST TO THE CITY.
30. BOULEVARD RESTORATION SHALL INCLUDE THE FOLLOWING: ALL CONCRETE, ASPHALT, AND BASE MATERIALS SHALL BE REMOVED. BOULEVARD SOILS ARE TO BE PROTECTED DURING CONSTRUCTION BY USING PLYWOOD, A 6" LAYER OF MULCH, AND/OR TRACK PADS. SOIL COMPACTION DUE TO CONSTRUCTION ACTIVITIES SHALL BE CORRECTED TO THE SATISFACTION OF, AND AT NO COST TO THE CITY PRIOR TO FINAL GRADING. BOULEVARDS SHALL BE RESTORED WITH A MINIMUM OF 6" OF TOPSOIL.
31. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL EXCAVATION AND OBSTRUCTION PERMITS REQUIRED BY ANY GOVERNING AUTHORITY.
32. CONTRACTOR MUST MAINTAIN AS-BUILT PLANS THROUGHOUT CONSTRUCTION AND SUBMIT THESE PLANS TO SAINT PAUL REGIONAL WATER SERVICES ENGINEERING DEPARTMENT UPON COMPLETION OF WORK VIA EMAIL AT: WATER-PLUMBINGPERMITAPP@CI.STPAUL.MN.US.
33. CONTRACTOR TO MAINTAIN ACCESS TO THE FIRE DEPARTMENT CONNECTION FOR FIRE DEPARTMENT PERSONNEL AT ALL TIMES DURING THE CONSTRUCTION PERIOD.
34. ANY PUBLIC INFRASTRUCTURE DAMAGE RESULTING FROM THE CONTRACTORS ACTIVITIES, INCIDENTAL OR OTHERWISE, SHALL BE REPAIRED/REPLACED TO THE SATISFACTION OF THE CITY AT NO COST TO THE CITY.
35. NOTIFY **GRAEME CHAPLE AT 651-266-6882** A MINIMUM OF 2 WEEKS PRIOR TO SCHEDULING WORK BY SPRWS CONSTRUCTION CREW.
36. THE FOLLOWING WORK IN THE RIGHT-OF-WAY SHALL BE PERFORMED BY SPRWS ON AN ACTUAL COST BASIS: (1) CONNECTION TO THE PUBLIC MAIN FOR ANY INSTALLATION THAT IS OFF A PUBLIC MAIN LARGER THAN 12" OR OF MATERIAL NOT MADE OF IRON, (2) INSPECTION OF CONTRACTOR INSTALLED MAINS AND SERVICES. (3) CONSTRUCTION OF TEMPORARY SERVICES IF NECESSARY. AN ESTIMATE WILL BE PROVIDED FOR THIS WORK AND PAYMENT IN THE AMOUNT OF THE ESTIMATE MUST BE RECEIVED BEFORE THE WORK CAN BE SCHEDULED. ALL OTHER WORK, INCLUDING EXCAVATION, RESTORATION, CUTOFFS, AND PIPEWORK TO BE PERFORMED BY THE CONTRACTOR.
37. SANITARY AND/OR STORM SEWER SERVICE PASSING WITHIN 10 FEET OF THE BUILDING ARE GOVERNED BY THE MN PLUMBING CODE. SPECIFICATION FOR PIPE MATERIAL SELECTION AND NOTES FOR REQUIRED AIR TEST OF THE PIPING, COMPLIANT WITH THE MN STAT



1 C3.0 PAVING AND GEOMETRIC PLAN
1"=30'

PAVING NOTES:

1. CONTRACTOR SHALL FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.
2. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS NOTED OTHERWISE.
3. ALL CURB AND GUTTER IS TO BE B612 CONCRETE CURB AND GUTTER UNLESS NOTED OTHERWISE.
4. NO SIDEWALK IS TO HAVE MORE THAN A 2% CROSS SLOPE OR MORE THAN A 5% LONGITUDINAL SLOPE.
5. REFER TO ARCHITECTURAL PLANS FOR PROPOSED BUILDING LAYOUT.
6. FOLLOW ALL CITY OF ST. PAUL RULES, REGULATIONS, AND SPECIFICATIONS WHEN WORKING IN PUBLIC RIGHT OF WAY.
7. STRIPE PARKING LOT AS SHOWN. ALL BUS PARKING STALLS ARE TO BE 14 FEET WIDE BY 52 FEET LONG, UNLESS NOTED OTHERWISE.
8. THE CONTRACTOR IS TO CONTACT THE CITY OF ST. PAUL FIRE MARSHALL FOR THE EXACT PLACEMENT OF FIRE LANES, YELLOW-PAINTED CURBING, AND NO PARKING AREAS FOR FIRE PROTECTION PURPOSES.
9. REFER TO STRUCTURAL PLANS FOR STOOP DETAILS. ALL WALKS ARE TO BE CENTERED ON THE DOORS.
10. INSTALL APPROPRIATE EXPANSION MATERIAL WHERE CONCRETE IS ADJACENT TO BUILDING FACE.
11. ALL EXPANSION AND ISOLATION JOINTS SHALL BE SEALED PER SPECIFICATIONS.
12. MATCH NEW PAVEMENT, CURB AND GUTTER, AND SIDEWALK INTO EXISTING. NO ABRUPT GRADE TRANSITIONS OR PONDING OF WATER WILL BE ALLOWED.
13. SAWCUT EXISTING PAVEMENT, SIDEWALK, AND CURB AND GUTTER TO NEAREST JOINT. COORDINATE REMOVAL LIMITS WITH SITE DEMOLITION CONTRACTOR AND CONSTRUCTION MANAGER.
14. INSTALL DRIVE ENTRANCE PER CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS. FOLLOW ALL CITY OF ST. PAUL REQUIREMENTS FOR TRAFFIC CONTROL.

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

1. INSTALL B612 CONCRETE CURB AND GUTTER. REFER TO DETAIL 3/C502.
2. INSTALL NOSE-DOWN CURB SECTION. REFER TO DETAIL 6/C502.
3. INSTALL BITUMINOUS PAVEMENT. REFER TO DETAIL 4/C502.
4. INSTALL CONCRETE WALK. REFER TO DETAIL 5/C502.
5. INSTALL CONCRETE DRIVE ENTRANCE. REFER TO DETAIL 1/C502.
6. STOOP. REFER TO STRUCTURAL PLANS AND DETAILS.
7. INSTALL NEW BITUMINOUS PAVEMENT TO MATCH EXISTING PAVEMENT CROSS SECTION. FOR BIDDING PURPOSES REFER TO DETAIL 4/C502. INTENT IS TO MATCH EXISTING PAVEMENT CROSS SECTION
8. INSTALL CONCRETE CURB AND GUTTER TO MATCH EXISTING CURB STYLE AND SECTION. REFER TO DETAIL 2/C502.

PROPOSED PLAN SYMBOLS

CONSTRUCTION LIMITS	
PROPERTY LINE	
SAWCUT LINE (APPROX.)	
BITUMINOUS PAVEMENT	
CONCRETE PAVEMENT/SIDEWALK	
PARKING STALL COUNT	4

*NOTE: CONSTRUCTION LIMITS ARE ANTICIPATED TO BE PROPERTY LINE UNLESS OTHERWISE SHOWN.

ABBREVIATIONS

BLDG	Building
BM	Benchmark
CONC	Concrete
ELEV	Elevation
EX	Existing
FFE	Finished Floor Elevation
LFE	Lower Floor Elevation
MAX	Maximum
MIN	Minimum
R	Radius
TYP.	Typical
MNMUTCD	Minnesota Manual on Uniform Traffic Control Devices

N

30' 15' 0 30' 60'
SCALE 1" = 30'

ST. PAUL'S NOTES:

1. INSPECTION CONTACT: THE DEVELOPER SHALL CONTACT THE RIGHT OF WAY INSPECTOR **DAN BRADY AT (651) 485-4398** (TWO WEEK PRIOR TO BEGINNING WORK) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY AND COORDINATION OF ALL WORK IN THE PUBLIC RIGHT OF WAY. NOTE: IF A TWO WEEK NOTICE IS NOT PROVIDED TO THE CITY, ANY RESULTING DELAYS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. SAFE WORK SITE REQUIREMENTS: THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD REQUIREMENTS FOR WORK IN THE PUBLIC RIGHT OF WAY.
3. NO PRIVATE FACILITIES IN THE RIGHT OF WAY: THE DEVELOPER IS STRICTLY PROHIBITED FROM INSTALLING PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES AND/OR LIGHTING IN THE CITY'S RIGHT OF WAY. THIS INCLUDES STUBBING CONDUIT OR CABLE INTO THE PUBLIC RIGHT OF WAY TO ACCOMMODATE UTILITY FEEDS TO THE SITE. COORDINATE WITH EACH UTILITY PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. UTILITIES ARE RESPONSIBLE FOR SECURING EXCAVATION PERMITS TO RUN THEIR SERVICE INTO A SITE, AND (WHERE REQUIRED) SUBMITTING PLANS FOR REVIEW BY THE PUBLIC WORKS UTILITY REVIEW COMMITTEE.
4. CITY OF ST. PAUL PERMIT REQUIREMENTS:
   - 4.1. ORDERING OBSTRUCTION AND EXCAVATION PERMITS: CONTACT **PUBLIC WORKS RIGHT OF WAY SERVICE DESK AT (651) 266-6151. IT IS STRONGLY RECOMMENDED THAT CONTRACTORS CALL FOR COST ESTIMATES PRIOR TO BIDDING TO OBTAIN ACCURATE COST ESTIMATES.**
   - 4.2. OBSTRUCTION PERMITS: THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION PERMIT IF CONSTRUCTION (INCLUDING SILT FENCES) WILL BLOCK CITY STREETS, SIDEWALKS OR ALLEYS, OR IF DRIVING OVER CURBS.
   - 4.3. EXCAVATION PERMITS: ALL DIGGING IN THE PUBLIC RIGHT OF WAY REQUIRES AN EXCAVATION PERMIT. IF THE PROPOSED BUILDING IS CLOSE TO THE RIGHT OF WAY, AND EXCAVATING INTO THE RIGHT OF WAY IS NEEDED TO FACILITATE CONSTRUCTION, CONTACT THE UTILITY INSPECTOR.
   - 4.4. FAILURE TO SECURE PERMITS: FAILURE TO SECURE OBSTRUCTION PERMITS OR EXCAVATION PERMITS WILL RESULT IN A DOUBLE-PERMIT FEE AND OTHER FEES REQUIRED UNDER CITY OF ST. PAUL LEGISLATIVE CODES.
   - 4.5. REQUIREMENTS TO WORK IN THE PUBLIC RIGHT OF WAY: ALL UTILITIES AND CONTRACTORS WORKING IN THE PUBLIC RIGHT OF WAY MUST TO BE REGISTERED, INSURED AND BONDED, AS RECOGNIZED BY THE **PUBLIC WORKS SERVICE DESK. (651) 266-6151.**
5. ALL WORK ON CURBS, DRIVEWAYS, AND SIDEWALKS WITHIN THE PUBLIC RIGHT OF WAY MUST BE DONE BY A LICENSED AND BONDED CONTRACTOR UNDER A PERMIT FROM **PUBLIC WORKS SIDEWALK SECTION (651) 266-9700.** SIDEWALK GRADES MUST BE CARRIED ACROSS DRIVEWAYS.
6. RESTORATION OF ASPHALT AND CONCRETE PAVEMENTS ARE PERFORMED BY THE PUBLIC WORKS STREET MAINTENANCE DIVISION. THE CONTRACTOR IS RESPONSIBLE FOR PAYMENT TO THE CITY FOR THE COST OF THESE RESTORATIONS. THE CONTRACTOR SHALL **CONTACT PUBLIC WORKS STREET MAINTENANCE TO SET UP A WORK ORDER PRIOR TO BEGINNING ANY REMOVALS IN THE STREET AT (651) 266-9700.** PROCEDURES AND UNIT COSTS ARE FOUND IN STREET MAINTENANCE'S "GENERAL REQUIREMENTS – ALL RESTORATIONS" AND ARE AVAILABLE AT THE PERMIT OFFICE.
7. SIGNS REGULATING PARKING AND/OR TRAFFIC ON PRIVATE PROPERTY (OUTSIDE OF THE PUBLIC RIGHT- OF-WAY ROW) SHALL BE FURNISHED AND INSTALLED BY THE PROPERTY OWNER OR CONTRACTOR AT NO COST TO THE CITY OF ST. PAUL DEPARTMENT OF PUBLIC WORKS. REMOVAL OF EXISTING SIGNS WITHIN THE PUBLIC ROW THAT REGULATE TRAFFIC AND OR PARKING SHALL BE COMPLETED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. NEW SIGNS OR THE REINSTALLATION OF EXISTING SIGNS, AS APPROVED BY PUBLIC WORKS TRAFFIC ENGINEERING, REGULATING PARKING AND/OR TRAFFIC IN THE PUBLIC ROW SHALL BE FURNISHED AND INSTALLED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. ALL EQUIPMENT, MATERIALS, AND LABOR COSTS ASSOCIATED WITH THE CITY AFFECTING A COMPLETE SIGN INSTALLATION SHALL BE THE RESPONSIBILITY OF THE DEVELOPMENT. CONTACT CHRIS GULDEN OF PUBLIC WORKS 651-266-9778 TWO WEEKS IN ADVANCE OF NEEDED SIGN WORK.
8. SEWER REMOVAL/ABANDONMENT PERMIT: LICENSE HOUSE DRAIN CONTRACTOR TO OBTAIN REMOVAL PERMITS FROM PUBLIC WORKS TO CUT OFF EXISTING SEWER CONNECTIONS SERVICES TO THE MAIN LINE. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
9. SEWER CONNECTION PERMIT: PLUMBING CONTRACTOR TO OBTAIN (SEWER CONNECTION PERMIT) TO CONSTRUCT NEW SANITARY AND STORM CONNECTION IN STREET FROM MAIN TO THE PROPERTY. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
10. ALL WATER MAIN AND SERVICES TO BE INSTALLED ACCORDING TO 'SPRWS STANDARDS FOR INSTALLATION OF WATER MAINS', AND 'SPRWS WATER CODE'.
11. SERVICES THAT ARE TO BECOME UNUSED UPON COMPLETION OF THE NEW SERVICE CONNECTION MUST BE CUT OFF BY THE CONTRACTOR AT THE MAIN PRIOR TO THE TURN ON OF THE NEW SERVICES. EXCAVATION AND RESTORATION BY CONTRACTOR.
12. THE CONTRACTOR SHALL CONTACT **MIKE LUSIAN, GENERAL FOREMAN, LIGHTING – SIGNAL MAINTENANCE, (651-266-9780),** IF REMOVAL OR RELOCATION OF EXISTING FACILITIES IS REQUIRED OR IN THE EVENT OF DAMAGE TO THE LIGHTING OR SIGNAL UTILITIES. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY (AND RELATED COSTS) FOR ANY DAMAGE OR RELOCATIONS. .
    - 12.1 THE INSTALLATION OF PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES AND/OR LIGHTING IS STRICTLY PROHIBITED IN THE CITY'S ROW (RIGHT OF WAY).
13. CONTRACTOR IS TO CONTACT **SAINT PAUL CITY FORESTER (651) 632-2436** PRIOR TO IMPACTING ANY BOULEVARD TREES.
    - 13.1 EXISTING PUBLIC PROPERTY TREES ARE TO BE PROTECTED AT ALL TIMES. PUBLIC TREES DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE RESTORED OR REPLACED TO THE SATISFACTION OF, AND AT NO COST TO THE CITY, AS DETERMINED BY THE FORESTRY MANAGER. THE CONTRACTOR IS ADVISED TO DOCUMENT PRE-EXISTING CONDITIONS OF PUBLIC TREES AS WELL AS THE SURROUNDING BOULEVARD PRIOR TO CONSTRUCTION ACTIVITIES.
    - 13.2 THE REMOVAL, PRUNING, AND/OR PLANTING OF TREES ON PUBLIC PROPERTY REQUIRES AN APPROVED FORESTRY TREE WORK PERMIT FROM THE CITY FORESTER (651-632-2436). ANY WORK MUST BE COMPLETED BY A LICENSED TREE CONTRACTOR.
    - 13.3 PUBLIC PROPERTY TREES SHALL BE PROTECTED BY ESTABLISHING A TREE PROTECTION ZONE USING A 4' TALL FENCING INSTALLED AT THE DRIP LINE OF THE TREE. TREE PROTECTION FENCING SHALL BE INSTALLED PRIOR TO THE START OF ANY SITE WORK AND MAINTAINED FOR THE DURATION OF THE PROJECT. PROPOSED WORK WITHIN, OR CHANGES TO THE LOCATION OF TREE PROTECTION FENCING SHALL BE REVIEWED BY THE CITY FORESTER PRIOR TO ALTERATION.
    - 13.4 CONSTRUCTION SUPPLIES, MATERIALS, SPOILS, EQUIPMENT, AND VEHICLES SHALL NOT BE STORED OR OPERATED WITHIN THE DRIP LINE OF ANY PUBLIC TREE OR WITHIN TREE PAVER AREA OF BOULEVARD WITHOUT PRIOR WRITTEN APPROVAL FROM THE CITY FORESTER. IF THE BOULEVARD MUST BE USED FOR CONSTRUCTION ACTIVITIES, SITE ACCESS ROUTES, MATERIAL STORAGE, OR OTHER RELATED ACTIVITIES, PROTECTIVE MEASURES APPROVED BY THE CITY FORESTER SHALL BE TAKEN TO REDUCE SOIL COMPACTION AND DAMAGE TO PUBLIC TREES.
    - 13.5 IN LOCATIONS WHERE PUBLIC TREES CANNOT BE PROTECTED TO THE DRIP LINE WITH TEMPORARY TREE PROTECTION FENCING, THE USE OF A 6" LAYER OF MULCH OR TRACK PADS WILL BE REQUIRED TO LIMIT SOIL COMPACTION AND PROTECT ROOT SYSTEMS WITHIN THE BOULEVARD WHEN ACCESS ROUTES OR MATERIAL STORAGE IS NECESSARY.
14. BUSINESS SIGNS WILL REQUIRE A SEPARATE REVIEW AND SIGN PERMIT FROM THE DEPARTMENT OF SAFETY AND INSPECTIONS. SITE PLAN APPROVAL DOES NOT CONSTITUTE APPROVAL OF BUSINESS SIGNS SHOWN ON THE SITE PLAN. CONTACT **YAYA DIATTA OF DSI ZONING (651) 266-9080** IF YOU HAVE ANY QUESTIONS ABOUT SIGNS.
15. CARE MUST BE TAKEN DURING CONSTRUCTION AND EXCAVATION TO PROTECT ANY SURVEY MONUMENTS AND/OR PROPERTY IRONS. **CALL SAM GIBSON OF PUBLIC WORKS SURVEYING (651-266-6075)** IF YOU HAVE ANY QUESTIONS.
16. AS PER THE CITY'S "STANDARD SPECIFICATION FOR STREET OPENINGS' POLICY, RESTORATION ON ROADWAY SURFACES LESS THAN 5 YEARS OLD WILL REQUIRE FULL WIDTH MILL AND OVERLAY OR ADDITIONAL DEGRADATION FEES. PAVEMENT RESTORATION SHALL BE COMPLETED BY THE ST. PAUL PUBLIC WORKS STREET MAINTENANCE DIVISION. ALL RELATED COSTS ARE THE RESPONSIBILITY OF THE DEVELOPER/CONTRACTOR. CONTACT KEVIN NELSON AT 651-266-9700 FOR ESTIMATE OF COSTS FOR PAVEMENT RESTORATION.
17. PIPE MUST BE MECHANICAL JOINT UNDERNEATH THE BUILDING FOOTPRINT AND UP TO TEN FEET OUTSIDE OF THE BUILDING FOOTPRINT.
18. A FOUR-SIDED TRENCH BOX IS REQUIRED ON ALL EXCAVATIONS DEEPER THAN 5 FEET WHERE UNDERGROUND WORK OR INSPECTION IS TO BE PERFORMED BY SPRWS. FOR ALL WET TAPS TO BE PERFORMED BY SPRWS, A MINIMUM TRENCH BOX SIZE OF 8 FEET HIGH X 8 FEET WIDE X 10 FEET LONG IS REQUIRED. LADDERS ARE REQUIRED AND MUST EXTEND 3 FEET ABOVE THE SURFACE OF THE TRENCH. SIDEWALKS, PAVEMENTS, DUCTS AND APPURTENANT STRUCTURES SHALL NOT BE UNDERMINED UNLESS A SUPPORT SYSTEM OR ANOTHER METHOD OF PROTECTION IS PROVIDED. TRENCHES IN EXCESS OF 20 FEET IN DEPTH MUST BE SIGNED OFF BY A REGISTERED PROFESSIONAL ENGINEER. EXCAVATED MATERIAL MUST BE KEPT A MINIMUM OF 2 FEET FROM THE EDGE OF THE TRENCH.
19. SERVICE CONNECTIONS SHALL BE INSTALLED WITH 8 FEET OF COVER AS PER THE ESTABLISHED GRADE FROM THE MAIN TO THE PROPERTY LINE OR, IF APPLICABLE, TO THE UTILITY EASEMENT LINE. WHEN SOLID ROCK CONDITIONS ARE ENCOUNTERED, WATER SERVICES MAY BE INSTALLED WITH 6.5 FEET OF COVER. AT THIS DEPTH, THE NEED FOR INSULATION WILL BE DETERMINED BY SPRWS INSPECTORS
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24. ALL PIPE WORK INSIDE OF PROPERTY TO BE PERFORMED BY A PLUMBER LICENSED BY THE STATE OF MINNESOTA AND CERTIFIED BY THE CITY OF SAINT PAUL. SPRWS REQUIRES SEPARATE OUTSIDE AND INSIDE PLUMBING PERMITS FOR EACH NEW WATER SERVICE.
25. PIPES INSTALLED WITH LESS THAN 2% SLOPE SHALL BE INSTALLED UTILIZING LASER EQUIPMENT.
26. ALL STORM WATER PIPING INSTALLED BETWEEN THE BUILDING AND THE STORM WATER RETENTION SYSTEM SHALL BE INSPECTED AND TESTED PRIOR TO BACKFILLING. CONTACT THE DEPARTMENT OF SAFETY AND INSPECTIONS AT 651-266-9006 TO SCHEDULE AN INSPECTION WITH THE AREA PLUMBING INSPECTOR.
27. STRIPING UNRESOLVED GENERAL RESTORATION SHALL BE COMPLETED IMMEDIATELY FOLLOWING FINAL PAVEMENT RESTORATION. ROADWAY STRIPING IMPACTED BY WORK ZONE SHALL BE REPLACED IN-KIND AT NO COST TO THE ROAD AUTHORITY. IF THERE ARE QUESTIONS AS TO THE TYPE OF STRIPING MATERIAL TO BE USED, CONTACT CHRIS GULDEN (651) 266-9778 IN THE CITY'S TRAFFIC OPERATIONS SECTION. IF THERE IS A DESIRE FOR THE CITY OF ST. PAIL PUBLIC WORKS DEPARTMENT TO COMPLETE PAVEMENT MARKING RESTORATION WORK, CONTACT CHRIS GULDEN OF PUBLIC WORKS TRAFFIC OPERATIONS FOR AN ESTIMATE. AT A MINIMUM, TWO WEEKS ADVANCE NOTICE SHALL BE PROVIDE FOR ANY STRIPING REQUEST. IF ADVANCE NOTICE IS NOT PROVIDED, ANY ASSOCIATED PROJECT DELAYS, AND COSTS INCURRED FROM SAID DELAYS, SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
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32. CONTRACTOR MUST MAINTAIN AS-BUILT PLANS THROUCHOUT CONSTRUCTION AND SUBMIT THESE PLANS TO SAINT PAUL REGIONAL WATER SERVICES ENGINEERING DEPARTMENT UPON COMPLETION OF WORK VIA EMAIL AT: WATER-PLUMBINGPERMITAPP@CI.STPAUL.MN.US.
33. CONTRACTOR TO MAINTAIN ACCESS TO THE FIRE DEPARTMENT CONNECTION FOR FIRE DEPARTMENT PERSONNEL AT ALL TIMES DURING THE CONSTRUCTION PERIOD.
34. ANY PUBLIC INFRASTRUCTURE DAMAGE RESULTING FROM THE CONTRACTORS ACTIVITIES, INCIDENTAL OR OTHERWISE, SHALL BE REPAIRED/REPLACED TO THE SATISFACTION OF THE CITY AT NO COST TO THE CITY.
35. NOTIFY **GRAEME CHAPLE AT 651-266-6882** A MINIMUM OF 2 WEEKS PRIOR TO SCHEDULING WORK BY SPRWS CONSTRUCTION CREW.
36. THE FOLLOWING WORK IN THE RIGHT-OF-WAY SHALL BE PERFORMED BY SPRWS ON AN ACTUAL COST BASIS: (1) CONNECTION TO THE PUBLIC MAIN FOR ANY INSTALLATION THAT IS OFF A PUBLIC MAIN LARGER THAN 12" OR OF MATERIAL NOT MADE OF IRON, (2) INSPECTION OF CONTRACTOR INSTALLED MAINS AND SERVICES. (3) CONSTRUCTION OF TEMPORARY SERVICES IF NECESSARY. AN ESTIMATE WILL BE PROVIDED FOR THIS WORK AND PAYMENT IN THE AMOUNT OF THE ESTIMATE MUST BE RECEIVED BEFORE THE WORK CAN BE SCHEDULED. ALL OTHER WORK, INCLUDING EXCAVATION, RESTORATION, CUTOFFS, AND PIPEWORK TO BE PERFORMED BY THE CONTRACTOR.
37. SANITARY AND/OR STORM SEWER SERVICE PASSING WITHIN 10 FEET OF THE BUILDING ARE GOVERNED BY THE MN PLUMBING CODE. SPECIFICATION FOR PIPE MATERIAL SELECTION AND NOTES FOR REQUIRED AIR TEST OF THE PIPING, COMPLIANT WITH THE MN STATE PLUMBING CODE, MUST BE SHOWN ON THE PLAN. IF UNDERGROUND INFILTRATION SYSTEM IS WITHIN 10 FEET, PROVIDE PLUMBING INSPECTOR APPROVAL.
38. SUBMIT MANHOLE SHOP DRAWINGS FOR REVIEW. THE SHOP DRAWINGS NEED TO BE SUBMITTED/APPROVED PRIOR TO ISSUING CONNECTION PERMITS.
39. ALL STORMWATER PIPING CONNECTIONS INSTALLED BWETEEN THE BUILDING AND THE STORM WATER RETENTION SYSTEM SHALL BE INSPECTED END TESTED PRIOR TO BACK FILLING. CONTACT THE DEPARTMENT OF SAFETY AND INSPECTIONS AT (651) 266-9009 TO SCHEDULE AN INSPECTION WITH THE AREA PLUMBING INSPECTOR.

BLOOM HAY DOBBS

Midtown Commons
2324 University Ave. W,
Suite 200
St. Paul, MN 55114
Tel. 612.338.4960

NOVA CLASSICAL ACADEMY
1455 VICTORIA WAY
ST. PAUL, MN 55102

CONSULTANT

BKBM Structural & Civil Engineers
6120 Earle Brown Drive
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BKBM Project No. 24226.5

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025
BKBM Project Number: 24426.50

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.

JOEL W. MAIER
PRINT NAME

SIGNATURE

19181
LICENSE NO.

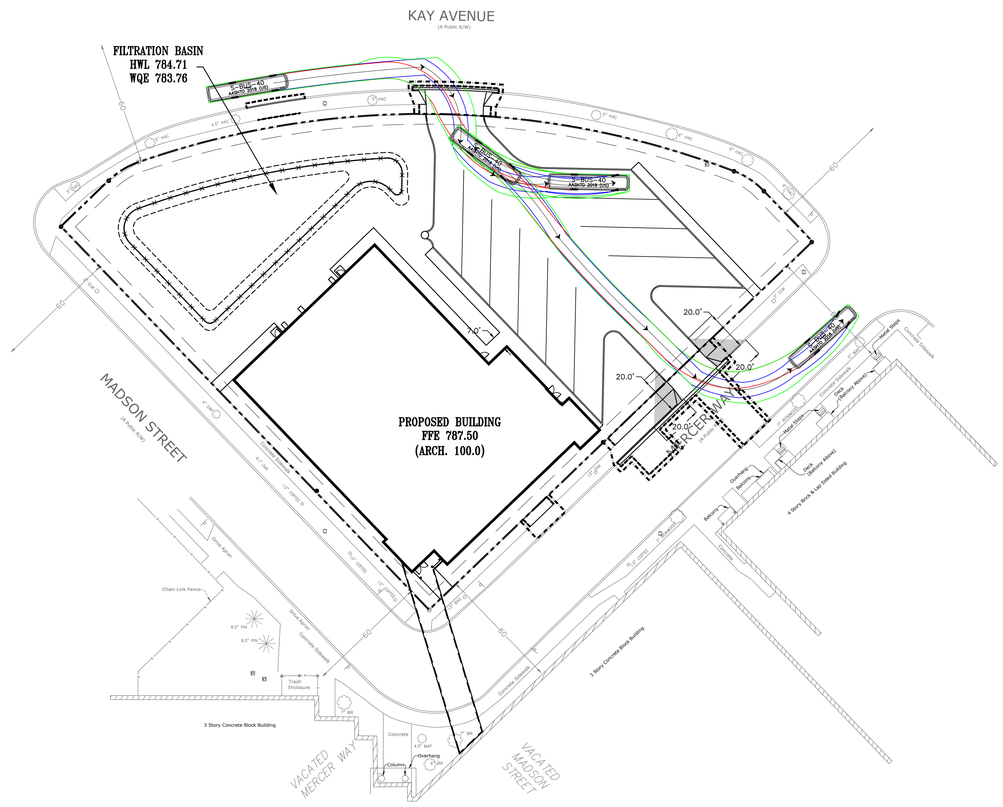
05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
UTILITY PLAN

SHEET NUMBER:
C400

2008 HAY DOBBS, P.A. - CONSTRUCTION



1 C3.0 PAVING AND GEOMETRIC PLAN
1"=30'

PROPOSED PLAN SYMBOLS	
CONSTRUCTION LIMITS	
PROPERTY LINE	
SAWCUT LINE (APPROX.)	
SIGHT TRIANGLE	

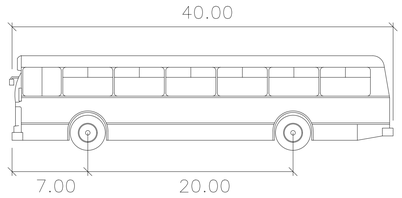
*NOTE: CONSTRUCTION LIMITS ARE ANTICIPATED TO BE PROPERTY LINE UNLESS OTHERWISE SHOWN.

ABBREVIATIONS	
BLDG	Building
BM	Benchmark
CONC	Concrete
ELEV	Elevation
EX	Existing
FFE	Finished Floor Elevation
LFE	Lower Floor Elevation
MAX	Maximum
MIN	Minimum
R	Radius
TYP.	Typical
MNMUTCD	Minnesota Manual on Uniform Traffic Control Devices

N

30' 15' 0 30' 60'

SCALE 1" = 30'



S-BUS-40
feet

Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 34.4

BLOOM HAY DOBBS

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JOEL W. MAIER
PRINT NAME

SIGNATURE

19181
LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
CIVIL SITE PLAN AND TURNING MOVEMENTS

SHEET NUMBER:
C401

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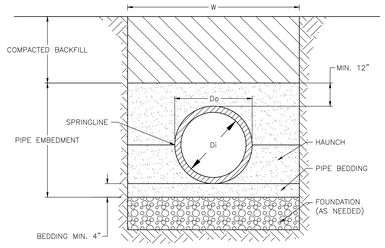
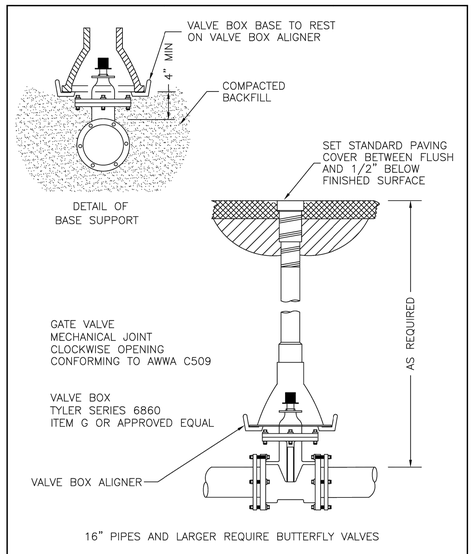


NOTES:

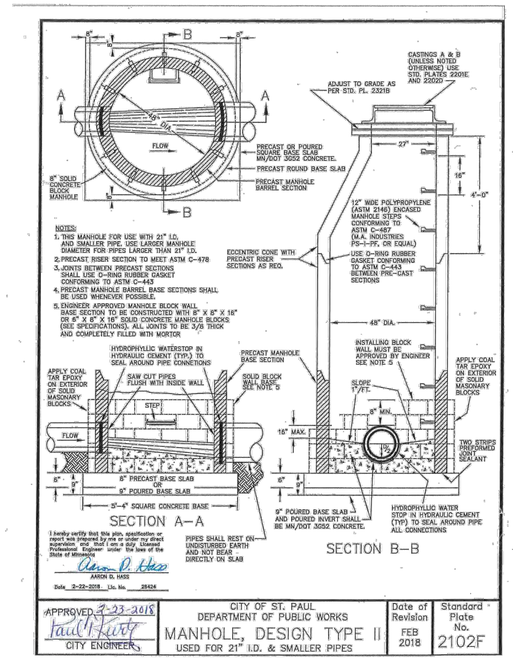
1. THE MINIMUM TRENCH WIDTH "W" SHALL BE W=Do+16" OR 1.25*Do+12 WHICHEVER IS GREATER.
2. PIPE EMBEDMENT MATERIAL SHALL BE CLASS I OR CLASS II MATERIAL. REFER TO SPECIFICATIONS FOR DETAILS.
3. REFER TO ASTM D2321–05 "UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY–FLOW APPLICATIONS" FOR DETAILS.

8 C500 TYPICAL PIPE BEDDING FOR PVC
NOT TO SCALE

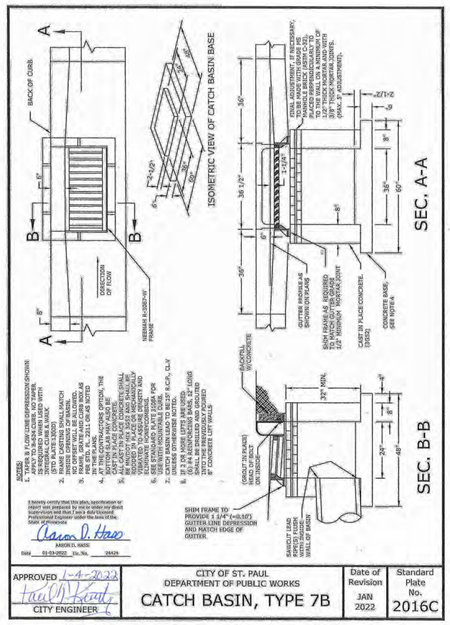


DR. LJP DATE. 01/13/2020	SAINT PAUL REGIONAL WATER SERVICES ST. PAUL, MINNESOTA	STANDARD PLATE
CH. VLH		
APPROVED DJS	VALVE BOX & INSTALLATION	D-2

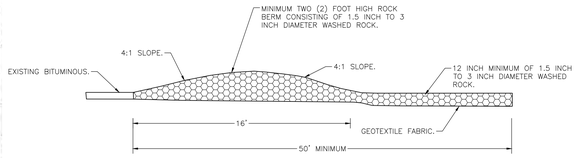
9 C500 GATE VALE AND BOX INSTALLATION
NOT TO SCALE



6 C500 MANHOLE, DESIGN TYPE II
NOT TO SCALE



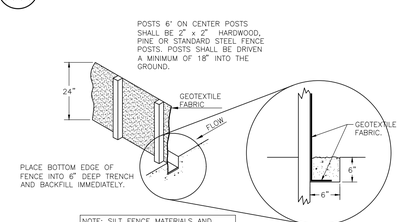
5 C500 CATCH BASIN, TYPE 7B
NOT TO SCALE



NOTE:

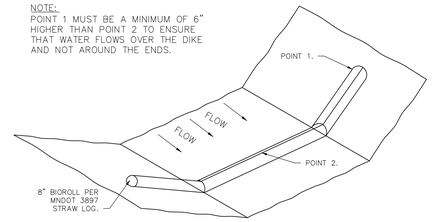
1. MINIMUM LENGTH OF 50 FEET AND WIDTH OF 12 FEET.
2. FOLLOW ALL CITY, WATERSHED DISTRICT AND MPCA STANDARDS.
3. CLEAN STREETS ON A DAILY BASIS OR MORE FREQUENTLY IF REQUESTED BY CITY, WATERSHED DISTRICT OR MPCA.

1 C500 BERMED ROCK CONSTRUCTION ENTRANCE
NOT TO SCALE

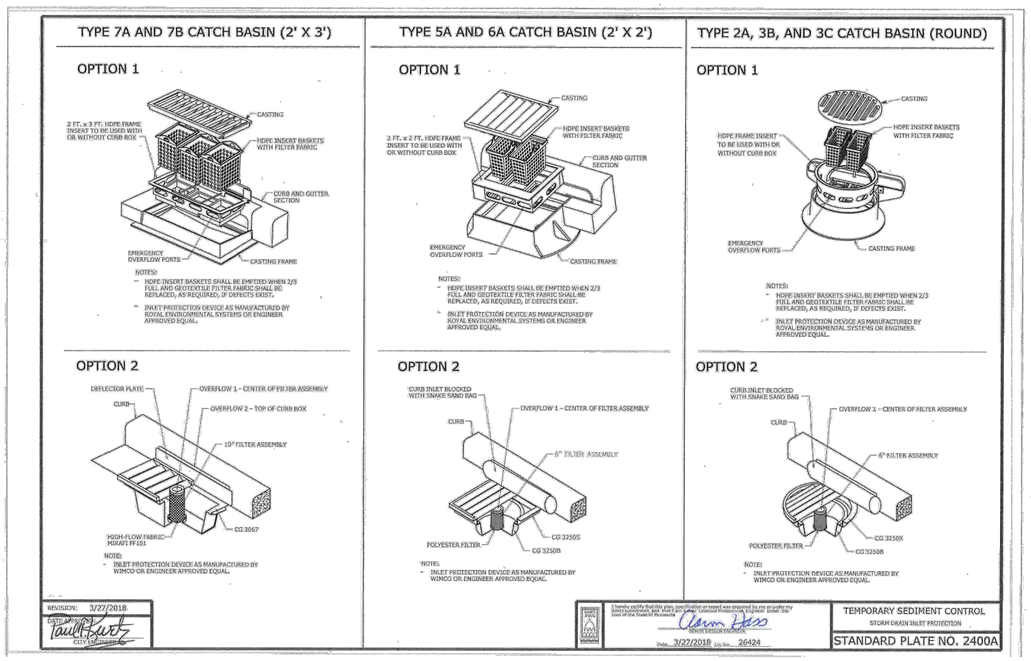


2 C500 SILTATION FENCE
NOT TO SCALE

NOTE:
POINT 1 MUST BE A MINIMUM OF 6" HIGHER THAN POINT 2 TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.



3 C500 BIO ROLL
NOT TO SCALE



4 C500 STORM DRAIN INLET PROTECTION
NOT TO SCALE

STANDARD TRENCH INSTALLATION SOIL AND MINIMUM STANDARD PROCTOR COMPACTION REQUIREMENTS		
INSTALLATION TYPE	HAUNCH AND OUTER BEDDING	LOWER SIDE
TYPE 1	95% CATEGORY I	90% CATEGORY I 95% CATEGORY II 100% CATEGORY III
TYPE 2	90% CATEGORY I 95% CATEGORY II	85% CATEGORY I 90% CATEGORY II 95% CATEGORY III
TYPE 3	85% CATEGORY I 90% CATEGORY II 95% CATEGORY III	85% CATEGORY I 90% CATEGORY II 95% CATEGORY III
TYPE 4	NO COMPACTION REQUIRED, EXCEPT IF CATEGORY III USE 85% CATEGORY III	NO COMPACTION REQUIRED, EXCEPT IF CATEGORY III USE 85% CATEGORY III

EQUIVALENT SOIL CLASSIFICATIONS FOR SOIL DESIGNATIONS		
SOIL	UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)	MN/DOT SPECIFICATION
CATEGORY I	CLEAN COURSE GRAINED SOILS: SW, SP, GW, GP, OR ANY SOIL BEGINNING WITH ONE OF THESE SYMBOLS WITH 12% OR LESS PASSING A #200 SIEVE	COARSE FILTER AGGREGATE MN/DOT 3149.2H
CATEGORY II	COURSE GRAINED SOILS WITH FINES: GW, GC, SW, SC, OR ANY SOIL BEGINNING WITH ONE OF THESE SYMBOLS CONTAINING MORE THAN 12% PASSING A #200 SIEVE	AGGREGATE BEDDING MN/DOT 3149.2G
CATEGORY III	FINE GRAINED SOILS: CL, ML, (OR CL–ML, CL.ML, ML/CL) WITH LESS THAN 30% RETAINED ON A #200 SIEVE.	NOT APPLICABLE

NOTES:

1. COMPACTION AND SOIL SYMBOLS–I.E. "95% CATEGORY I" REFERS TO CATEGORY I SOIL MATERIAL WITH MINIMUM STANDARD PROCTOR COMPACTION OF 95%.
2. SOIL IN BEDDING AND HAUNCH ZONES SHALL BE COMPACTED TO AT LEAST THE SAME COMPACTION AS SPECIFIED FOR THE MAJORITY OF SOIL IN THE BACKFILL ZONE.
3. THE TRENCH WIDTH SHALL BE WIDER THAN SHOWN IF REQUIRED FOR ADEQUATE SPACE TO ATTAIN SPECIFIED COMPACTION IN THE HAUNCH AND BEDDING ZONES.
4. FOR TRENCH WALLS WITH GREATER THAN 10 DEGREE SLOPES THAT CONSIST OF EMBANKMENT, THE LOWER SIDE SHALL BE COMPACTED TO AT LEAST THE SAME COMPACTION AS SPECIFIED FOR THE SOIL IN THE BACKFILL ZONE.
5. NO BEDDING IS REQUIRED FOR TYPE 4 STANDARD INSTALLATION.
6. REFER TO ASTM C1479–07 FOR DETAILS.
7. TYPE III BEDDING SHALL BE USED UNLESS NOTED OTHERWISE.

7 C500 TYPICAL PIPE BEDDING FOR RCP AND DIP
NOT TO SCALE

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BKBM Project No. 24226.5

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025
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JOEL W. MAIER
PRINT NAME

SIGNATURE

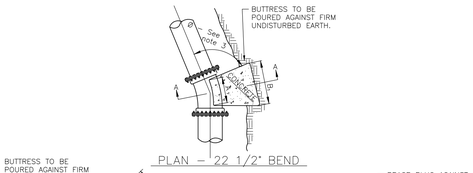
19181
LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
CIVIL DETAILS

SHEET NUMBER:
C500



NOTES:
1. DIMENSIONS IN TABLE ARE BASED ON A WATER PRESSURE OF 150 P.S.I. AND AN EARTH RESISTANCE OF 1 TON PER SQUARE FOOT.
2. DIMENSIONS C1,C2,C3 SHOULD BE LARGE ENOUGH TO MAKE ANGLE Ø EQUAL TO OR LARGER THAN 45°.
3. DIMENSION A1,A2,A3 SHOULD BE AS LARGE AS POSSIBLE WITHOUT INTERFERING WITH M.J. BOLTS.
4. SHAPE OF BACK OF BUTTRESS MAY VARY AS LONG AS POUR IS AGAINST FIRM UNDISTURBED EARTH.

BUTTRESS DIMENSIONS

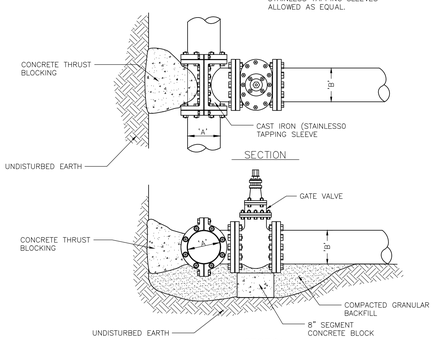
PIPE SIZE	22 ½° BEND		45° BEND		90° BEND		
	B1	D1	B2	D2	B3	D3	
6"	1'–5"	1'–5"	1'–5"	1'–5"	2'–1"	1'–6"	
8	1'–5"	1'–5"	2'–1"	1'–6"	2'–8"	2'–0"	
12	1'–10"	1'–10"	3'–4"	2'–0"	4'–9"	2'–6"	
16"	3'–0"	2'–0"	3'–10"	3'–0"	6'–2"	3'–6"	
20"	3'–6"	2'–8"	5'–6"	3'–4"	8'–4"	4'–0"	
24"	4'–0"	3'–0"	6'–10"	3'–10"	9'–8"	5'–0"	

9 / C501 THRUST BLOCK DETAIL FOR MECHANICAL PIPE BENDS
NOT TO SCALE

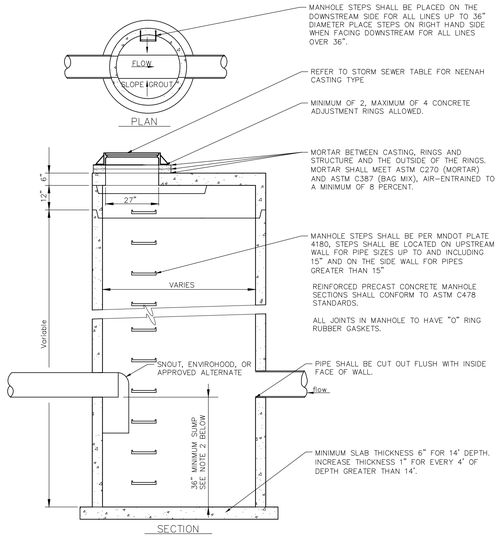
BRANCH PIPE 'B'	EXISTING PIPE 'A'						
	18"	16"	14"	12"	10"	8"	6"
12"	C,D	C,D	C	C			
10"	C,D	C,D	C,D	C	C		
8"	C,D	C,D	C,D	C,D	C	C	
6"	C,D	C,D	C,D	C,D	C,D	C	C
4"	C,D	C,D	C,D	C,D	C,D	C,D	C

C – CLOW F–5205,TCIW A212A OR EQUAL.
FULL CAST IRON TAPPING SLEEVE.
D – KENNEDY SQUARESEAL OR EQUAL.
CAST IRON TAPPING SLEEVE.

NOTE:
STAINLESS TAPPING SLEEVES ALLOWED AS EQUAL.

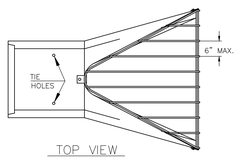


10 / C501 WATERMAIN WET TAP (TYP.)
NOT TO SCALE



NOTE
1: SNOUT OR ENVIROHOOD DEVICE SHALL HAVE A CROSS–SECTIONAL AREA GREATER THAN OR EQUAL TO THE CROSS–SECTIONAL AREA OF THE OUTLET PIPE OF THE SUMP MANHOLE.
2: SUMP DEPTH SHALL BE EQUAL TO 3 TIMES THE OUTLET PIPE DIAMETER. WITH A MAXIMUM SUMP DEPTH OF 9 FEET.

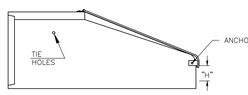
6 / C501 SUMP CATCH BASIN MANHOLE
NOT TO SCALE



RIPRAP REQUIRED

SIZE OF PIPE	CU. YD. MN/DOT 3601 CL. II
12" TO 24"	4
27" TO 33"	8
36" TO 48"	12
54" TO 72"	16

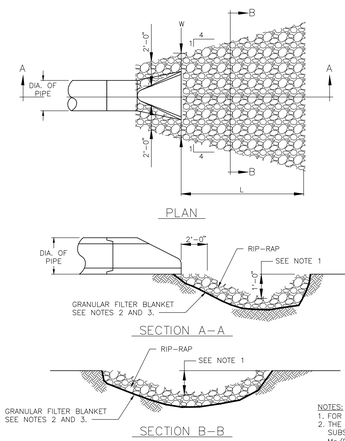
NOTES:
1. TIE LAST 3 JOINTS. USE 2 TIE BOLT FASTENERS PER JOINT INSTALLED AT 60° FROM TOP OF BOTTOM OF PIPE.
2. PROVIDE 3 CLIPS TO FASTEN TRASH GUARD TO FLARED END. HOT DIP GALVANIZE AFTER FABRICATION.



TRASH GUARD

SIZE OF PIPE	BARS	"H"	BOLTS
12" TO 18"	3/4"	4"	5/8"
21" TO 42"	1"	6"	3/4"
48" TO 72"	1–1/4"	12"	1"

7 / C501 FLARED–END SECTION
NOT TO SCALE

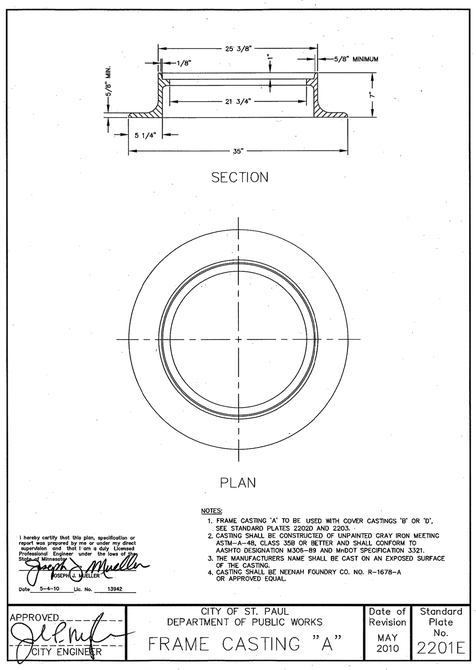


RIPRAP REQUIREMENTS

DIA. OF ROUND PIPE (IN.)	W (FT.)	L (FT.)	12" DEPTH CLASS II RIPRAP (CU. YDS.)	18" DEPTH CLASS II RIPRAP (CU. YDS.)
12	6.0	8	2.8	4.1
15	6.5	8	2.9	4.4
18	7.0	10	3.9	5.9
21	7.5	10	4.2	6.3
24	8.0	12	5.5	8.3
27	8.5	12	5.8	8.7
30	9.0	14	7.3	10.9
36	10.0	16	9.2	13.8
42	10.5	18	10.9	16.3
48	11.0	20	12.9	19.4

NOTES:
1. FOR PIPES GREATER THAN 30" USE 1'–6".
2. THE CONTRACTOR, AT THEIR OPTION, MAY SUBSTITUTE A GEOTEXTILE FABRIC BLANKET, Mn/DOT SPEC. 3601, FOR THE GRANULAR FILTER BLANKET UNLESS OTHERWISE NOTED IN THE SPECIFICATIONS.
3. VOLUMES OF GRANULAR FILTER SHALL BE 1/2 THE VOLUME OF OF RIP–RAP AT ANY GIVEN PIPE DIAMETER.
4. RIP–RAP SHALL BE PLACED IN ACCORDANCE WITH Mn/DOT SPEC. 2511.

8 / C501 RIP–RAP AT FLARED ENDS
NOT TO SCALE

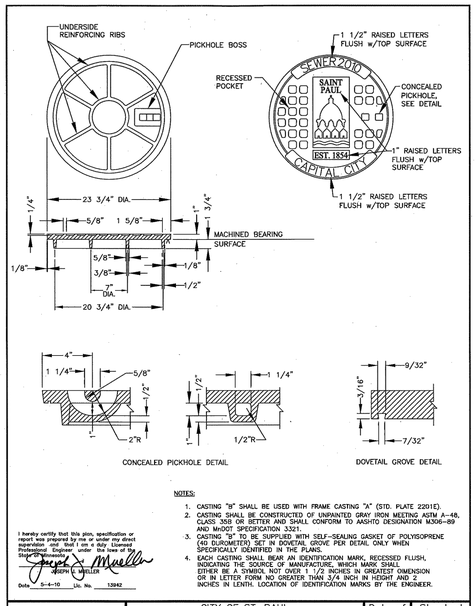


NOTES:
1. FRAME CASTING 'A' TO BE USED WITH COVER CASTINGS 'B' OR 'D', SEE STANDARD PLATES 2202D AND 2203.
2. CASTING SHALL BE CONSTRUCTED OF UNPAINTED GRAY IRON MEETING ASTM–A–48, CLASS 35B OR BETTER AND SHALL CONFORM TO AASHTO DESIGNATION M306–89 AND MnDOT SPECIFICATION 3321.
3. THE MANUFACTURERS NAME SHALL BE CAST ON AN EXPOSED SURFACE OF THE CASTING.
4. CASTING SHALL BE NEENAH FOUNDRY CO. NO. R–1678–A OR APPROVED EQUAL.

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 law of the State of Minnesota.
JOSEPH C. MUELLER
Date 5–4–10 Lic. No. 13942

APPROVED CITY ENGINEER	CITY OF ST. PAUL DEPARTMENT OF PUBLIC WORKS	Date of Revision	Standard Plate No.
	FRAME CASTING "A"	MAY 2010	2201E

4 / C501 FRAME CASTING 'A'
NOT TO SCALE

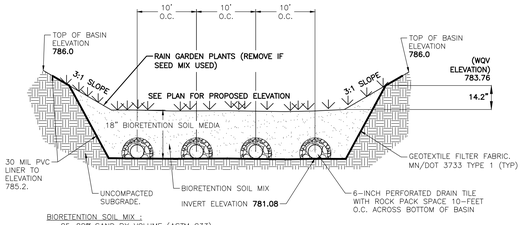


NOTES:
1. CASTING "B" SHALL BE USED WITH FRAME CASTING "A" (STD. PLATE 2201E).
2. CASTING SHALL BE CONSTRUCTED OF UNPAINTED GRAY IRON MEETING ASTM A–48, CLASS 35B OR BETTER AND SHALL CONFORM TO AASHTO DESIGNATION M306–89 AND MnDOT SPECIFICATION 3321.
3. CASTING "B" TO BE SUPPLIED WITH SELF–SEALING GASKET OF POLYISOPRENE (40 DUROMOTER) SET IN DOVETAIL GROVE PER DETAIL, ONLY WHEN SPECIFICALLY IDENTIFIED IN THE PLANS.
4. EACH CASTING SHALL BEAR AN IDENTIFICATION MARK, RECESSED FLUSH, INDICATING THE SOURCE OF MANUFACTURE, WHICH MARK SHALL EITHER BE A SYMBOL NOT OVER 1 1/2 INCHES IN GREATEST DIMENSION OR IN LETTER FORM NO GREATER THAN 3/4 INCH IN HEIGHT AND 2 INCHES IN LENTH. LOCATION OF IDENTIFICATION MARKS BY THE ENGINEER.

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 law of the State of Minnesota.
JOSEPH C. MUELLER
Date 5–4–10 Lic. No. 13942

APPROVED CITY ENGINEER	CITY OF ST. PAUL DEPARTMENT OF PUBLIC WORKS	Date of Revision	Standard Plate No.
	COVER CASTING "B"	MAY 2010	2202D

5 / C501 FRAME CASTING 'B'
NOT TO SCALE

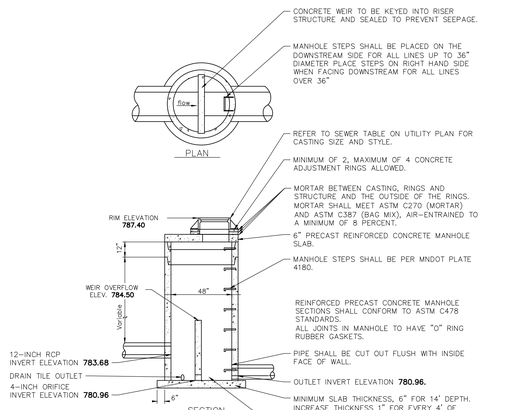


BIORETENTION SOIL MIX :
- 85–88% SAND BY VOLUME (ASTM C33)
- 8–12% FINES BY VOLUME (SILT AND CLAY, MAX CLAY CONTENT 5%)
- 3–5% MN/DOT 3890 GRADE 2 COMPOST BY VOLUME
- PHOSPHORUS INDEX BETWEEN 10 AND 30 MG/KG

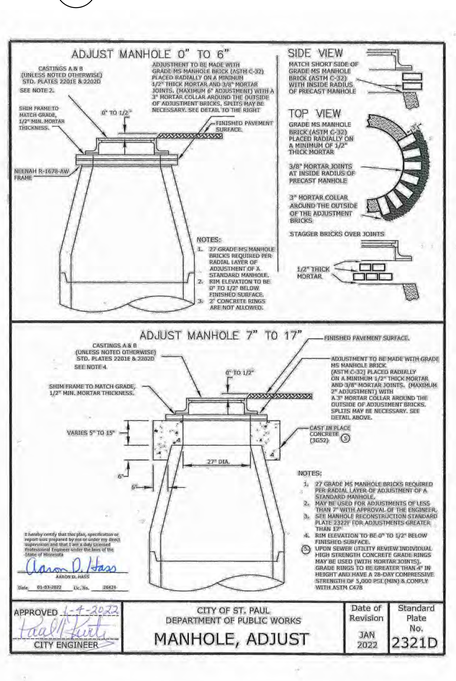
NOTES:
1. PLACE IN 12–15" LIFTS, HAND TAMPED. SUBMIT MIX DESIGN SHOP DRAWING FOR APPROVAL.
2. **REFER TO LANDSCAPE ARCHITECTURAL PLANS FOR SEEDING. (REMOVE RAIN GARDEN PLANTS NOTE IF USED)**
3. **APPLY MN/DOT 35–221 SEED MIX, ON SIDE SLOPES, AND 33–261 SEED MIX, ON BASIN BOTTOM, AT A RATE OF 60 LB PER ACRE. ADD AN ADDITIONAL 10 LB PER ACRE OF MN/DOT 21–111 OATS TO BOTH MIXES. (REMOVE RAIN GARDEN PLANTS NOTE IF USED. USE 33–261 SEED MIX IF LOCATED IN NORTHEAST MN.)**

DRAIN TILE ROCK PACK DETAIL

1 / C501 BIOFILTRATION BASIN DETAIL
NOT TO SCALE



2 / C501 STORM SEWER MANHOLE WITH WEIR
NOT TO SCALE



3 / C501 MANHOLE, ADJUST
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BKBM Project No. 24226.5

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025
BKBM Project Number: 24426.50

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JOEL W. MAIER
PRINT NAME

SIGNATURE

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LICENSE NO.

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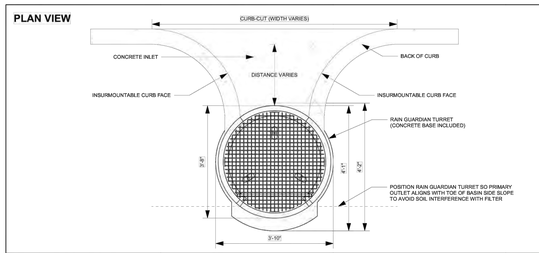
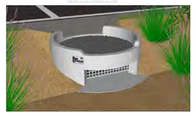
SHEET TITLE:
CIVIL DETAILS

SHEET NUMBER:
C501



PLAN VIEW NOTES
1. INLET WIDTH AND DISTANCE BETWEEN BACK OF CURB AND RAIN GUARDIAN TURRET MAY VARY WITH SITE CONDITIONS.
2. CONCRETE BASE EXTENDS BEYOND THE FILTER WALL OF THE RAIN GUARDIAN TURRET TO SERVE AS A SPLASH DISSIPATOR.

3D VIEWS



ELEVATION VIEW NOTES
1. THE TOP OF THE CLASS 5 BASE (COMPACTED TO 95% STANDARD PROCTOR) IS PRECISELY 1'-4" BELOW THE GUTTERLINE ELEVATION.

SPECIFICATIONS
1. STEEL REINFORCED, COLD JOINT SECURED MONOLITHIC CONCRETE STRUCTURE (1,030 LBS). CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT 28 DAYS. CONCRETE AIR ENTRAINED (4% TO 8% BY VOLUME). MANUFACTURED AND DESIGNED TO ASTM C858.

2. THREE-POINT PICK USING RECESSED LIFTING POCKETS WITH A STANDARD HOOK.

3. FIBERGLASS TOP GRATE (32 LBS, 1-1/2" THICK) - 1,760 LB CONCENTRATED LOAD OR 409 LB/SQ-FT UNIFORM LOAD.

INSTALLATION NOTES
1. INSTALL THE CLASS 5 BASE (COMPACTED TO 95% STANDARD PROCTOR). THE DISTANCE FROM THE BACK OF THE CURB MAY VARY BASED ON SITE CONDITIONS, BUT CONSIDERATIONS SHOULD INCLUDE SLOPE OF THE INLET AND BASIN SIDE SLOPES ADJACENT TO THE RAIN GUARDIAN TURRET. POSITION RAIN GUARDIAN TURRET SO PRIMARY OUTLET ALIGNS WITH TOE OF BASIN SIDE SLOPE TO AVOID SOIL INTERFERENCE WITH REMOVABLE FILTER WALL. EXCAVATE 1' 10" BELOW THE GUTTERLINE ELEVATION (I.E. THE BIORETENTION OVERFLOW ELEVATION) TO ACCOMMODATE THE 1' PONDING DEPTH, 6" CLASS 5 AGGREGATE, AND 4" RAIN GUARDIAN TURRET BASE (INCLUDED). THEREFORE, THE TOP OF THE CLASS 5 COMPACTED BASE IS PRECISELY 1' 4" BELOW THE GUTTERLINE ELEVATION. THE INLET TO THE RAIN GUARDIAN TURRET WILL BE 10-1/2" ABOVE THE TOP OF THE CONCRETE BASE AND 1-1/2" BELOW THE GUTTERLINE ELEVATION TO ACCOMMODATE A SLOPED INLET FROM THE GUTTER TO THE RAIN GUARDIAN TURRET.

2. SET RAIN GUARDIAN TURRET ON THE PREPARED CLASS 5 BASE.

3. INSTALL FRAMING FOR INLET BETWEEN RAIN GUARDIAN TURRET AND BACK OF CURB. TOP ELEVATIONS OF THE FRAMING SHOULD MATCH THE TOP OF THE CURB ON THE STREET SIDE AND THE TOP OF THE RAIN GUARDIAN TURRET ON THE BIORETENTION SIDE.

4. INSTALL EXPANSION/CONTRACTION JOINT MATERIAL OR A SHEET OF POLY TO SERVE AS A BOND BREAK BETWEEN RAIN GUARDIAN TURRET AND CONCRETE INLET BEFORE POURING INLET.

5. SIDE CURBS OF THE POURED INLET MUST HAVE AN INSURMOUNTABLE PROFILE TO PREVENT WATER FLOW FROM OVERTOPPING THE DOWNSTREAM SIDE OF THE INLET.

6. REMOVABLE FILTER WALL SHOULD BE INSTALLED WITH FILTER FABRIC ON THE INTERIOR SIDE OF THE RAIN GUARDIAN TURRET.

RAIN GUARDIAN
U.S. PATENT NOS. 8,501,016 AND 8,950,994
PRETREATMENT FOR BIORETENTION
Rain Gardens • Swales • Filtration Basins • Infiltration Basins
www.RainGuardian.biz

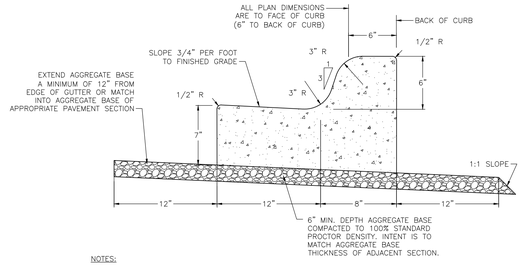
RAIN GUARDIAN TURRET
PRETREATMENT CHAMBER
BIORETENTION PONDING DEPTH: 1'
TYPICAL DETAIL

REVISION HISTORY

REV	BY	DATE	DESCRIPTION
A	MDH	04/27/2022	TURRET - 1'
SCALE		VARIABLE	
U.S. PATENT NOS.		8,501,016 AND 8,950,994	

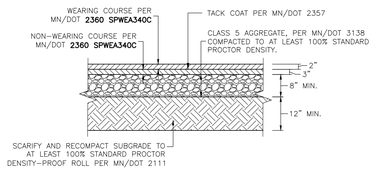
DEVELOPED BY: ANOKA CONSERVATION DISTRICT
MANUFACTURED BY: Rinker MATERIALS

7 C502 RAIN GUARDIAN TURRET
NOT TO SCALE

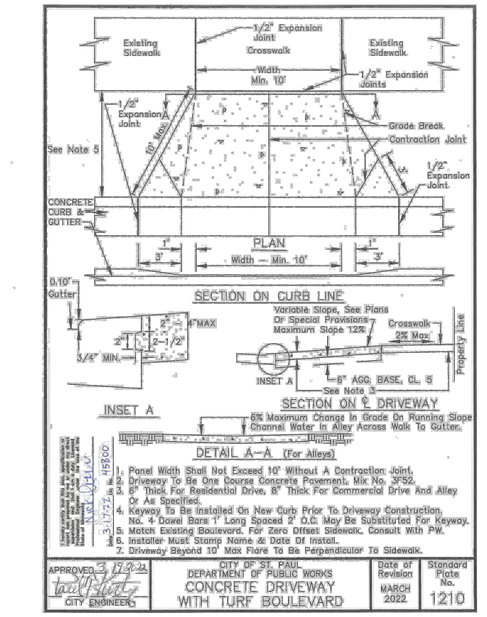


NOTES:
1. DIRECTION OF TRANSVERSE GUTTER SLOPE TO MATCH DIRECTION OF ADJACENT PAVEMENT SLOPE.
2. CONSTRUCT CURB AND GUTTER IN ACCORDANCE WITH MNDOT SPECIFICATION 2531.

3 C502 B612 CONCRETE CURB AND GUTTER
NOT TO SCALE



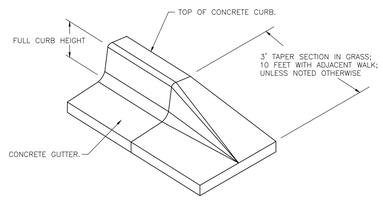
4 C502 BITUMINOUS PAVEMENT
NOT TO SCALE



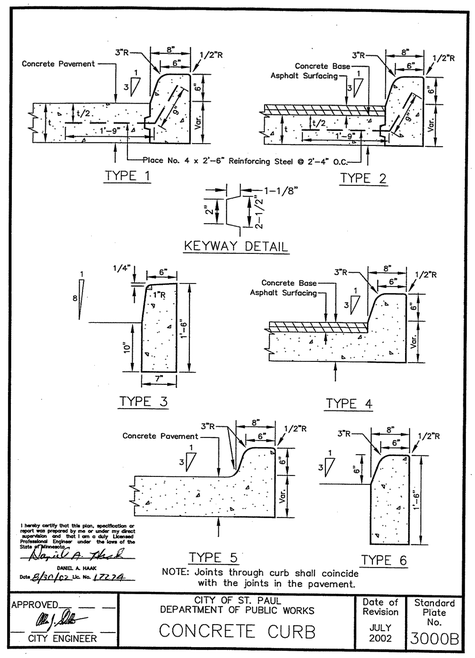
1 C502 CONCRETE DRIVEWAY
NOT TO SCALE

NOTE:
1: JOINT SPACING SHALL BE A MAXIMUM OF 6-FEET ON CENTER.

5 C502 CONCRETE SIDEWALK (TYP.)
NOT TO SCALE



6 C502 NOSE-DOWN CURB SECTION
NOT TO SCALE



NOTE: Joints through curb shall coincide with the joints in the pavement.

2 C502 CONCRETE CURB
NOT TO SCALE

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BKBM Project No. 24226.5

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SHEET NUMBER:
C502

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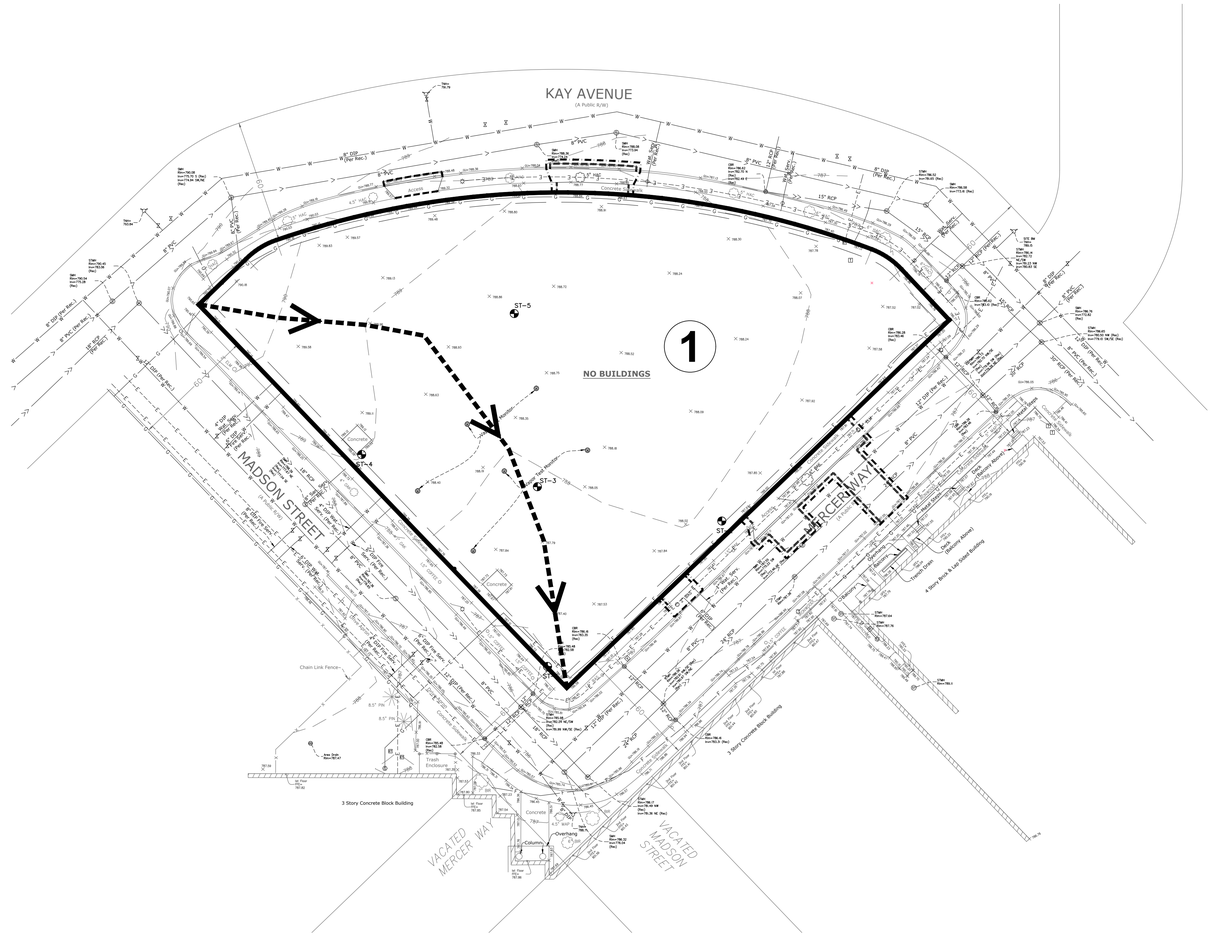
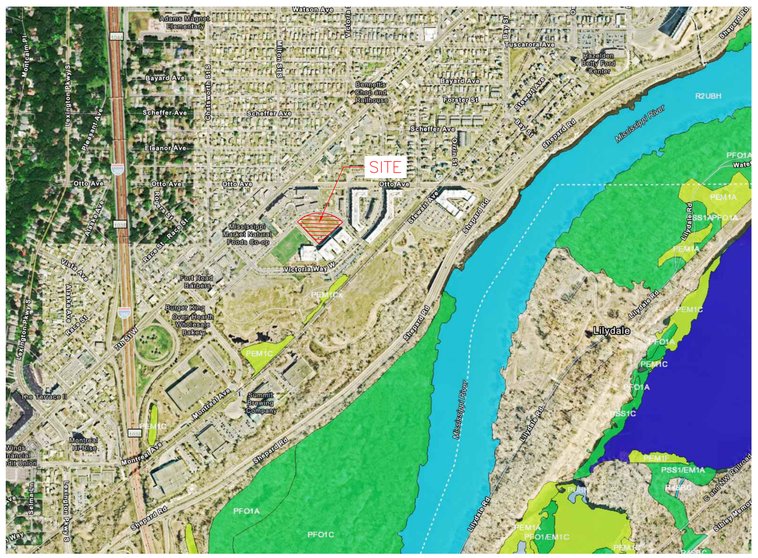
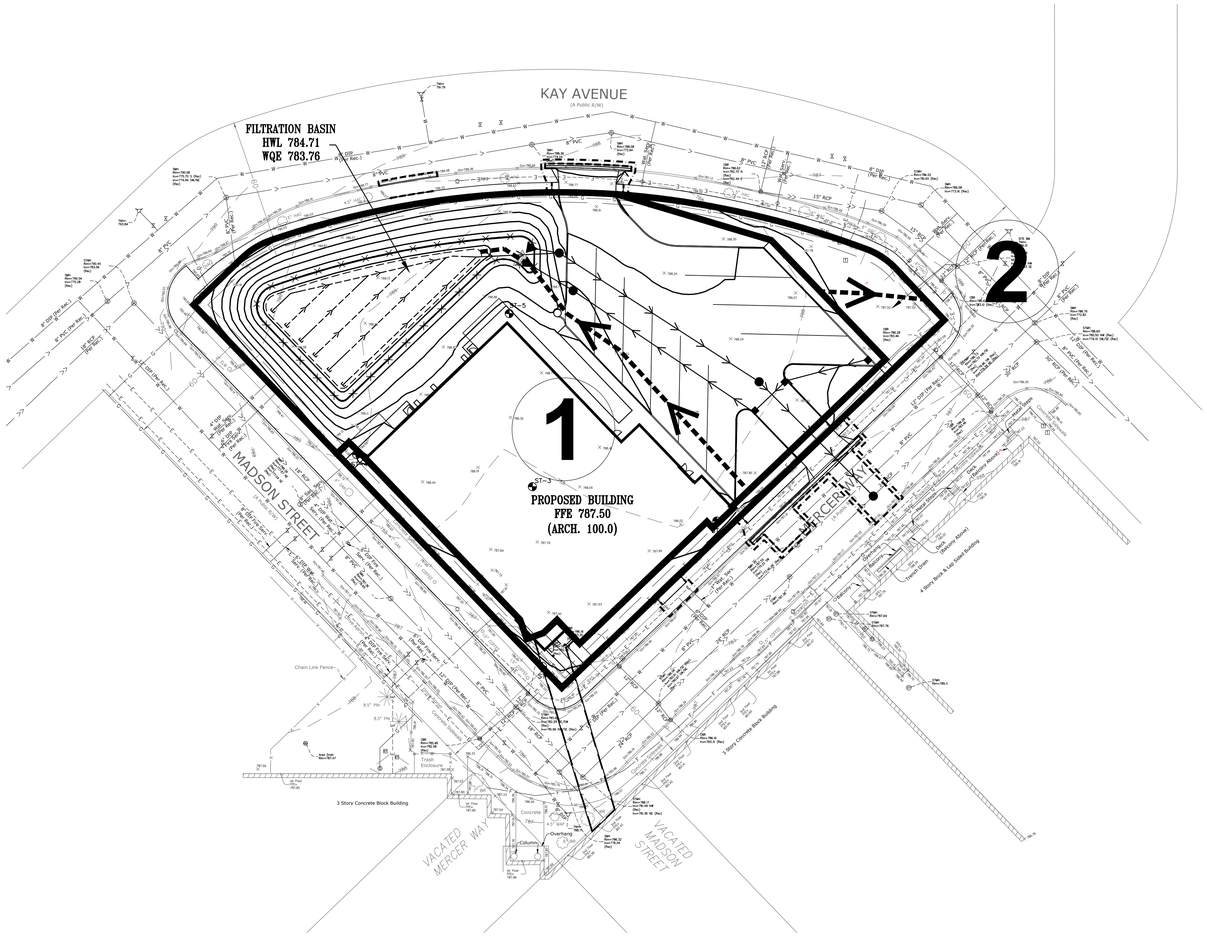
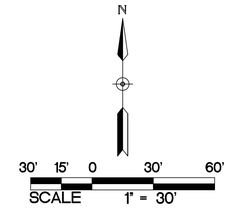


1 C600 EXISTING CONDITIONS
1" = 30'


SITE
Wilson Ave
Maryland Ave
Sterling St
Margaret St
Minnehaha Ave
Hudson Rd
Burns Ave
Hyacinth Ave
Hyacinth Pl
Hyacinth Ct
Hyacinth Terr
Hyacinth Cir
Hyacinth Way
Hyacinth Ln
Hyacinth Trl
Hyacinth Curve
Hyacinth Loop
Hyacinth Path
Hyacinth Crossing
Hyacinth Run
Hyacinth Vista
Hyacinth Overlook
Hyacinth Bend
Hyacinth Hollow
Hyacinth Meadow
Hyacinth Grove
Hyacinth Glen
Hyacinth Ridge
Hyacinth Knoll
Hyacinth Hill
Hyacinth Valley
Hyacinth Creek
Hyacinth Pond
Hyacinth Lake
Hyacinth Shore
Hyacinth Beach
Hyacinth Island
Hyacinth Peninsula
Hyacinth Cove
Hyacinth Bay
Hyacinth Harbor
Hyacinth Port
Hyacinth Dock
Hyacinth Pier
Hyacinth Wharf
Hyacinth Quay
Hyacinth Marina
Hyacinth Yacht Club
Hyacinth Sailing Club
Hyacinth Rowing Club
Hyacinth Canoe Club
Hyacinth Kayak Club
Hyacinth Paddle Club
Hyacinth Oar Club
Hyacinth Boat Club
Hyacinth Ship Club
Hyacinth Navy Club
Hyacinth Coast Guard Club
Hyacinth Lighthouse Club
Hyacinth Beacon Club
Hyacinth Buoy Club
Hyacinth Anchor Club
Hyacinth Mast Club
Hyacinth Sail Club
Hyacinth Rudder Club
Hyacinth Propeller Club
Hyacinth Engine Club
Hyacinth Motor Club
Hyacinth Fuel Club
Hyacinth Oil Club
Hyacinth Gas Club
Hyacinth Electric Club
Hyacinth Battery Club
Hyacinth Wire Club
Hyacinth Cable Club
Hyacinth Fiber Club
Hyacinth Optic Club
Hyacinth Light Club
Hyacinth Bulb Club
Hyacinth Lamp Club
Hyacinth Shade Club
Hyacinth Switch Club
Hyacinth Plug Club
Hyacinth Socket Club
Hyacinth Outlet Club
Hyacinth Inlet Club
Hyacinth Valve Club
Hyacinth Pump Club
Hyacinth Motor Club
Hyacinth Engine Club
Hyacinth Fuel Club
Hyacinth Oil Club
Hyacinth Gas Club
Hyacinth Electric Club
Hyacinth Battery Club
Hyacinth Wire Club
Hyacinth Cable Club
Hyacinth Fiber Club
Hyacinth Optic Club
Hyacinth Light Club
Hyacinth Bulb Club
Hyacinth Lamp Club
Hyacinth Shade Club
Hyacinth Switch Club
Hyacinth Plug Club
Hyacinth Socket Club
Hyacinth Outlet Club
Hyacinth Inlet Club
Hyacinth Valve Club
Hyacinth Pump Club
R2UBH
PFO1A
PEMA
PEMC
PSS1/EM1A
PSS1C
PEMF
PEM1C
PFO1C
PEM1/EM1C
Lilydale
Mississippi River Regional Park
Pool Field Archery
Super Mac Boat Launch Parking Lot
Lilydale Regional Park
Lilydale Fish Pond Picnic Area
Lilydale Regional Park Picnic Area
Lilydale Regional Park Picnic Area
Lilydale Regional Park



1 / C601 PROPOSED CONDITIONS
1" = 30'



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SHEET TITLE:
STORM WATER POLLUTION PREVENTION PLAN

SHEET NUMBER:
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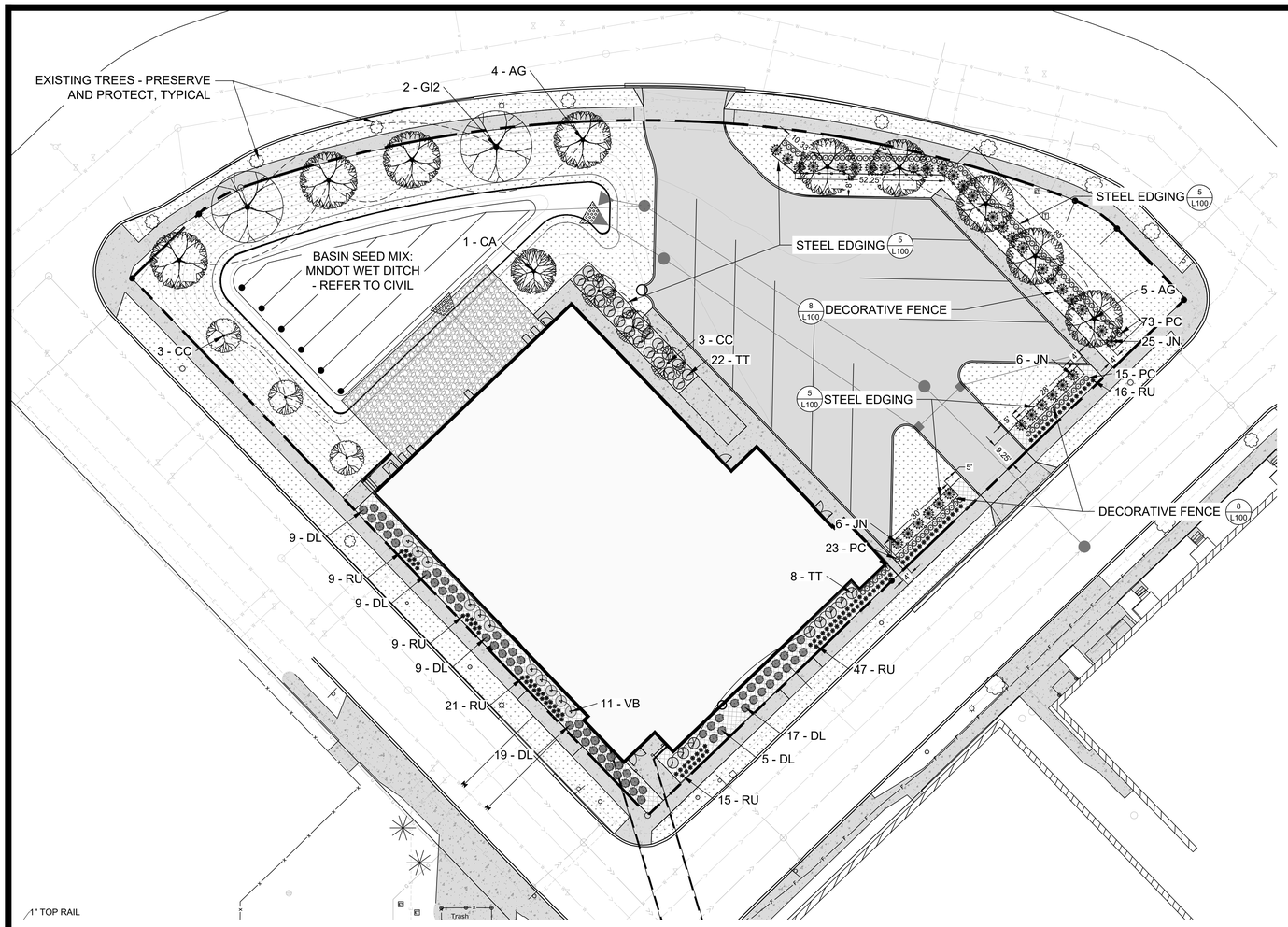


1 LANDSCAPE PLAN
1" = 30'-0"

GENERAL NOTES

1. CONTRACTOR SHALL SEED WITH TEMPORARY COVER CROP THE ENTIRE SITE PRIOR TO GROUND-DISTURBING ACTIVITIES (EXCEPT AREAS ALREADY STABILIZED WITH VEGETATIVE COVER). COVER WITH CLEAN STRAW MULCH (TYPE 3) AND DISC ANCHOR PER MNDOT SPECIFICATIONS. USE A COVER CROP OF OATS AT A RATE OF 80 LB PER ACRE.
2. LANDSCAPE CONTRACTOR SHALL INSPECT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS RELATING TO THE NATURE AND SCOPE OF WORK.
3. LANDSCAPE CONTRACTOR SHALL VERIFY PLAN LAYOUT AND BRING TO THE ATTENTION OF THE LANDSCAPE ARCHITECT DISCREPANCIES WHICH MAY COMPROMISE THE DESIGN OR INTENT OF THE LAYOUT.
4. LANDSCAPE CONTRACTOR SHALL ASSURE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS GOVERNING THE WORK AND MATERIALS SUPPLIED.
5. LANDSCAPE CONTRACTOR SHALL VERIFY ALIGNMENT AND LOCATION OF UNDERGROUND AND ABOVE GRADE UTILITIES AND PROVIDE THE NECESSARY PROTECTION FOR SAME BEFORE CONSTRUCTION BEGINS.
6. LANDSCAPE CONTRACTOR SHALL REVIEW THE SITE FOR DEFICIENCIES IN SITE CONDITIONS WHICH MIGHT NEGATIVELY AFFECT PLANT ESTABLISHMENT, SURVIVAL OR WARRANTY. UNDESIRABLE SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO BEGINNING OF WORK.
7. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR ONGOING MAINTENANCE OF NEWLY INSTALLED MATERIALS UNTIL TIME OF FINAL ACCEPTANCE BY LANDSCAPE ARCHITECT. REPAIR OF ACTS OF VANDALISM OR DAMAGE WHICH MAY OCCUR PRIOR TO FINAL ACCEPTANCE SHALL BE THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR.

PLANTING NOTES

1. NO PLANTS WILL BE INSTALLED UNTIL FINAL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
2. PROPOSED PLANT MATERIAL SHALL COMPLY WITH THE CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, ANSI Z60.1. UNLESS NOTED OTHERWISE, DECIDUOUS SHRUBS SHALL HAVE AT LEAST 5 CANES AT THE SPECIFIED HEIGHT. ORNAMENTAL TREES SHALL HAVE NO 'V' CROTCHES AND SHALL BEGIN BRANCHING NO LOWER THAN 3' FEET ABOVE THE ROOT BALL. STREET AND BOULEVARD TREES SHALL BEGIN BRANCHING NO LOWER THAN 6' ABOVE PAVED SURFACE.
3. PLANT SYMBOLS ON PLAN DRAWING TAKES PRECEDENCE OVER PLANT SCHEDULE IF DISCREPANCIES IN QUANTITIES EXIST. SPECIFICATIONS AND DETAILS TAKE PRECEDENCE OVER NOTES.
4. TREES SHALL BE LOCATED AND STAKED AS SHOWN ON PLAN. LANDSCAPE ARCHITECT MUST APPROVE STAKING OF PLANT MATERIAL PRIOR TO DIGGING.
5. NO PLANT MATERIAL SUBSTITUTIONS WILL BE ACCEPTED UNLESS APPROVAL IS GRANTED BY THE LANDSCAPE ARCHITECT TO THE LANDSCAPE CONTRACTOR IN WRITING.
6. ADJUSTMENTS IN LOCATION OF PROPOSED PLANT MATERIALS MAY BE NEEDED IN FIELD. LANDSCAPE ARCHITECT MUST BE NOTIFIED PRIOR TO ADJUSTMENT OF PLANTS.
7. PLANT MATERIALS TO BE INSTALLED PER PLANTING DETAILS.
8. WATER ALL PLANT MATERIAL WITHIN 2 HOURS OF PLANTING. APPLY ENOUGH WATER TO THOROUGHLY SATURATE ALL PLANTING SOIL.
9. LANDSCAPE CONTRACTOR SHALL WARRANTY NEW PLANT MATERIAL THROUGH ONE CALENDAR YEAR FROM THE DATE OF FINAL ACCEPTANCE BY LANDSCAPE ARCHITECT. NO PARTIAL ACCEPTANCE WILL BE CONSIDERED.

TURF NOTES

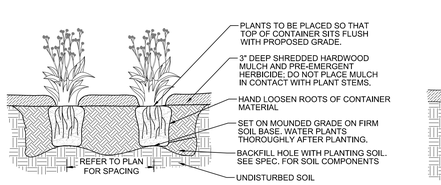
1. SOD ALL AREAS DISTURBED DUE TO GRADING AND CONSTRUCTION, EXCEPT BASIN BOTTOMS PER PLAN.
2. WHERE SOD ABUTS PAVED SURFACES, FINISHED GRADE OF SOD SHALL BE HELD 1.5" BELOW SURFACE ELEVATION OF SLAB.
3. SOD SHALL BE LAID PARALLEL TO THE CONTOURS AND SHALL HAVE STAGGERED JOINTS. ON SLOPES 3:1 OR STEEPER OR IN DRAINAGE SWALES, SOD SHALL BE STAKED SECURELY. STAKE SOD SECURELY OVER TURF REINFORCEMENT MAT OVERFLOWS.
4. WATER SOD REGULARLY FOR A MINIMUM OF 30 DAYS. SUFFICIENTLY TO ENSURE ESTABLISHMENT OF PERMANENT VEGETATION. IN THE ABSENCE OF RAIN THIS MEANS A MINIMUM OF .75" AND A MAXIMUM OF 1.0" OF WATER PER SQUARE FOOT PER DAY. CONTRACTOR TO PROVIDE 30 DAY WARRANTY ON ALL SOD.

PLANT AND MATERIALS SCHEDULE

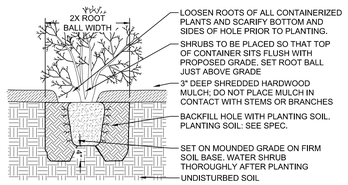
SYMBOL	CODE	BOTANICAL / COMMON NAME	SIZE	CONT.	QTY
CONIFEROUS TREES					
	JN	Juniperus virginiana 'J.N. Select Green' / Emerald Feather™ Eastern Redcedar	5` Ht.	B&B	37
DECIDUOUS TREES					
	AG	Amelanchier x grandiflora 'Autumn Brilliance' / Autumn Brilliance Apple Serviceberry	2.5" Cal.	B&B	9
	CC	Carpinus caroliniana 'Uxbridge' / Rising Fire® American Hornbeam	2.5" Cal.	B&B	6
	CA	Cornus alternifolia / Pagoda Dogwood	2.5" Cal.	B&B	1
	GI2	Gleditsia triacanthos inermis `Harve` / Northern Acclaim® Honey Locust	2.5" Cal.	B&B	2
DECIDUOUS SHRUBS					
	DL	Diervilla lonicera / Bush Honeysuckle	# 2	Cont	68
	VB	Viburnum trilobum 'Bailey Compact' / Bailey's Compact Cranberrybush	# 5	Cont	11
EVERGREEN SHRUBS					
	TT	Taxus x media 'Tauntonii' / Taunton's Anglo-Japanese Yew	# 5	Cont	30
PERENNIALS					
	RU	Rudbeckia x 'American Gold Rush' / American Gold Rush Coneflower	1 gal.	Cont	117
GRASSES AND SEDGES					
	PC	Panicum virgatum 'Cheyenne Sky' / Cheyenne Sky Prairie Winds® Switch Grass	1 gal.	Cont	111

AREAS

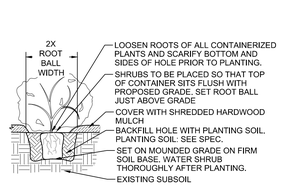
SYMBOL	CODE	DESCRIPTION	QTY
	MULCH	Planting Bed Mulch	4,292 SF
	SOD	Turf Sod	7,113 SF



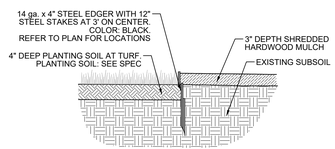
2 PERENNIAL CONTAINER PLANTING DETAIL
NO SCALE



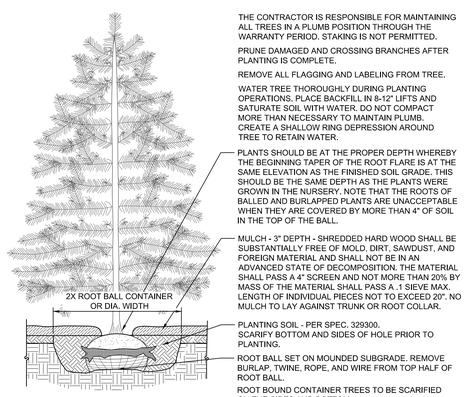
3 DECIDUOUS SHRUB PLANTING DETAIL
NO SCALE



4 EVERGREEN SHRUB PLANTING DETAIL
NO SCALE



5 STEEL EDGING DETAIL
NO SCALE



THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL TREES IN A PLUMB POSITION THROUGH THE WARRANTY PERIOD. STAKING IS NOT PERMITTED.

PRUNE DAMAGED AND CROSSING BRANCHES AFTER PLANTING IS COMPLETE.

REMOVE ALL FLAGGING AND LABELING FROM TREE.

WATER TREE THOROUGHLY DURING PLANTING OPERATIONS. PLACE BACKFILL IN 8-12" LIFTS AND SATURATE SOIL WITH WATER. DO NOT COMPACT MORE THAN NECESSARY TO MAINTAIN PLUMB. CREATE A SHALLOW RING DEPRESSION AROUND TREE TO RETAIN WATER.

PLANTS SHOULD BE AT THE PROPER DEPTH WHEREBY THE BEGINNING TAPER OF THE ROOT FLARE IS AT THE SAME ELEVATION AS THE FINISHED SOIL GRADE. THIS SHOULD BE THE SAME DEPTH AS THE PLANTS WERE GROWN IN THE NURSERY. NOTE THAT THE ROOTS OF BALLED AND BURLAPPED PLANTS ARE UNACCEPTABLE WHEN THEY ARE COVERED BY MORE THAN 4" OF SOIL IN THE TOP OF THE BALL.

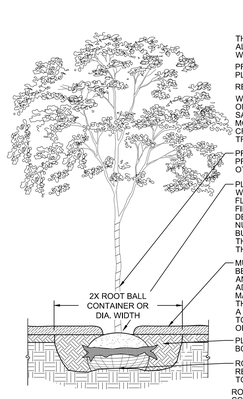
MULCH - 3" DEPTH - SHREDDED HARD WOOD SHALL BE SUBSTANTIALLY FREE OF MOLD, DIRT, SAWDUST, AND FOREIGN MATERIAL AND SHALL NOT BE IN AN ADVANCED STATE OF DECOMPOSITION. THE MATERIAL SHALL PASS A 4" SCREEN AND NOT MORE THAN 20% BY MASS OF THE MATERIAL SHALL PASS A .1 SIEVE MAX. LENGTH OF INDIVIDUAL PIECES NOT TO EXCEED 20". NO MULCH TO LAY AGAINST TRUNK OR ROOT COLLAR.

PLANTING SOIL - PER SPEC, 329300. SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING.

ROOT BALL SET ON MOUNDED SUBGRADE. REMOVE BURLAP, TWINE, ROPE, AND WIRE FROM TOP HALF OF ROOT BALL.

ROOT BOUND CONTAINER TREES TO BE SCARIFIED ON THE SIDES AND BOTTOM.

6 CONIFEROUS TREE PLANTING DETAIL
NO SCALE



THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL TREES IN A PLUMB POSITION THROUGH THE WARRANTY PERIOD. STAKING IS NOT PERMITTED.

PRUNE DAMAGED AND CROSSING BRANCHES AFTER PLANTING IS COMPLETE.

REMOVE ALL FLAGGING AND LABELING FROM TREE.

WATER TREE THOROUGHLY DURING PLANTING OPERATIONS. PLACE BACKFILL IN 8-12" LIFTS AND SATURATE SOIL WITH WATER. DO NOT COMPACT MORE THAN NECESSARY TO MAINTAIN PLUMB. CREATE A SHALLOW RING DEPRESSION AROUND TREE TO RETAIN WATER.

PROVIDE FLEXIBLE, CORRUGATED TREE PROTECTION ON ALL DECIDUOUS TREES UNLESS OTHERWISE SPECIFIED.

PLANTS SHOULD BE AT THE PROPER DEPTH WHEREBY THE BEGINNING TAPER OF THE ROOT FLARE IS AT THE SAME ELEVATION AS THE FINISHED SOIL GRADE. THIS SHOULD BE THE SAME DEPTH AS THE PLANTS WERE GROWN IN THE NURSERY. NOTE THAT THE ROOTS OF BALLED AND BURLAPPED PLANTS ARE UNACCEPTABLE WHEN THEY ARE COVERED BY MORE THAN 4" OF SOIL ON THE TOP OF THE BALL.

MULCH - 3" DEPTH - SHREDDED HARD WOOD SHALL BE SUBSTANTIALLY FREE OF MOLD, DIRT, SAWDUST, AND FOREIGN MATERIAL AND SHALL NOT BE IN AN ADVANCED STATE OF DECOMPOSITION. THE MATERIAL SHALL PASS A 4" SCREEN AND NOT MORE THAN 20% BY MASS OF THE MATERIAL SHALL PASS A .1 SIEVE MAX. LENGTH OF INDIVIDUAL PIECES NOT TO EXCEED 20". NO MULCH TO LAY AGAINST TRUNK OR COLLAR.

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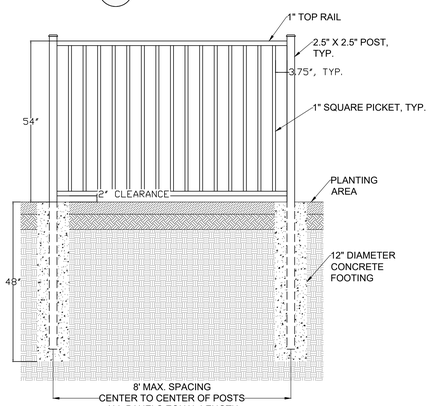
ROOT BALL SET ON MOUNDED SUBGRADE. REMOVE BURLAP, TWINE, ROPE, AND WIRE FROM TOP HALF OF ROOT BALL

ROOT BOUND CONTAINER TREES TO BE SCARIFIED ON THE SIDES AND BOTTOM.

7 DECIDUOUS TREE PLANTING DETAIL
NO SCALE



8 DECORATIVE FENCE DETAIL
NO SCALE

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CONSULTANT

EOR water ecology community
EMMONS & OLIVIER RESOURCES, INC.
1919 UNIV. AVE. W. - #300 ST. PAUL, MN
TEL: 651.770.8448 WWW.EORINC.COM

FOR REVIEW ONLY, NOT FOR CONSTRUCTION

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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 ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME

SIGNATURE

LICENSE NO.

05/23/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
LANDSCAPE PLAN

SHEET NUMBER:
L100

PROJECT NARRATIVE
THIS PROJECT IS PROVIDING ADDITIONAL SPACE ON THE NOVA CLASSICAL ACADEMY CAMPUS. THE PROJECT WILL ADD A NEW OPEN RECREATION/FLEXIBLE TEACHING SPACE, WHICH IS DESIGNED AS AN ICC 500 COMPLIANT STORM SHELTER, AS WELL AS A HOST BUILDING WITH STAFF AND ADMINISTRATIVE OFFICES, A LARGE MEETING/SEMINAR ROOM AND OTHER ADDITIONAL SUPPORT SPACES. THIS PROJECT ALSO INCLUDES A PEDESTRIAN SKYWAY BRIDGE TO CONNECT THE NEW BUILDING TO THE EXISTING NOVA CLASSICAL ACADEMY BUILDING, AS WELL AS MINOR INTERIOR RENOVATIONS WITHIN THE EXISTING BUILDING. NO ADDITIONAL SQUARE FOOTAGE IS BEING ADDED TO THE EXISTING NOVA CLASSICAL ACADEMY BUILDING AS A RESULT OF THIS PROJECT.

APPLICABLE CODES
2020 MN STATE BUILDING CODE
2024 MN COMMERCIAL ENGERY CODE (ASHRE 90.1- 2019 WITH MN AMENDMENTS)
2020 MN ACCESSIBILITY CODE
2020 MN MECHANICAL CODE
2020 MN ELECTRICAL CODE
2020 MN PLUMBING CODE
2020 MN STATE FIRE CODE
2020 MN CONSERVATION CODE FOR EXISTING BUILDINGS
ICC 500 - 2014

CONSTRUCTION CLASSIFICATION
TYPE IIB CONSTRUCTION

BUILDING OCCUPANCY CLASSIFICATION AND USE

GROUP E OCCUPANCY
IN ACCORDANCE WITH 303.1.3 - A ROOM OR SPACE USED FOR ASSEMBLY PURPOSES THAT IS ASSOCIATED WITH A GROUP E OCCUPANCY IS NOT CONSIDERED A SEPARATE OCCPANCY

GENERAL BUILDING HEIGHTS AND AREAS SUMMARY (EXISTING)
THE EXISTING NOVA CLASSICAL ACADEMY BUILDING WAS CONSTRUCTED IN 2011/2012 AND WAS DESIGNED BY RIVERA ARCHITECTS. THE EXISTING BUILDING IS DESIGNED AS A TYPE II-B, E-OCCUPANCY BUILDING. THE CODE PLAN ON FILE FROM THE EXISTING DOCUMENTS INDICATES THAT THE BUILDING WAS WITHIN THE ALLOWABLE AREA AT THE TIME OF DESIGN/CONSTRUCTION. THE CODE PLAN ISSUED IN THE 2011 DOCUMENT SET IDENTIFIES COMPLIANCE WITH THE 2007 MINNESOTA STATE BUILDING CODE. ACCORDING TO THE BUILDING HEIGHTS AND AREA SUMMARY, THE EXISTING BUILDING IS 44,420SF ON THE FIRST FLOOR, 22,392SF FOR FLOORS 2 AND 3, WITH AN ALLOWABLE AREA PER FLOOR IS 51,620SF (ACCORDING TO THE CODE PLAN CALCULATIONS). THE ALLOWABLE NUMBER OF STORIES IS IDENDIFIED ON THE CODE SHEET AS 3 (2 + 1 FLOOR SPRINKLER INCREASE), THE EXISITNG BUILDING IS 3 STORIES. BASED ON A CURSORY REVIEW, THE EXISTING BUILDING REMAINS COMPLIANT WITH *CURRENT* (2020 MSBC) BUILDING HEIGHTS AND AREAS FOR TYPE IIB CONSTRUCTION WITH A GROUP E OCCUPANCY (43,500SF *TABULAR* + 8,120SF *FRONTAGE INCREASE* = 51,620SF ALLOWABLE PER STORY) .

GENERAL BUILDING HEIGHTS AND AREAS (NEW)

IN ACCORDANCE WITH SECTION 510.2, NEW CONSTRUCTION IS HORIZONTALLY SEPARATED FROM THE EXISTING BUILDING BY A FIRE WALL. THE IDENTIFIED FIRE WALL IS 2HR RATED IN ACCORDANCE WITH TABLE 706.4 NOTE "a"

ALLOWABLE HEIGHT (TABLE 504.3)
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE FOR SPRINKLERED **TYPE II B** CONSTRUCTION FOR OCCUPANCY CLASSIFICATION **E: 75 FEET**
ACTUAL HEIGHT OF ## FEET IS LESS THAN 75 FEET

ALLOWABLE NUMBER OF STORIES (TABLE 504.4)
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE FOR SPRINKLERED **TYPE II B** CONSTRUCTION FOR OCCUPANCY CLASSIFICATION **E: 3 STORIES**
ACTUAL STORIES OF 2 STORIES IS LESS THAN 3 STORIES ALLOWED

ALLOWABLE AREA (TABLE 506.2)
PROPOSED BUILDING IS MORE THAN ONE STORY, AREAS NOTED IN TABLE 506.2 WILL BE USED
ALLOWABLE BUILDING AREA FACTOR FOR SPRINKLERED **TYPE II B** CONSTRUCTION FOR OCCUPANCY CLASSIFICATION **E S1: 43,500SF**

FRONTAGE INCREASE (506.3)
If = [F/P - .25] W/30
.68 = [678/723 - .25] 30/30

ALLOWABLE AREA DETERMINATION (506.2.3 SINGLE-OCCUPANCY, MULTISTORY BUILDINGS)
Aa = [At + (NS x If)]xSa
160,080sf = [43,500sf + (14,500sf x .68)]x3

ACTUAL AREA:
FLOOR 1: 14,109 sf
FLOOR 2: 14,254 sf
SKYWAY: 1,346 sf
TOTAL: 29,709 sf

ACTUAL AREA OF 29,709 sf IS LESS THAN CALCULATED TOTAL ALLOWABLE AREA OF 160,080 sf
ALL STORIES ARE LESS THAN THE MAXIMUM ALLOWABLE AREA PER STORY OF 53,360 sf

FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS

BUILDING ELEMENT	REQUIRED RATING
PRIMARY STRUCTURAL FRAME	0
BEARING WALLS (INTERIOR)	0
BEARING WALLS (EXTERIOR)	0
NON BEARING WALLS & PARTITIONS	0
FLOOR CONSTRUCTION	0
ROOF CONSTRUCTION	0

SUMMARY OF ADDITIONAL RELEVANT CODE SECTIONS

THIS SECTION IS INTENDED TO HIGHLIGHT CODE SECTIONS THAT MAY BE UNIQUE TO THIS PROJECT TYPE AND SCOPE, THIS SECTION IS NOT INTENDED TO CAPTURE OR SUMMARIZE ALL CODE REQUIREMENTS

423.4 STORM SHELTER FOR GROUP E OCCUPANCY
THIS PROJECT IS LOCATED IN RAMSEY COUNTY, AND HAS AN OCCUPANT LOAD OF 50 OR MORE. A STORM SHELTER CONSTRUCTED IN ACCORDANCE WITH THE ICC500-2014 IS REQUIRED. SEE SHEET A002 FOR SHELTER AREA CODE ANALYSIS AND ICC 500 COMPLIANCE.

SECTION 31 - PEDESTRIAN WALKWAYS AND TUNNELS
3104.3 CONSTRUCTION
THE PROPOSED PEDESTRIAN WALKWAY IS OF NON COMBUSTIBLE CONSTRUCTION, MEETING THE REQUIREMENT OF 3104.3 WITH NO EXCEPTIONS.

3104.5.2 ALTERNATIVE SEPARATION
THIS PROJECT WILL COMPLY WITH 3104.5.2.1 AND 3104.5.2.2 IN ACCORDANCE WITH 3104.5.2. THE DISTANCE BETWEEN THE TWO BUILDINGS IS GREATER THAN 10 FEET, THE PEDESTRIAN WALKWAY AND CONNECTED BUILDINGS ARE EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM, THE ROOF OF THE WALKWAY IS NOT GREATER THAN 55 FEET ABOVE GRADE, AND THE CONNECTION IS ON THE SECOND STORY
AS REQUIRED BY THIS SECTION, THE WALLS SEPARATING THE SKYWAY FROM THE BUILDING SHALL BE CAPABLE OF RESISTING THE PASSAGE OF SMOKE, AND THE GLASS WALL SEPARATING THE BUILDINGS WILL BE PROTECTED WITH A SPRINKLER SYSTEM IN ACCORDANCE WITH 903.3.1.1 (AS REQUIRED BY 314.5.2.2)

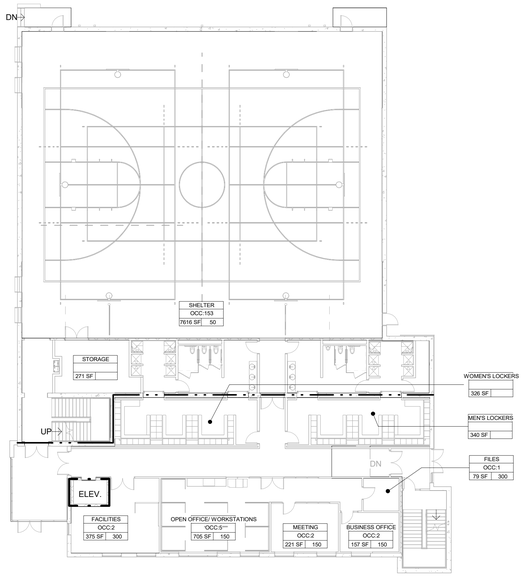
3104.6 PUBLIC WAY
THE PROPOSED PEDESTRIAN WALKWAY COMPIES WITH THE REQUIREMENTS OF SECTION 32 AS APPLICABLE, MEETING THE REQUIREMENTS OF 3104.6, SEE ADDITIONAL NARRATIVE UNDER "SECTION 32" HEADING

3104.9 EXIT ACCESS TRAVEL DISTANCE
EXCEPTION 1: EXIT ACCESS TRAVEL DISTANCE ON A PEDESTRIAN WALKWAY EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH 903.3.1.1 SHALL BE 250 FEET OR LESS. THE MEASURED WORST-CASE EXIT ACCESS TRAVEL DISTANCE AT THE PROPOSED PEDESTRIAN WALKWAY IS 239 FEET, WHICH IS LESS THAN THE ALLOWABLE 250 FEET.

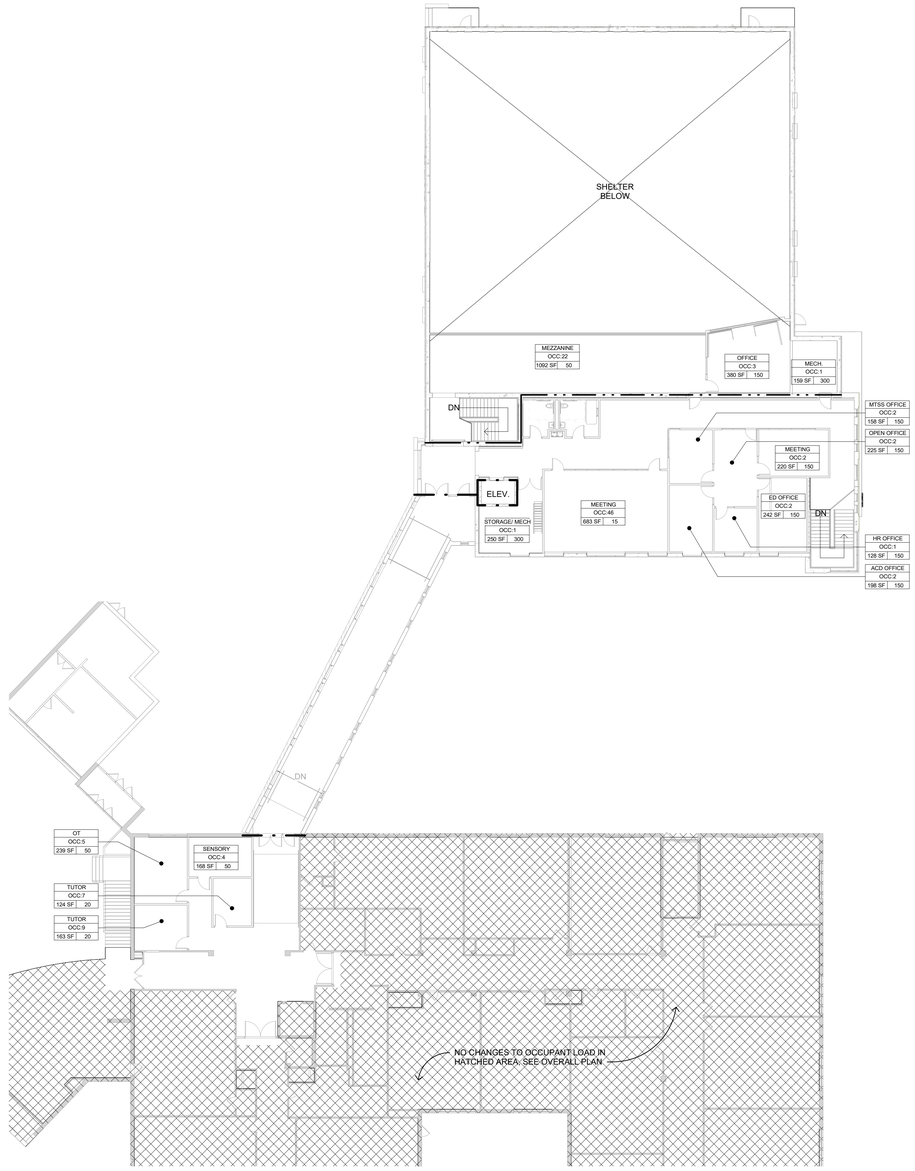
SECTION 32 ENCROACHMENTS INTO THE PUBLIC RIGHT-OF-WAY
3202.3.4 PEDESTRIAN WALKWAYS
THE VERITCAL CLEARANCE FROM THE PUBLIC RIGHT-OF-WAY TO THE LOWEST PART OF THE SKYWAY IS NOT LESS THAN 15 FEET.

BUILDING EGRESS

EGRESS REQUIRED FROM SHELTER OCCUPANT LOADS HAS BEEN CALCULATED AT .15" PER OCCUPANT
153 OCCUPANTS x .15 IN/OCCUPANT = 22.95 TOTAL INCHES REQUIRED.
TOTAL EGRESS INCHES PROVIDED AT GYMNASIUM = 238 INCHES



1 LEVEL 1 CODE PLAN
1/16" = 1'-0"



2 LEVEL 2 CODE PLAN
1/16" = 1'-0"

CODE PLAN LINE TYPE KEY
2HR FIRE BARRIER WALL
SMOKE RATED PARTITION

3 CODE LINE TYPES
1/16" = 1'-0"

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NOVA CLASSICAL ACADEMY
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ST. PAUL, MN 55102
Phone: 651.209.6320

CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
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PRINT NAME

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LICENSE NO.

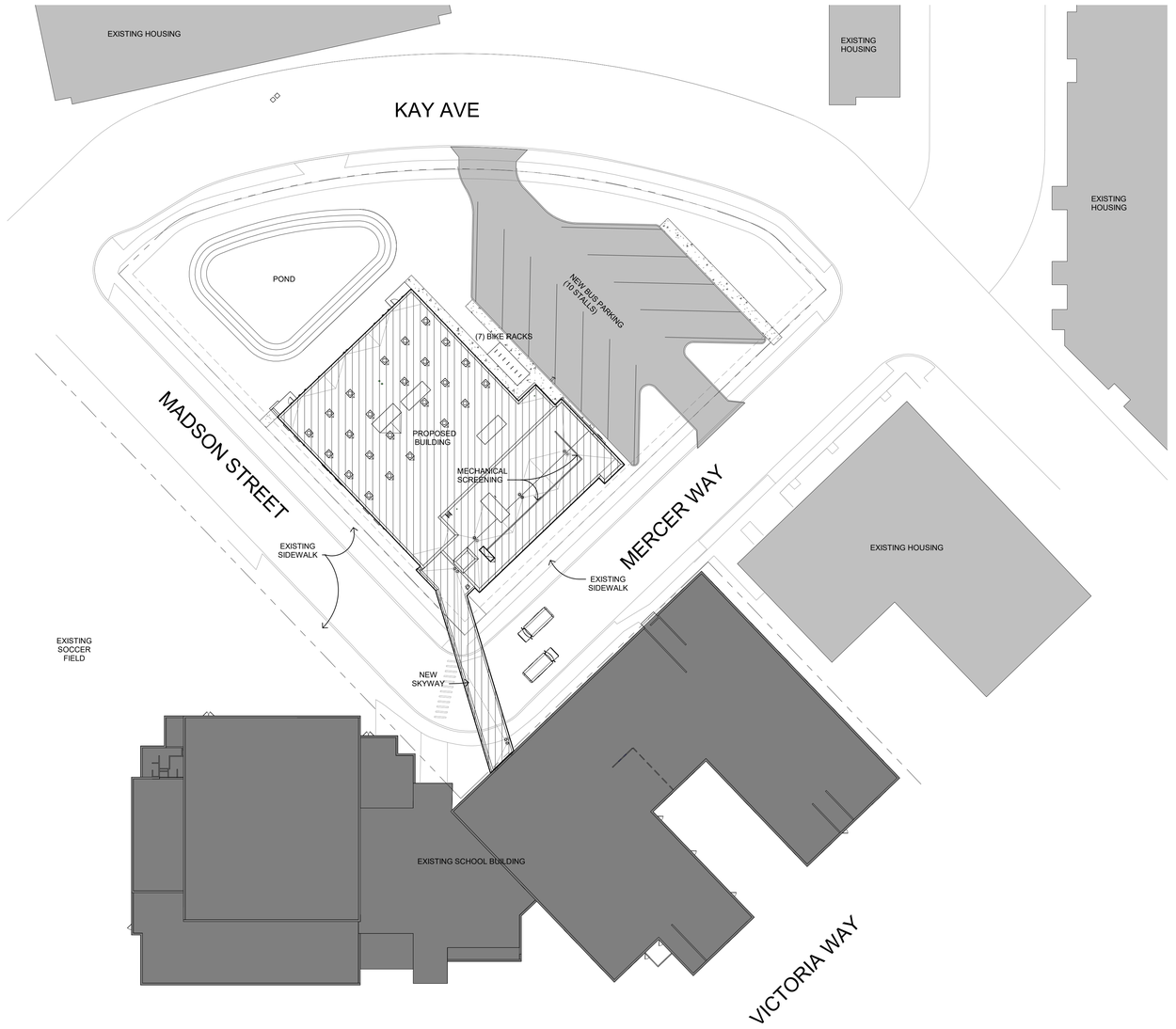
05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
BUILDING CODE SUMMARY

SHEET NUMBER:
A001

2308 BHY (FOSEL, P.A. - 0 CONSTRUCTION



1 SITE PLAN
1" = 30'-0"

PROJECT TRUE

BLOOM HAY DOBBS

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NOVA CLASSICAL ACADEMY
1455 VICTORIA WAY
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PRINT NAME

SIGNATURE

LICENSE NO.

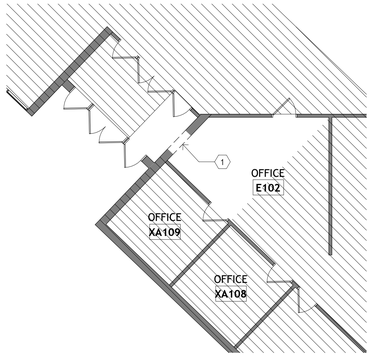
05/07/2025
DATE

DD DOCUMENT Not For Construction

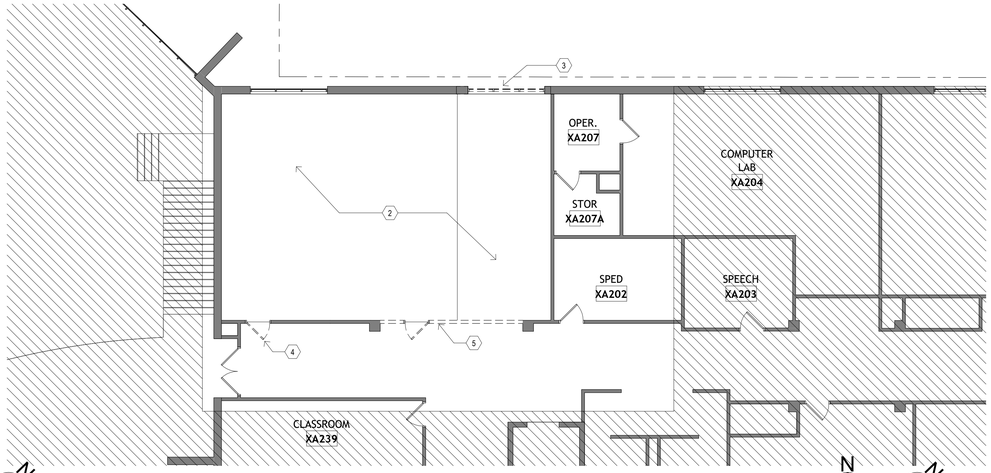
SHEET TITLE:
ARCHITECTURAL SITE PLAN

SHEET NUMBER:
A100

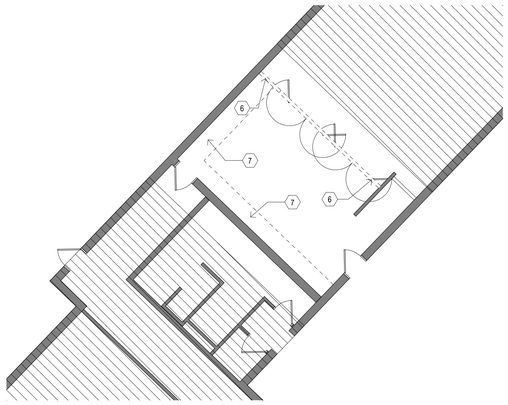
208 BAY DOBBS, P.A. - ©2025 BLOOM



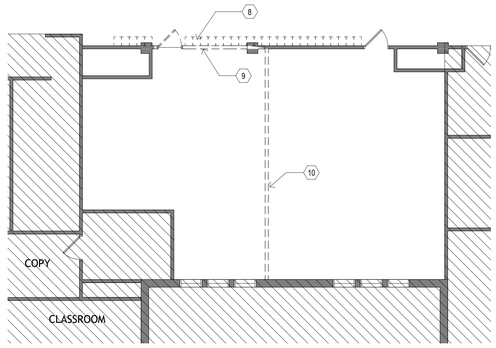
3 EXISTING BUILDING - LEVEL 1 DEMOLITION - ADMIN OFFICES
1/8" = 1'-0"



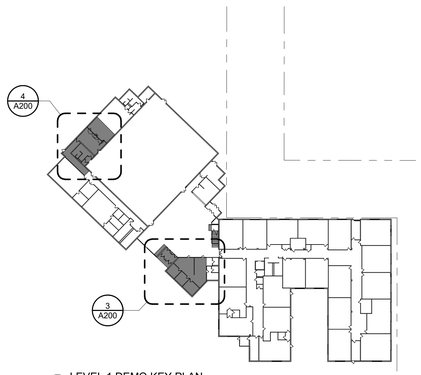
1 EXISTING BUILDING - LEVEL 2 DEMOLITION - OFFICE SUITE
1/8" = 1'-0"



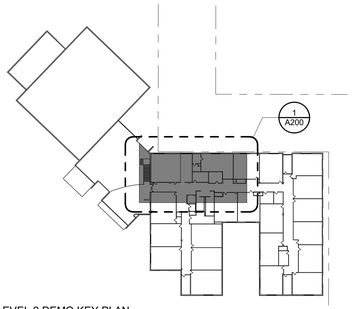
4 EXISTING BUILDING - LEVEL 1 DEMOLITION - FACILITIES ROOM (NEAR EXISTING STAGE)
1/8" = 1'-0"



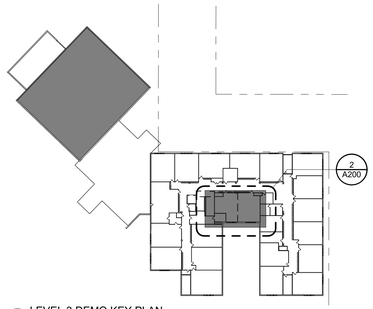
2 EXISTING BUILDING - LEVEL 3 DEMOLITION - EX. HALL
1/8" = 1'-0"



5 LEVEL 1 DEMO KEY PLAN
1/64" = 1'-0"



6 LEVEL 2 DEMO KEY PLAN
1/64" = 1'-0"



7 LEVEL 3 DEMO KEY PLAN
1/64" = 1'-0"

GENERAL DEMOLITION NOTES

A. PROVIDE ALL DEMOLITION WORK AS REQUIRED TO COMPLETE THE WORK IN THIS CONTRACT, INCLUDING THAT REQUIRED TO COMPLETE THE WORK SHOWN ELSEWHERE IN THESE DOCUMENTS, BUT NOT SPECIFICALLY IDENTIFIED ON THESE DEMOLITION PLANS.

B. SHADED AREAS ON THE PLAN GENERALLY INDICATE AREA TO CONTAIN NO DEMOLITION WORK. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PERFORMING ALL RELATED DEMOLITION THAT IS NECESSARY TO COMPLETE ALL WORK THAT IS DIRECTED BY THESE DOCUMENTS, WHETHER OR NOT THAT DEMOLITION WORK IS SPECIFICALLY IDENTIFIED ON THESE DEMOLITION PLANS OR IS LOCATED OUTSIDE THE AREAS OF CONSTRUCTION OR DEMOLITION THAT ARE IDENTIFIED ON THIS PLAN.

C. CONSTRUCTION SHOWN DASHED INDICATES CONSTRUCTION TO BE REMOVED. ALL PARTITIONS SHOWN TO BE DEMOLISHED ARE TO BE REMOVED FROM TOP OF FLOOR SLAB UP TO BOTTOM OF STRUCTURE ABOVE, UNLESS NOTED OTHERWISE. ALL CONSTRUCTION MOUNTED IN OR ON PARTITIONS TO BE REMOVED, SUCH AS DOORS, GLAZING AND OTHER WALL MOUNTED CONSTRUCTION AND FINISHES SHALL BE REMOVED AS A PART OF THE PARTITION DEMOLITION.

D. ALL PRIME CONTRACTORS AND SUBCONTRACTORS SUBMITTING BIDS SHALL CAREFULLY EXAMINE THE ENTIRE SET OF BIDDING DOCUMENTS, VISIT THE SITE OF THE WORK, RECORD THEIR OWN INVESTIGATIONS, AND SHALL BECOME FULLY INFORMED OF THE EXISTING CONDITIONS AND LIMITATIONS UNDER WHICH THE WORK SHALL BE PERFORMED, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

• EXISTING BUILDINGS: INCLUDING THE CONDITION OF EXISTING STRUCTURE, LOCATIONS AND CAPACITIES OF EXISTING UTILITIES, AND ANY OBSTACLE OR CONFLICT WHICH MAY BE ENCOUNTERED WHILE COMPLETING THE WORK DESCRIBED IN THE BIDDING DOCUMENTS

• SUBMITTAL OF A BID SHALL BE CONCLUSIVE EVIDENCE THAT THE BIDDER HAS MADE SUCH AN EXAMINATION, UNDERSTANDS THE CONTRACT DOCUMENTS IN THEIR ENTIRETY, AND IS FAMILIAR WITH THE SITE CONDITIONS IN WHICH THE WORK SHALL OCCUR. FAILURE TO MAKE SUCH AN EXAMINATION SHALL NOT BE ACCEPTED AS A BASIS FOR CLAIMS FOR ADDITIONAL COMPENSATION OR AN EXTENSION OF TIME.

• IF FIELD CONDITIONS ARE OBSERVED THAT CONFLICT WITH THE INTENTIONS AND FEASIBILITY OF THE WORK DESCRIBED IN THESE DOCUMENTS DURING BIDDING, THE CONTRACTOR/SUBCONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT SO THAT THEY MAY MAKE ACCOMMODATIONS THROUGH AN ADDENDUM.

• SUBMISSION OF BID ALSO PRESUMES THAT ALL REQUIRED DEMOLITION WORK, WHETHER OR NOT IT HAS BEEN SPECIFICALLY IDENTIFIED BY THESE DOCUMENTS OR BY ADDENDUM, HAS BEEN INCORPORATED INTO THE BIDDER'S BID PROPOSAL.

E. WHERE FINISHES ARE TO BE REMOVED FROM EXISTING SUBSTRATES AND SUBSTRATES ARE SCHEDULED TO RECEIVE NEW FINISHES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING EXISTING ADHESIVES, ATTACHMENTS, FASTENERS AND OTHER COATINGS THAT WILL INTERFERE WITH THE INSTALLATION OR ADHESION OF NEW FINISHES. THE CONTRACTOR SHALL PREPARE ALL EXISTING SURFACES TO PROVIDE SUBSTRATES THAT ARE ACCEPTABLE FOR THE NEW FINISH INSTALLER. AT EXISTING CONCRETE FLOOR SLABS WHERE SLAB IS DAMAGED DUE TO THE REMOVAL OF EXISTING FINISHES, THE CONTRACTOR SHALL PATCH ALL DAMAGE OF THE EXISTING SLAB WITH CONCRETE TOPPING TO PROVIDE A SMOOTH AND EVEN SUBSTRATE FOR NEW FINISHES.

F. SEE MECHANICAL/ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR WORK THAT REQUIRES ADDITIONAL DEMOLITION AND PATCHING. PROVIDE ALL DEMOLITION AS REQUIRED TO PERFORM THE SCHEDULED WORK AND REINSTALL ALL EXISTING CONSTRUCTION AND FINISHES TO MATCH PREVIOUS CONDITIONS WHERE POSSIBLE. IF NOT POSSIBLE, PATCH IN NEW CONSTRUCTION TO MATCH EXISTING CONDITITIONS.

G. PATCH ALL EXISTING AND NEW PENETRATIONS THROUGH EXISTING FIRE OR SMOKE RATED FLOOR SLABS AND PARTITIONS, USING U.L. LISTED MATERIALS THAT ARE REQUIRED TO MAINTAIN ALL EXISTING FIRE RATINGS.

H. SEE ALSO REFLECTED CEILING PLANS FOR ADDITIONAL REMOVAL AND REINSTALLATION OF EXISTING SUSPENDED ACOUSTICAL CEILINGS AS REQUIRED FOR NEW CONSTRUCTION.

I. WHERE EXISTING CEILINGS ARE SHOWN TO BE REMOVED AND REINSTALLED, SALVAGE ALL FIRE ALARM AND NOTIFICATION DEVICES, INCLUDING SMOKE DETECTORS, STROBES, ALARMS, ETC. CONTRACTOR MAY REINSTALL THOSE DEVICES THAT ARE FULLY FUNCTIONAL. IF IT IS NOT POSSIBLE TO REINSTALL EXISTING SYSTEM COMPONENTS, THE CONTRACTOR SHALL PROVIDE NEW MATCHING DEVICES THAT ARE COMPATIBLE AND WARRANTABLE WITH THE EXISTING SYSTEM WHICH SHALL PROVIDE A FULLY FUNCTIONAL, CODE-COMPLIANT FIRE DETECTION/ NOTIFICATION SYSTEM.

J. PATCHING: WHERE DEMOLITION OR CUTTING WORK HAS OCCURRED OR WHERE EXISTING CONSTRUCTION HAS BEEN REMOVED, DAMAGED OR DISTURBED AS A PART OF THIS WORK, THE SAID SURFACES SHALL BE CLOSED UP, PATCHED, FINISHED AND RESTORED AS REQUIRED TO MATCH CONTIGUOUS SURFACES AND FINISHES.

K. PROTECTION OF EXISTING CONSTRUCTION: ALL CONSTRUCTION INDICATED TO REMAIN SHALL BE PROTECTED FROM DAMAGE BY ALL CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL RETURN ALL EXISTING CONSTRUCTION TO THE CONDITION FOUND PRIOR TO THE START OF DEMOLITION AND CONSTRUCTION, WHETHER OR NOT IT IS SPECIFICALLY INDENTIFIED ON THE DRAWINGS TO REMAIN. UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL REPAIR OR REPLACE ALL SUCH DAMAGED ITEMS AT THE OWNER'S DISCRETION

L. SALVAGE: BEFORE COMMENCING ANY DEMOLITION WORK, THE CONTRACTOR SHALL CONTACT THE OWNER TO CONFIRM THEIR INTENT REGARDING THE SALVAGE, REUSE AND FINAL DISPOSITION OF ANY EXISTING ITEMS OF EQUIPMENT OR MATERIAL NOT USED IN THIS PROJECT, INCLUDING ALL WALL & CEILING MOUNTED EQUIPMENT (WHITEBOARDS, HEADWALL UNITS, CAMERAS, ETC.)

M. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND IDENTIFYING EXISTING UTILITY LINES PRIOR TO BEGINNING DEMOLITION. SEE MECHANICAL, PLUMBING, AND ELECTRICAL DOCUMENTS FOR PROTECTION AND PATCHING OF EXISTING UTILITIES

N. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING EXISTING PIPING, CONDUIT AND OTHER UTILITY LINES, AND THEIR HANGERS OR SUPPORTS WHICH ARE ABANDONED BY THE WORK DESCRIBED IN THESE DOCUMENTS OR THOSE THAT HAVE BEEN PREVIOUSLY ABANDONED AND LEFT IN PLACE, LOCATED IN ALL CONSTRUCTION AREAS, UNLESS NOTED OTHERWISE. SEE MECHANICAL AND ELECTRICAL DOCUMENTS FOR EXTENT OF REMOVAL AND THE CAPPING OFF OR TERMINATION OF EXISTING LINES

O SEE STRUCTURAL DRAWINGS FOR INFORMATION REGUARDING DEMOLITION OF EXISTING STRUCTURAL SYSTEMS AND SHORING REQUIREMENTS

DEMOLITION PLAN KEYNOTES

Keynote Number	Keynote Description
1	REMOVE EXISTING WINDOW BETWEEN OFFICE AND VESTIBULE, ENLARGE/PREPARE OPENING AS REQUIRED TO FIT SCHEDULE DOOR AND FRAME, REMOVE ANY EXISTING CASEWORK AFFIXED TO THIS WALL, AND PATCH ALL SURFACES AS REQUIRED
2	DEMOLISH ALL EXISTING PARTITIONS, SYSTEMS FURNITURE, FLOOR FINISH AND CEILING FINISH IN THIS AREA, PREPARE AS REQUIRED FOR NEW CONSTRUCTION, INCLUDING NEW RAMP AND WALLS, SEE PLAN
3	REMOVE EXISTING WINDOW SYSTEM AT EXISTING PRECAST WALL PANEL AND MODIFY PANELS AS REQUIRED FOR NEW SKYWAY, SEE PLANS
4	REMOVE EXISTING DOOR AND FRAME, PATCH WALL WITH MATERIALS TO MATCH ADJACENT WALL CONSTRUCTION AND FINISHES.
5	CUT NEW WALL OPENING IN EXISTING WALL, PATCH AS REQUIRED TO PREPARE ALL IMPACTED SUBSTRATES FOR SCHEDULED FINISHES.
6	DEMOLISH EXISTING WING WALLS AND GYP BD FRAMED HEADER AT TOP OF STAGE OPENING IN THEIR ENTIRETY DOWN TO THE TOP OF STAGE ELEVATION, RELOCATE EXISTING ELECTRICAL PANEL AND ALL ASSOCIATED CONDUITS AND FEEDERS AS REQUIRED TO ACCOMMODATE NEW STAIR AND MEZZANINE.
7	DEMOLISH WALL MOUNTED SHELVING
8	DEMOLISH LOCKERS +/- 150 LOCKERS IN VARIOUS LOCATIONS THROUGHOUT THIRD FLOOR, PATCH FLOOR AND WALL FINISHES AS REQUIRED TO MATCH EXISTING
9	REMOVE EXISTING DOOR AND ENLARGE OPENING IN EXISTING WALL, PATCH AS REQUIRED TO PREPARE ALL IMPACTED SUBSTRATES FOR SCHEDULED FINISHES.
10	DEMOLISH EXISTING OPERABLE PARTITION AND ALL ASSOCIATED INSTALLATION ACCESSORIES, PREPARE STRUCTURE/ADJACENT SURFACES TO ACCOMMODATE NEW PARTITION WALL, SEE PLAN.

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Phone: 651.209.6320

CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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PRINT NAME

SIGNATURE

LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
SELECTIVE DEMOLITION PLANS

SHEET NUMBER:

A200

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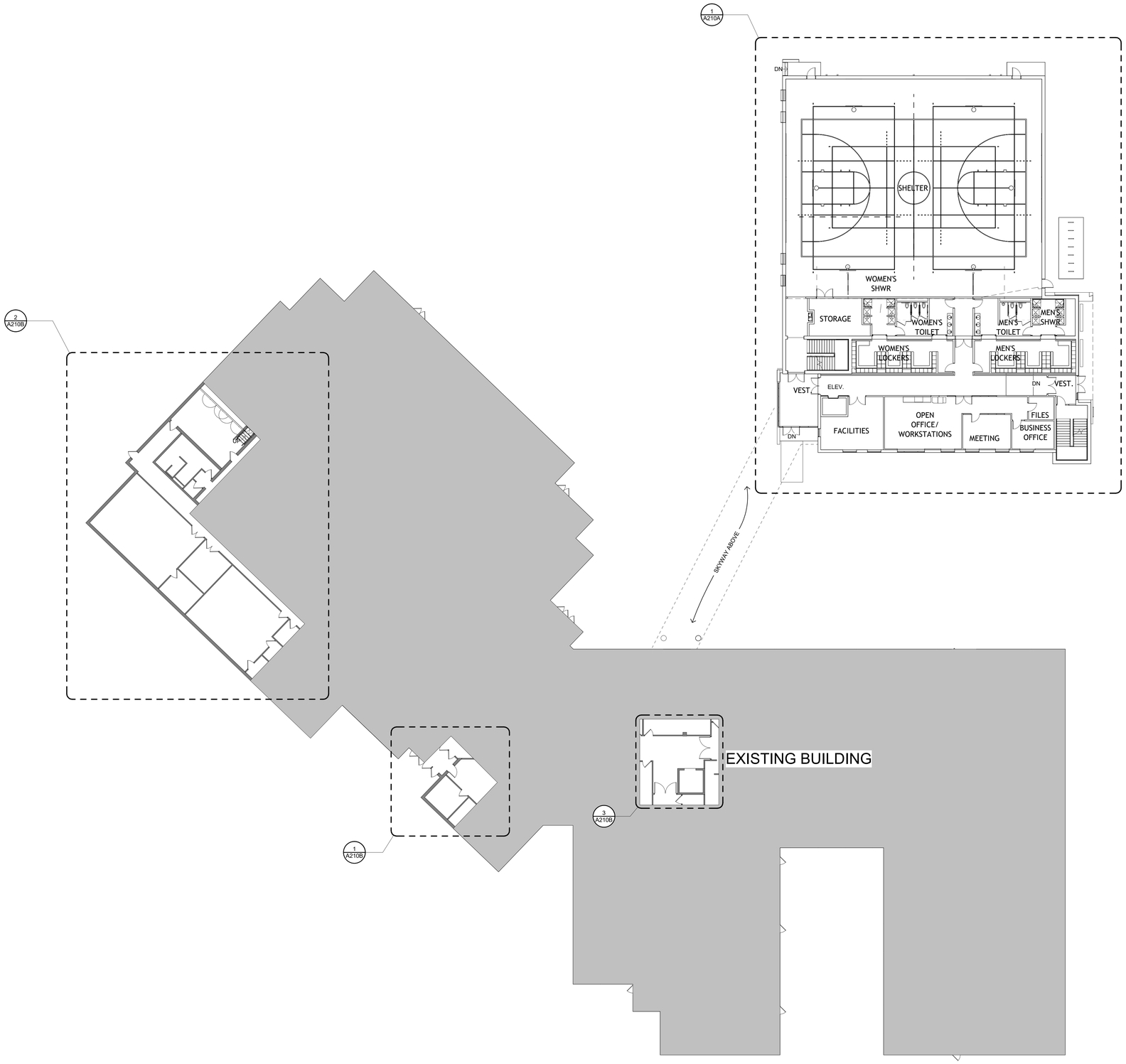

1 FIRST FLOOR OVERALL PLAN
1/16" = 1'-0"

N
PROJECT
TRUE

GENERAL PLAN NOTES

A. GENERAL NOTES APPLY TO ALL SHEETS.
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C. AREAS SHOWN HATCHED ARE EXISTING BUILDING AREAS OUTSIDE THE CONSTRUCTION LIMITS. NO WORK IN THESE AREAS UNLESS NOTED OTHERWISE. SEE MECHANICAL/ELECTRICAL DRAWINGS FOR ADDITIONAL WORK THAT MAY OCCUR OUTSIDE THE CONSTRUCTION LIMITS SHOWN, EITHER AS SHOWN ON DRAWINGS OR THROUGH EXTRAPOLATION OF EXISTING UTILITY LINES SERVING AREAS WITHIN THE CONSTRUCTION LIMITS.
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E. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER GRAPHIC SCALE. DO NOT SCALE THE DRAWINGS.
F. CONTRACTOR SHALL VISIT THE SITE AND VERIFY ALL FIELD CONDITIONS PRIOR TO BIDDING AND CONSTRUCTION.
G. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY ARCHITECT OF ANY DISCREPANCIES OR CONFLICTS PRIOR TO COMMENCING WORK.
H. THE CONTRACTOR SHALL LOCATE EXISTING BUILDING UTILITIES AND SERVICES PRIOR TO THE START OF CONSTRUCTION
I. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS IN THE DRAWINGS THAT ARE BASED ON FIELD MEASURING/OBSERVATION OF THE EXISTING CONSTRUCTION.
J. ALL WALLS SHADED ARE EXISTING CONSTRUCTION SCHEDULED TO REMAIN, PROTECT FROM DAMAGE FROM CONSTRUCTION ACTIVITIES UNLESS NOTED OTHERWISE.
K. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS OF NEW PENETRATIONS THROUGH EXISTING BEARING WALLS FOR DUCTWORK AND OTHER MECHANICAL/ ELECTRICAL RUNS. DO NOT CUT EXISTING BEAMS OR PURLINS. ADJUST LOCATIONS AS REQUIRED TO MISS EXISTING STRUCTURAL MEMBERS. IF IT IS NOT POSSIBLE TO MISS EXISTING STRUCTURAL MEMBERS, CONTACT THE ARCHITECT WHO WILL CONSULT WITH THE STRUCTURAL ENGINEER TO DETERMINE ACCEPTABLE LOCATIONS TO PENETRATE STRUCTURAL MEMBERS AND ADDITIONAL STRUCTURAL REINFORCEMENT OF EXISTING MEMBERS THAT MAY BE REQUIRED BY THE PENETRATION.
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O. SEE CODE PLANS FOR LOCATION OF WALLS OF FIRE-RESISTIVE AND SMOKE BARRIER CONSTRUCTION. ALL PARTITIONS CONSISTING OF SUCH ASSEMBLIES SHALL EXTEND TO UNDERSIDE OF FLOOR OR ROOF DECK ASSEMBLIES. COORDINATE WITH MECHANICAL AND PLUMBING. ALL NEW AND EXISTING PIPED PENETRATIONS THROUGH WALLS SHALL BE SEALED WITH FIRE-RATED SEALANTS OR FIRE-SAFING AS REQUIRED TO MAINTAIN EXISTING RATINGS AND SMOKE STOPPAGE. CONTRACTOR CREATING PENETRATION WILL BE RESPONSIBLE FOR PROVIDING FIRE SEAL OF OPENING. SEE MECHANICAL PLANS FOR LOCATIONS OF REQUIRED FIRE DAMPERS.
P. AT RATED PARTITIONS THAT EXTEND ABOVE ACCESSIBLE FINISHED CEILINGS, PROVIDE SIGNAGE OR PAINTED STENCILING IDENTIFYING PARTITION WITH THE WORDING "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS". LETTERING SHALL BE A MINIMUM HEIGHT OF 3" WITH A MINIMUM 3/8" STROKE IN A CONTRASTING COLOR. SIGNAGE SHALL BE LOCATED AT INTERVALS NOT EXCEEDING 30 FEET AND WITH 15 FEET OF THE END OF EACH WALL.
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R. GYPSUM BOARD SURFACES SHALL BE ISOLATED WITH CONTROL JOINTS WHERE SHOWN ON DRAWINGS OR NOTED IN SPECIFICATIONS.
S. SCRIBE GYPSUM BOARD OF WALL AND PARTITIONS TO PROFILES OF DECK ABOVE. SEAL TIGHTLY AROUND ALL PENETRATIONS WITH ACOUSTIC CAULK OR FIRE-RATED CAULK AT RATED PATITIONS
T. PROVIDE SOUND ATTENUATION BLANKETS IN ALL WALLS OF OFFICES, CLASSROOMS, ETC, AND AS INDICATED BY PARTITION TYPE
U. CONTRACTOR TO COORDINATE AND PROVIDE WOOD BLOCKING IN WALLS FOR ALL WALL MOUNTED EQUIPMENT, CASEWORK, SHELVING, AND CABINETRY. CONTRACTOR SHALL ALSO PROVIDE BLOCKING TO ACCOMMODATE ANY OWNER PROVIDED EQUIPMENT, AND SHALL COORDINATE INSTALLATION LOCATION DIRECTLY WITH OWNER.

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CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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PRINT NAME

SIGNATURE

LICENSE NO.

05/07/2025
DATE

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SHEET TITLE:
OVERALL PLAN - FIRST FLOOR

SHEET NUMBER:

A210

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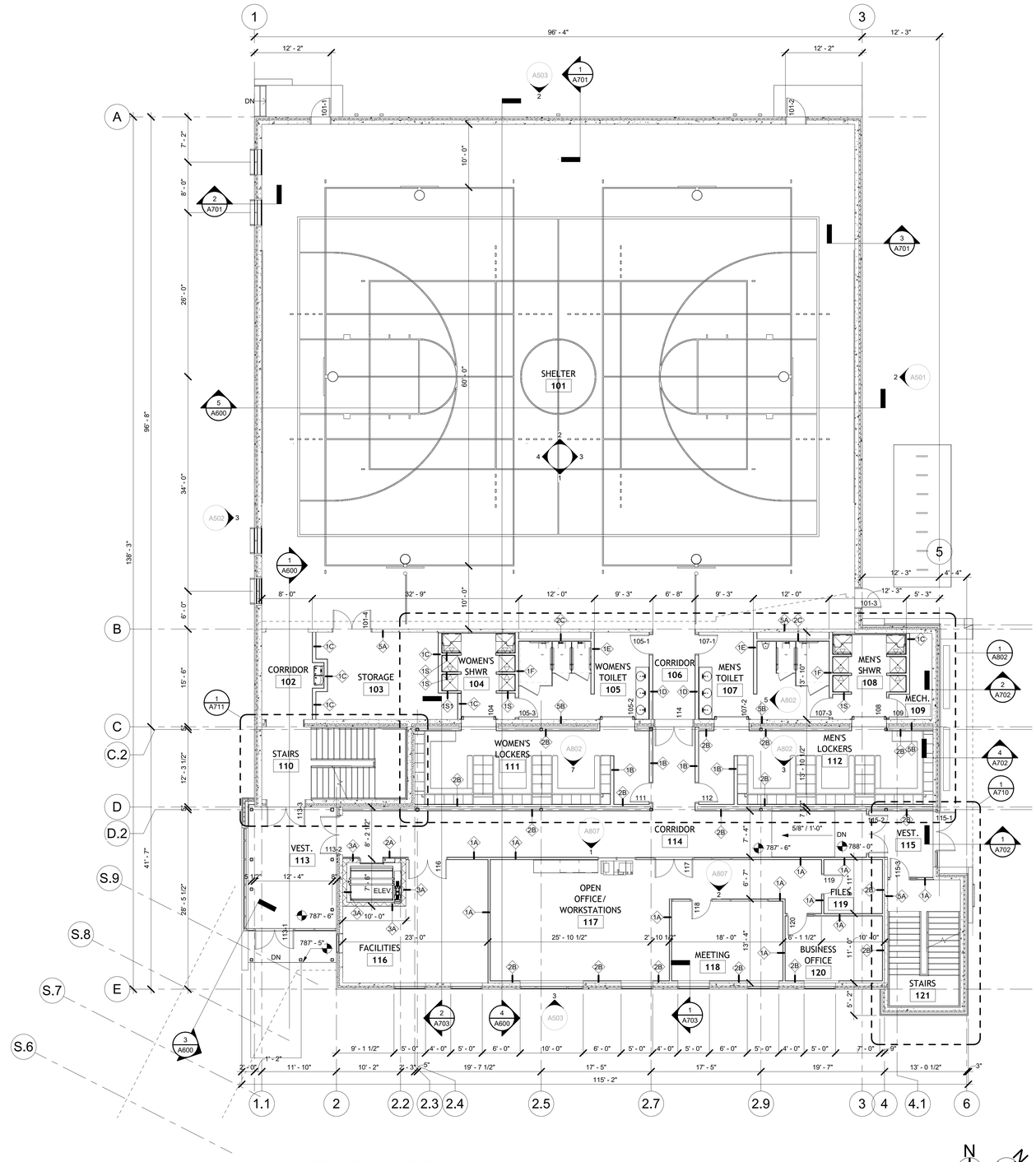
WALL TYPE TAGS

1A INTERIOR PARITITION TYPE SCHEDULE, SEE A300



1 FIRST FLOOR PLAN - SHELTER
1/8" = 1'-0"

PROJECT TRUE

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SHEET TITLE:
FIRST FLOOR PLAN - SHELTER

SHEET NUMBER:

A210A

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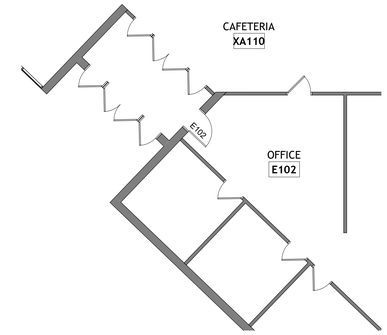
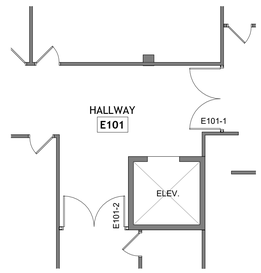
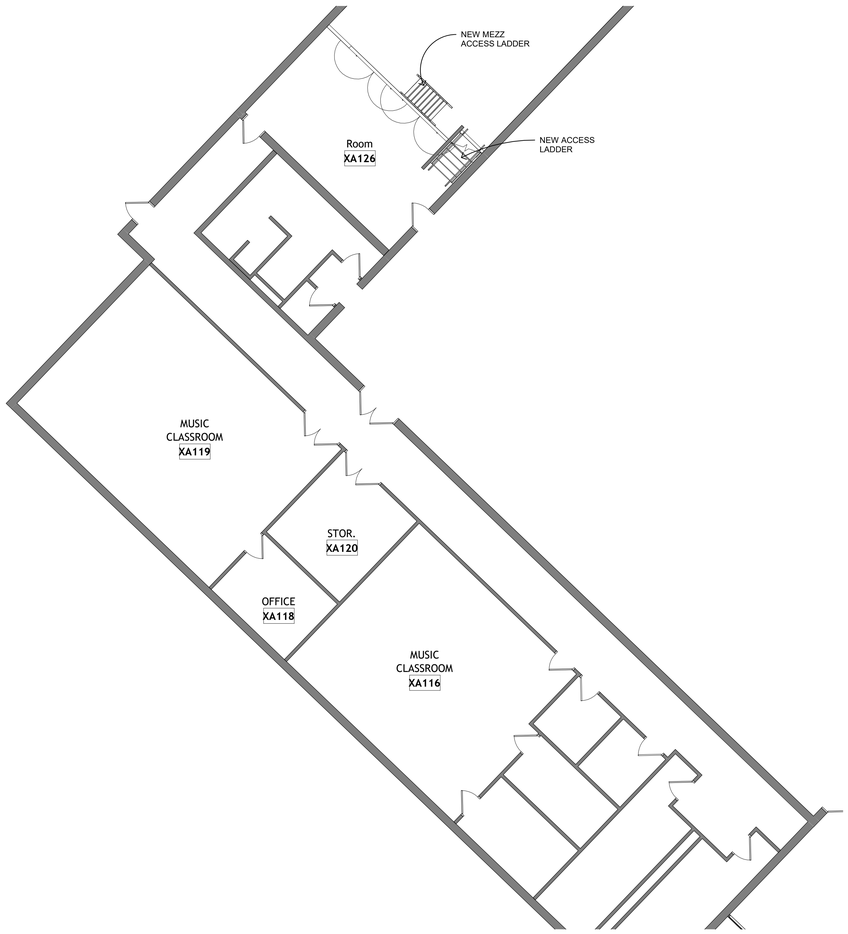


1 FIRST FLOOR PLAN - ENTRANCE & ADMIN AT EXISTING
1/8" = 1'-0"



3 FIRST FLOOR PLAN - SECURITY DOORS NEAR ELEVATOR
1/8" = 1'-0"



2 FIRST FLOOR PLAN - MUSIC ROOMS AT EXISTING
1/8" = 1'-0"

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SHEET TITLE:
FIRST FLOOR PLAN - EXISTING BUILDING

SHEET NUMBER:

A210B

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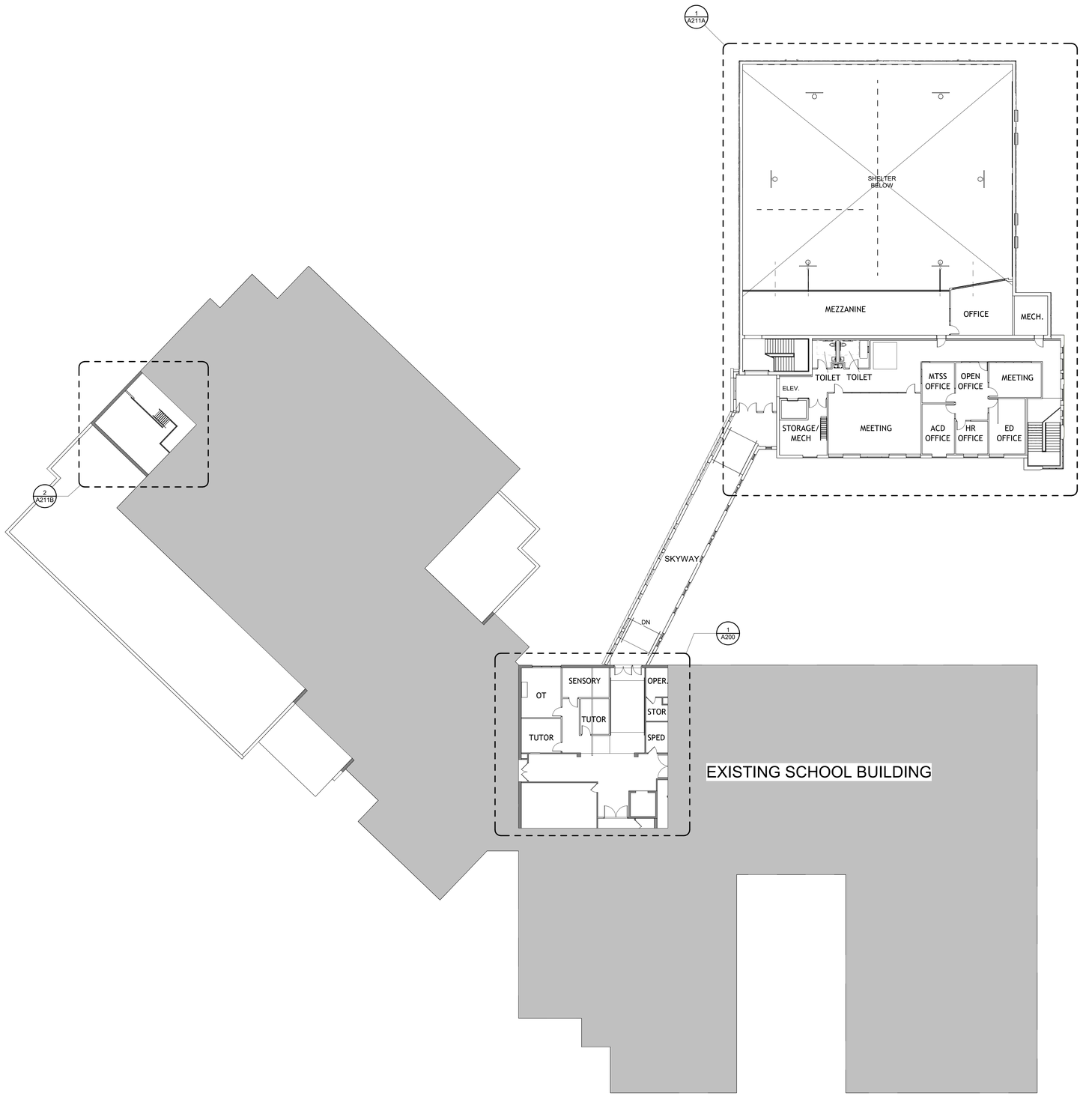

1 SECOND FLOOR OVERALL PLAN
1/16" = 1'-0"

N
PROJECT TRUE

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PRINT NAME

SIGNATURE

LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
OVERALL PLAN - SECOND FLOOR

SHEET NUMBER:
A211

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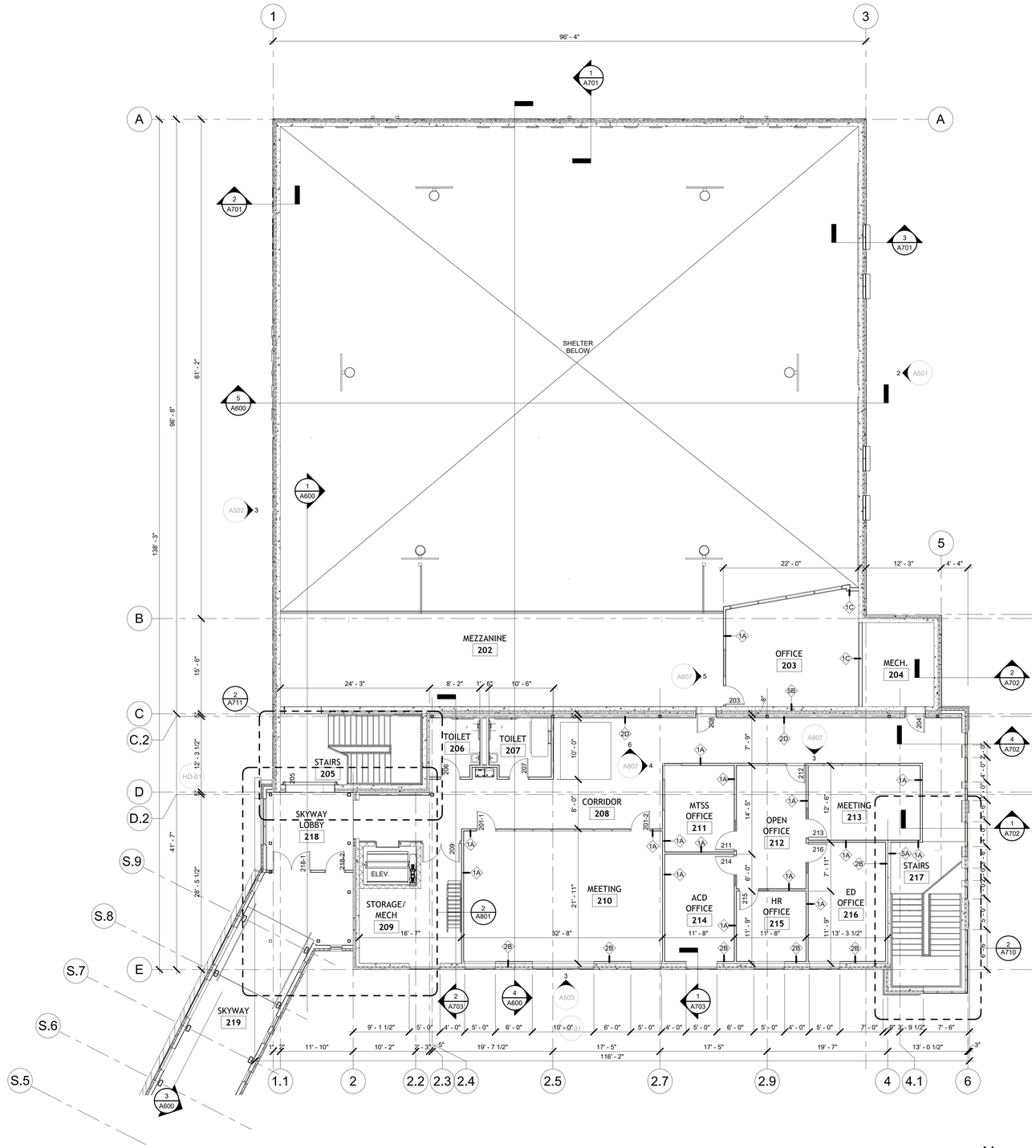
WALL TYPE TAGS

1A INTERIOR PARITITION TYPE SCHEDULE, SEE A300



1 SECOND FLOOR PLAN - SHELTER
1/8" = 1'-0"

N PROJECT TRUE

BLOOM HAY DOBBS

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SHEET TITLE:
SECOND FLOOR PLAN - SHELTER

SHEET NUMBER:

A211A

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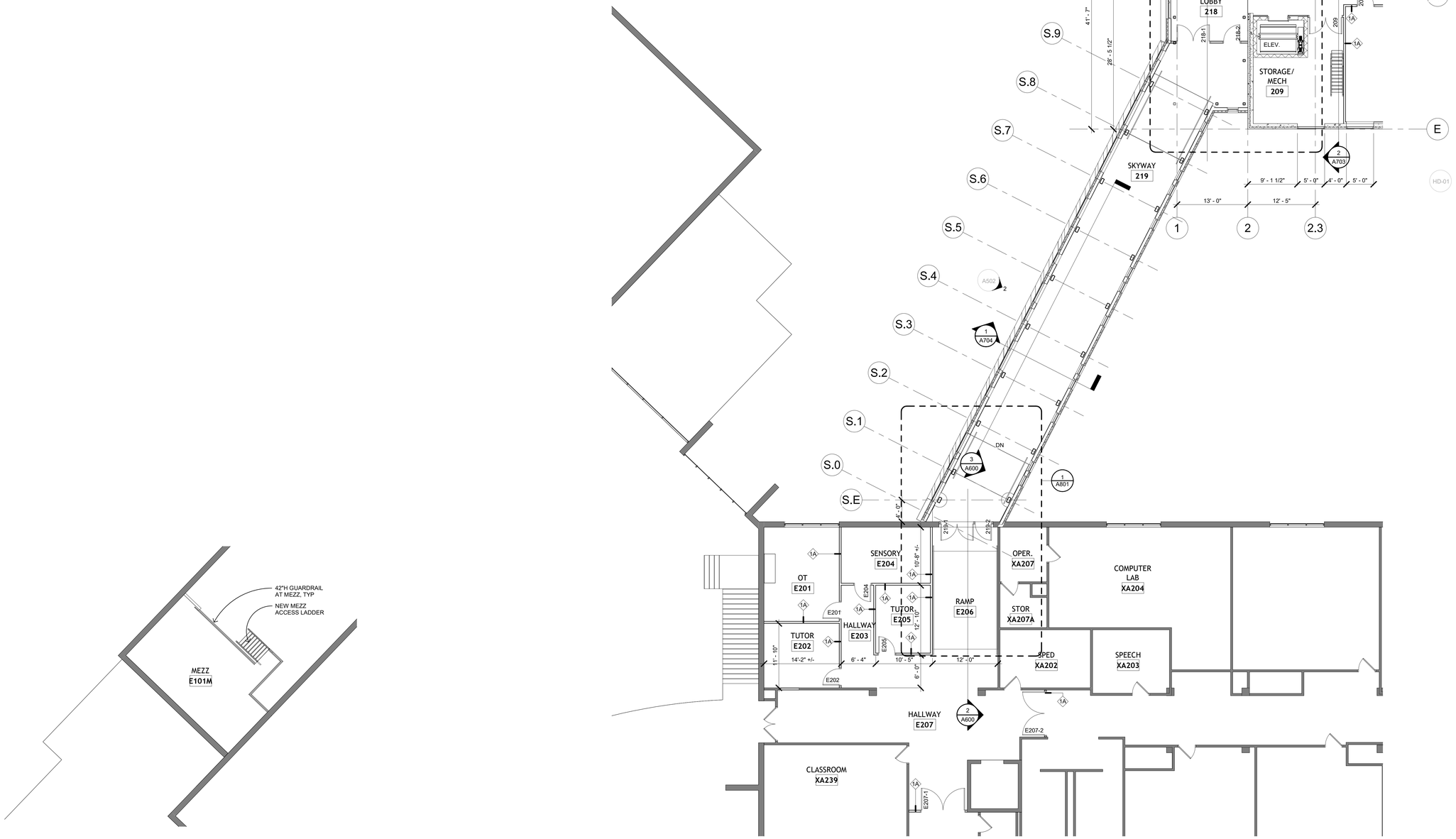
WALL TYPE TAGS

1A INTERIOR PARTITION TYPE SCHEDULE, SEE A300



2 SECOND FLOOR PLAN - MEZZANINE AT EXISTING
1/8" = 1'-0"

1 SECOND FLOOR PLAN - SKYWAY
1/8" = 1'-0"

N
PROJECT
TRUE

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Phone: 651.209.6320

CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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 ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME

SIGNATURE

LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
SECOND FLOOR PLAN - SKYWAY AND EXSITING BUILDING

SHEET NUMBER:

A211B

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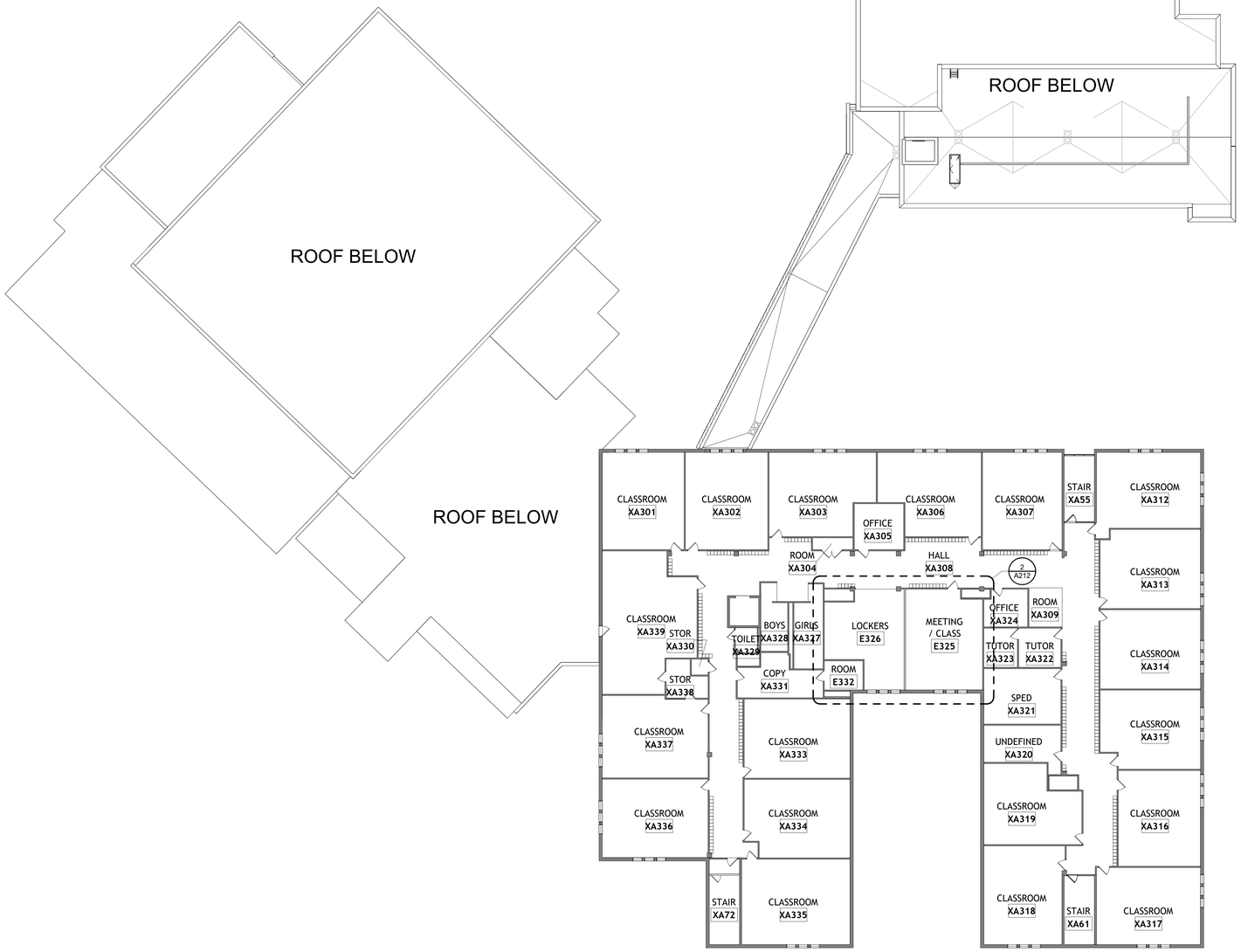
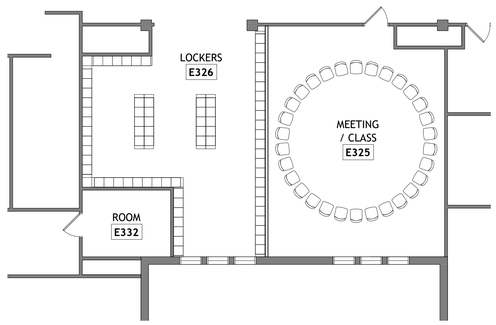
WALL TYPE TAGS

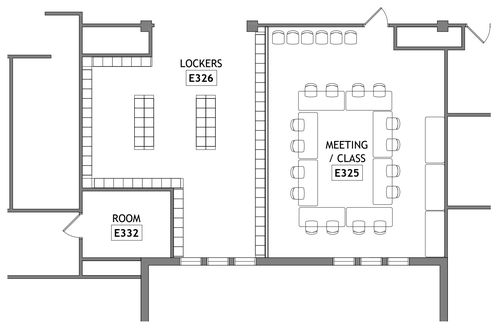
1A INTERIOR PARTITION TYPE SCHEDULE, SEE A300



1 THIRD FLOOR OVERALL PLAN
1/16" = 1'-0"



2 THIRD FLOOR PLAN - LOCKER & MEETING ROOM AT EXISITNG
1/8" = 1'-0"



3 THIRD FLOOR PLAN - EX HALL - MEETING
1/8" = 1'-0"

PROJECT N

TRUE

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BLOOM HAY DOBBS

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2324 University Ave. W,
Suite 200
St. Paul, MN 55114
Tel. 612.338.4990

NOVA CLASSICAL ACADEMY
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ST. PAUL, MN 55102
Phone: 651.209.6320

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05/07/2025
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DD DOCUMENT Not For Construction

SHEET TITLE:
OVERALL PLAN - THIRD FLOOR

SHEET NUMBER:

A212

GENERAL REFLECTED CEILING PLAN NOTES:

A. PROVIDE ALL DEMOLITION WORK AS REQUIRED TO COMPLETE THE WORK IN THIS CONTRACT, INCLUDING THAT WORK THAT IS REQUIRED TO COMPLETE ALL WORK SHOWN ELSEWHERE IN THESE DOCUMENTS, BUT NOT SPECIFICALLY IDENTIFIED ON THESE PLANS.

B. SEE MECHANICAL AND ELECTRICAL PLANS FOR WORK REQUIRING ADDITIONAL CEILING WORK THAT IS REQUIRED TO BE PERFORMED TO COMPLETE IT. SEE MECHANICAL AND ELECTRICAL PLANS FOR EXTENT OF THE REMOVAL AND CAPPING OF EXISTING UTILITY, AND ELECTRICAL LINES, DUCTWORK, ETC.

C. AREAS ON CEILING PLANS THAT ARE DENSELY HATCHED INDICATE EXISTING CEILINGS, LIGHTING AND OTHER CEILING MOUNTED ITEMS THAT ARE SCHEDULED TO REMAIN AND RECEIVE NO ADDITIONAL WORK, UNLESS NOTED OTHERWISE.

D. PROTECTION OF EXISTING CONSTRUCTION: ALL CONSTRUCTION INDICATED AS REMAINING IS TO BE PROTECTED FROM DAMAGE FROM ALL CONSTRUCTION ACTIVITIES. THE CONTRACTOR IS RESPONSIBLE FOR RETURNING EXISTING CONSTRUCTION INDICATED AS REMAINING TO THE CONDITION FOUND PRIOR TO THE START OF DEMOLITION AND CONSTRUCTION, UNLESS NOTED OTHERWISE. THE CONTRACTOR IS TO REPAIR OR REPLACE ALL DAMAGED ITEMS AT THE OWNER'S DISCRETION.

E. AT EXISTING CEILINGS THAT ARE INDICATED TO BE REMOVED AND NOT REINSTALLED, REMOVE THE ENTIRE CEILING SYSTEM; INCLUDING, BUT NOT LIMITED TO, THE TILES, SUSPENSION GRID, LIGHTING AND OTHER CEILING MOUNTED ITEMS, HANGERS, WIRES AND OTHER SUPPORT STRUCTURES. CEILING COMPONENTS MAY BE SALVAGED FOR REUSE IN OTHER AREAS FOR PATCHING IF THEY MATCH THOSE CEILINGS AND REMAIN UNDAMAGED.

F. EXISTING CEILINGS THAT ARE INDICATED ON THESE PLANS TO REMAIN, BUT ARE REQUIRED TO BE REMOVED IN ORDER TO PERFORM WORK IDENTIFIED ELSEWHERE IN THE CONTRACT DOCUMENTS SHALL BE DISASSEMBLED, SALVAGED, AND THEN REINSTALLED TO THEIR ORIGINAL CONDITION PRIOR TO THE START OF WORK. SALVAGE ONLY THOSE CEILING COMPONENTS WHICH REMAIN IN UNDAMAGED AND CLEAN CONDITION. DO NOT REINSTALL CEILING TILES THAT ARE STAINED, WHICH HAVE ABRASIONS, CRACKS OR OTHER SURFACE IMPERFECTIONS. DISCARD OTHER DAMAGED AND UN-REPAIRABLE CEILING COMPONENTS. IF THERE ARE NOT SUFFICIENT SALVAGED COMPONENTS TO COMPLETE PATCHING AND REINSTALLATION OF THE EXISTING CEILING, PROVIDE NEW CEILING COMPONENTS MATCHING THE EXISTING CEILING.

G. PROTECTION OF SALVAGED ITEMS: THE CONTRACTOR IS TO REMOVE AND STORE ITEMS INDICATED AS BEING REMOVED AND REUSED, AND STOCKPILE THEM IN A SECURE LOCATION ON SITE AS TO PROTECT FROM THEM FROM CONSTRUCTION DAMAGE UNTIL THEY ARE TO BE REINSTALLED. THE CONTRACTOR IS RESPONSIBLE FOR REPLACING SUCH ITEMS THAT ARE EITHER DAMAGED OR MISPLACED.

ELECTRICAL

LAY-IN LIGHT FIXTURE

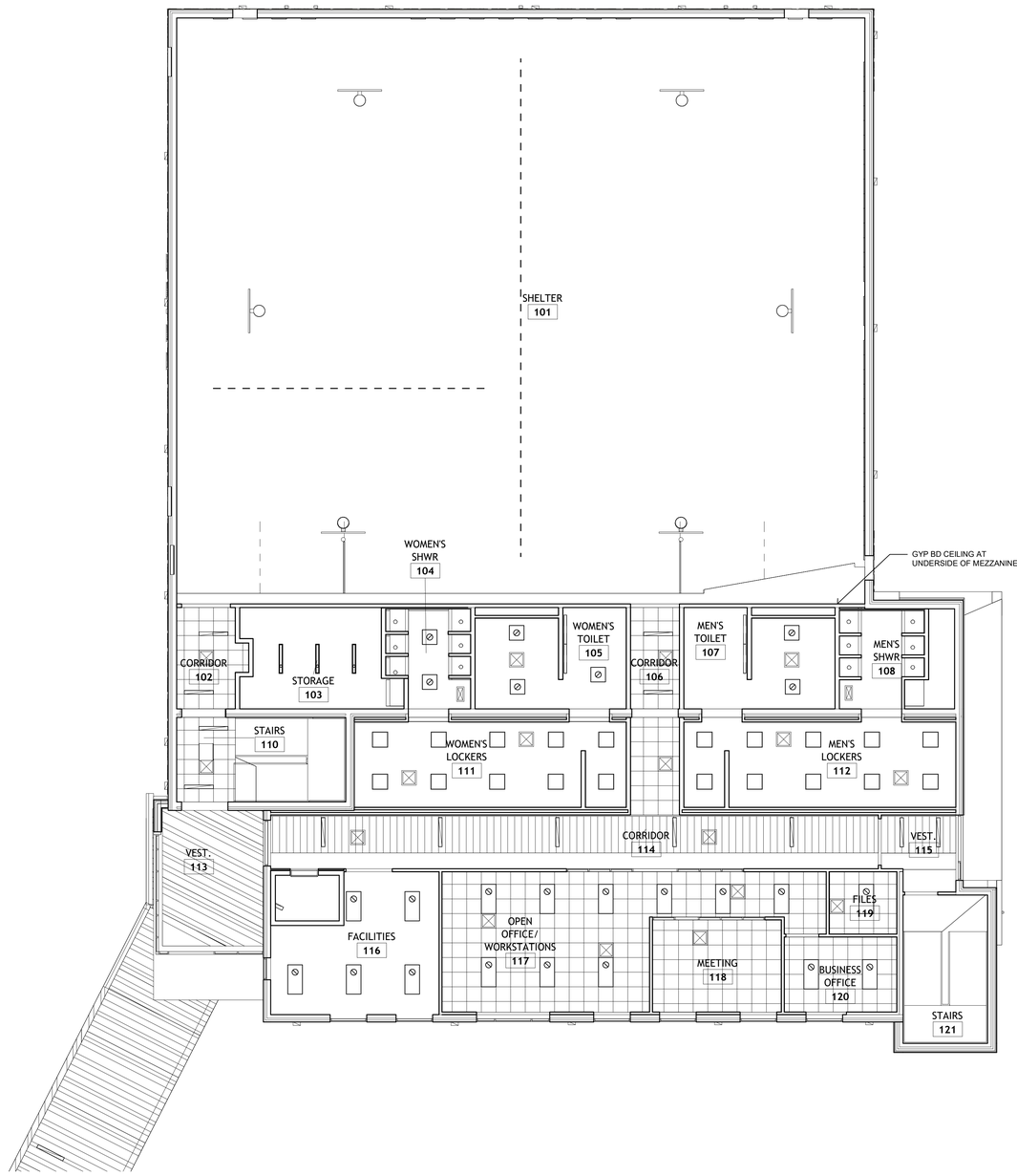
LINEAR PENDANT

LINEAR PENDANT

CEILING GRILLE SUPPLY

CEILING GRILLE RETURN

REFLECTED CEILING PLAN SYMBOLS
1/4" = 1'-0"



1 REFLECTED CEILING PLAN - FIRST FLOOR
1/8" = 1'-0"

N
PROJECT
TRUE

BLOOM HAY DOBBS

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2324 University Ave. W,
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ST. PAUL, MN 55102
Phone: 651.209.6320

CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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PRINT NAME

SIGNATURE

LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
FIRST FLOOR REFLECTED CEILING PLAN - SHELTER

SHEET NUMBER:

A220A

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GENERAL REFLECTED CEILING PLAN NOTES:

A. PROVIDE ALL DEMOLITION WORK AS REQUIRED TO COMPLETE THE WORK IN THIS CONTRACT, INCLUDING THAT WORK THAT IS REQUIRED TO COMPLETE ALL WORK SHOWN ELSEWHERE IN THESE DOCUMENTS, BUT NOT SPECIFICALLY IDENTIFIED ON THESE PLANS.

B. SEE MECHANICAL AND ELECTRICAL PLANS FOR WORK REQUIRING ADDITIONAL CEILING WORK THAT IS REQUIRED TO BE PERFORMED TO COMPLETE IT. SEE MECHANICAL AND ELECTRICAL PLANS FOR EXTENT OF THE REMOVAL AND CAPPING OF EXISTING UTILITY, AND ELECTRICAL LINES, DUCTWORK, ETC.

C. AREAS ON CEILING PLANS THAT ARE DENSELY HATCHED INDICATE EXISTING CEILINGS, LIGHTING AND OTHER CEILING MOUNTED ITEMS THAT ARE SCHEDULED TO REMAIN AND RECEIVE NO ADDITIONAL WORK, UNLESS NOTED OTHERWISE.

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E. AT EXISTING CEILINGS THAT ARE INDICATED TO BE REMOVED AND NOT REINSTALLED, REMOVE THE ENTIRE CEILING SYSTEM; INCLUDING, BUT NOT LIMITED TO, THE TILES, SUSPENSION GRID, LIGHTING AND OTHER CEILING MOUNTED ITEMS, HANGERS, WIRES AND OTHER SUPPORT STRUCTURES. CEILING COMPONENTS MAY BE SALVAGED FOR REUSE IN OTHER AREAS FOR PATCHING IF THEY MATCH THOSE CEILINGS AND REMAIN UNDAMAGED.

F. EXISTING CEILINGS THAT ARE INDICATED ON THESE PLANS TO REMAIN, BUT ARE REQUIRED TO BE REMOVED IN ORDER TO PERFORM WORK IDENTIFIED ELSEWHERE IN THE CONTRACT DOCUMENTS SHALL BE DISASSEMBLED, SALVAGED, AND THEN REINSTALLED TO THEIR ORIGINAL CONDITION PRIOR TO THE START OF WORK. SALVAGE ONLY THOSE CEILING COMPONENTS WHICH REMAIN IN UNDAMAGED AND CLEAN CONDITION. DO NOT REINSTALL CEILING TILES THAT ARE STAINED, WHICH HAVE ABRASIONS, CRACKS OR OTHER SURFACE IMPERFECTIONS. DISCARD OTHER DAMAGED AND UN-REPAIRABLE CEILING COMPONENTS. IF THERE ARE NOT SUFFICIENT SALVAGED COMPONENTS TO COMPLETE PATCHING AND REINSTALLATION OF THE EXISTING CEILING, PROVIDE NEW CEILING COMPONENTS MATCHING THE EXISTING CEILING.

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ELECTRICAL

LAY-IN LIGHT FIXTURE

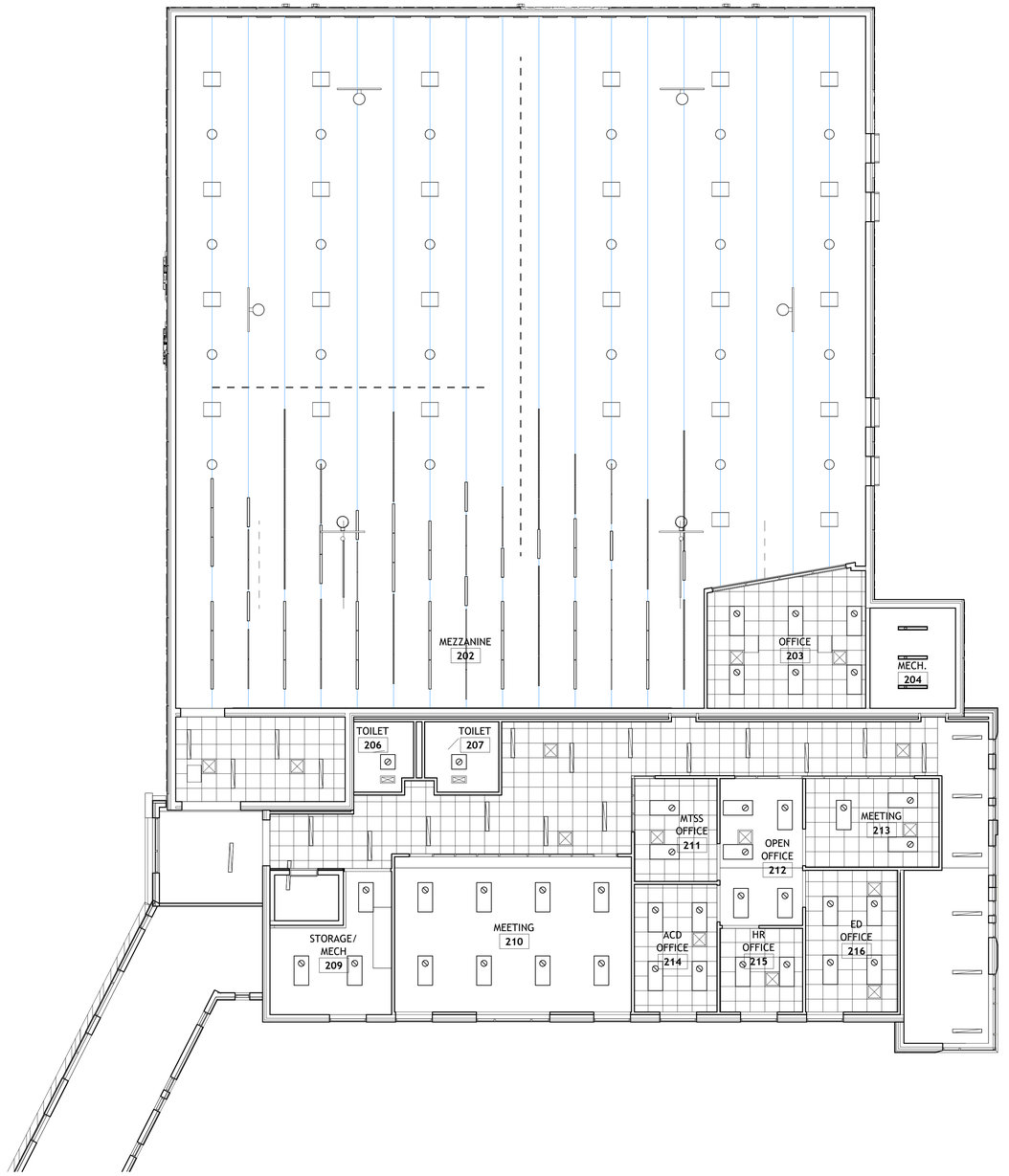
LINEAR PENDANT

LINEAR PENDANT

CEILING GRILLE SUPPLY

CEILING GRILLE RETURN

REFLECTED CEILING PLAN SYMBOLS
1/4" = 1'-0"



1 REFLECTED CEILING PLAN - SECOND FLOOR
1/8" = 1'-0"

N
PROJECT
TRUE

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PRINT NAME

SIGNATURE

LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
SECOND FLOOR REFLECTED CEILING PLAN - SHELTER

SHEET NUMBER:

A221A

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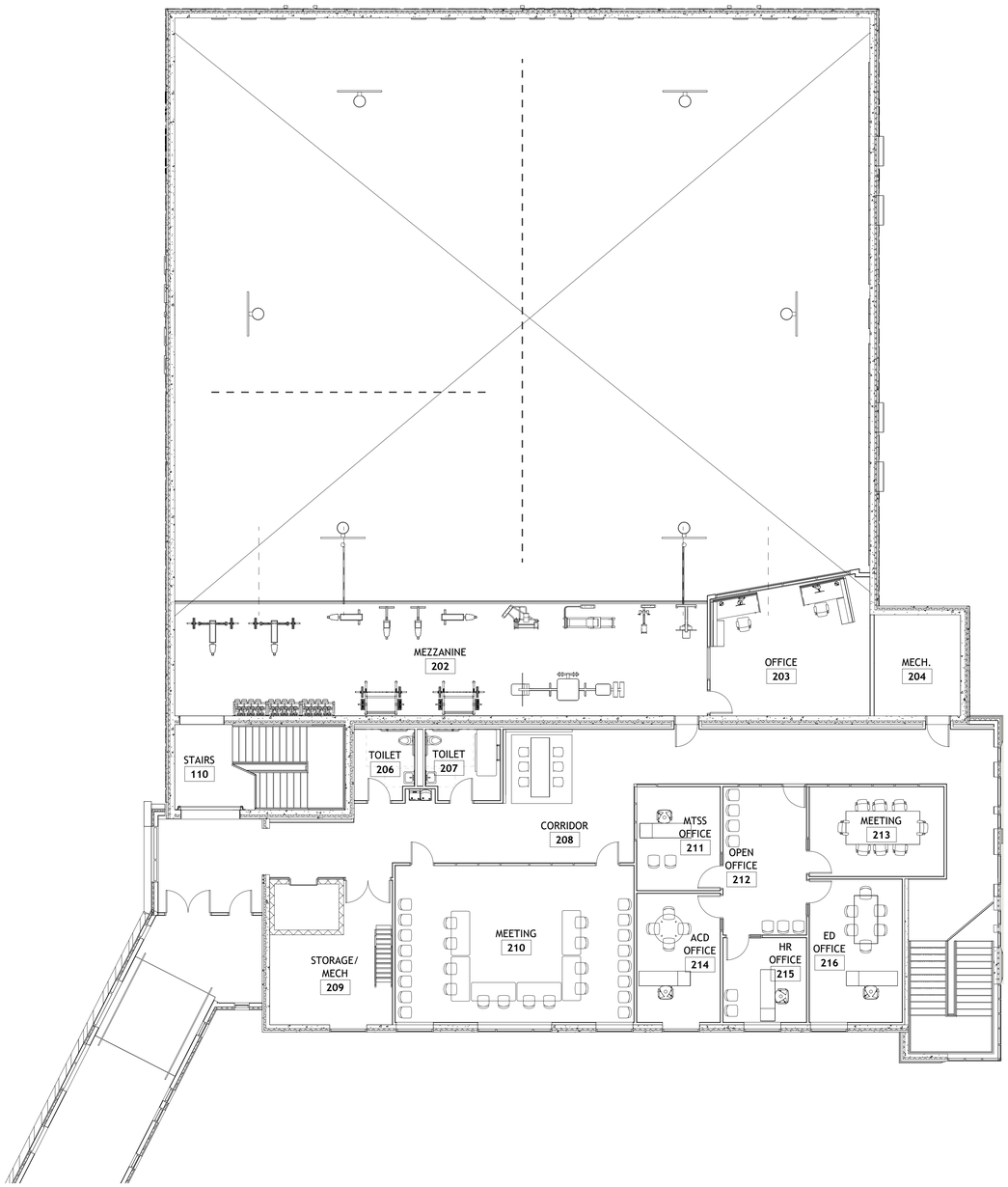
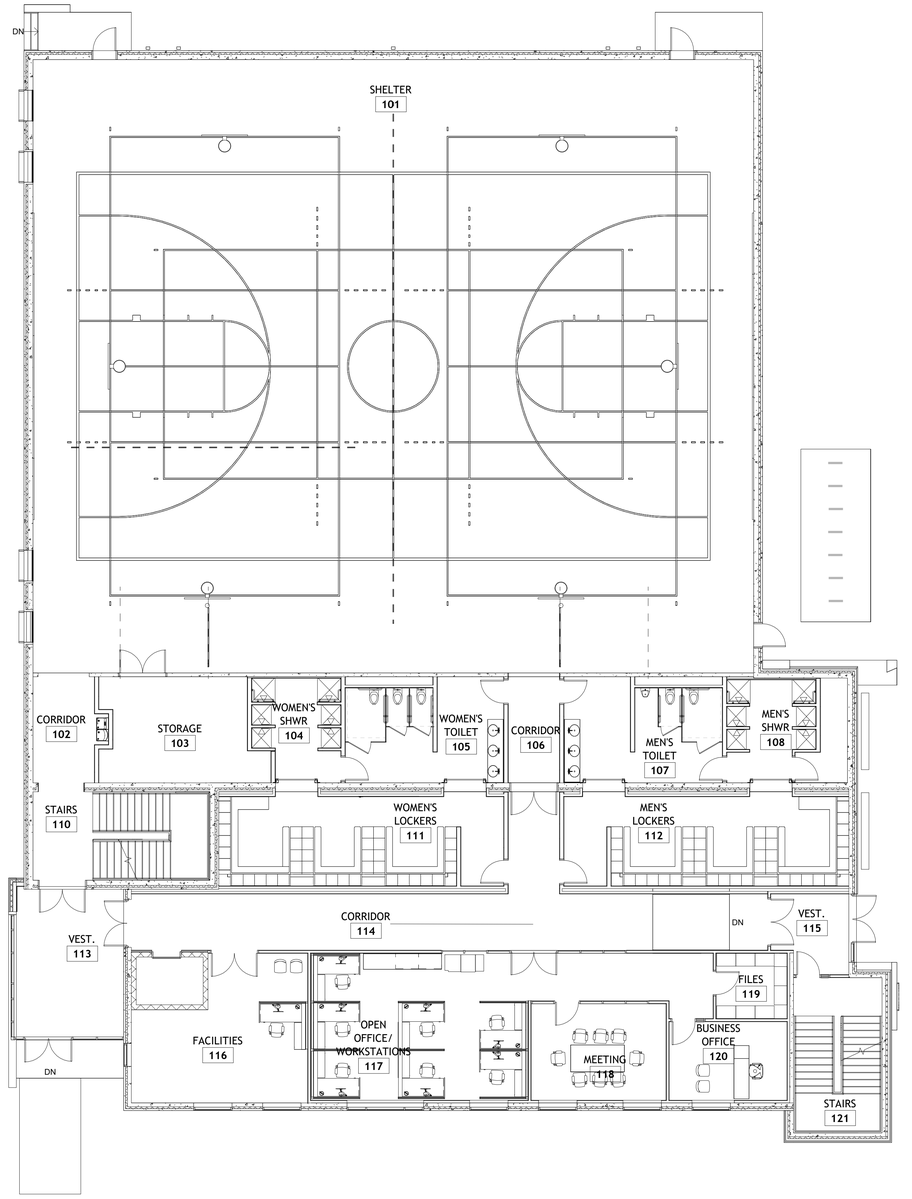


1 FURNITURE PLAN - LEVEL 2
1/8" = 1'-0"



2 FURNITURE PLAN - LEVEL 1
1/8" = 1'-0"

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SIGNATURE

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05/07/2025
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SHEET TITLE:
FURNITURE PLAN - FIRST & SECOND FLOOR

SHEET NUMBER:

A240

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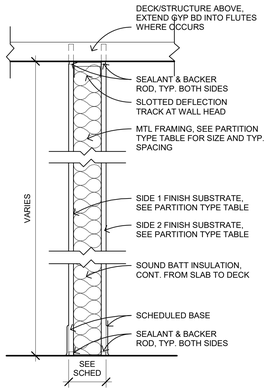
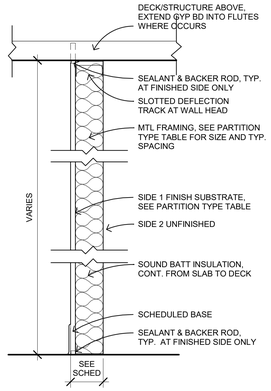


1 PARTITION TYPE 1 - TYP MTL STUD
1 1/2" = 1'-0"



2 PARTITION TYPE 2 - MTL STUD FURRING/SHAFT
1 1/2" = 1'-0"

PARTITION TYPE 1

TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.
1A	4 7/8"	3 5/8"	5/8" TYPE-X GYP BD	5/8" TYPE-X GYP BD	YES		
1B	7 1/4"	6"	5/8" TYPE-X GYP BD	5/8" TYPE-X GYP BD	YES		
1C	7 1/4"	6"	5/8" TYPE-X GYP BD	5/8" TYPE-X GYP BD	YES		
1D	7 1/4"	6"	5/8" TYPE-X GYP BD	5/8" MOIST. RES. GYP BD W/CT	YES		
1E	7 1/4"	6"	5/8" MOIST. RES. GYP BD	5/8" MOIST. RES. GYP BD W/CT	YES		
1F	7 1/4"	6"	5/8" MOIST. RES. GYP BD W/ CT	5/8" CEMENT BACKER BOARD	YES		
1S	4 7/8"	3 5/8"	5/8" MOIST. RES. GYP BD W/ S.S.	5/8" MOIST. RES. GYP BD W/ S.S.	YES		
1S1	4 7/8"	3 5/8"	5/8" MOIST. RES. GYP BD W/ S.S.	5/8" TYPE-X GYP BD	YES		

PARTITION TYPE 2

TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.
2A	2 1/4"	1 5/8"	5/8" TYPE-X GYP BD	NONE			
2B	4 1/4"	3 5/8"	5/8" TYPE-X GYP BD	NONE	YES		
2C	4 1/2"	3 5/8"	5/8" MOIST. RES. GYP BD W/ CT	NONE	NO		
2D	4 1/4"	3 5/8"	5/8" TYPE-X GYP BD	NONE	YES		

GENERAL FINISH SCHEDULE NOTES:

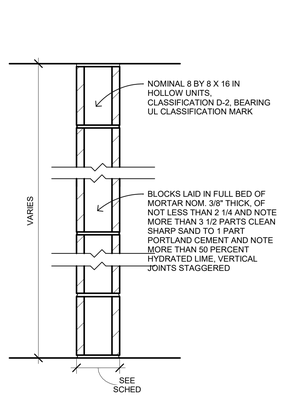
1. REVIEW INTERIOR ELEVATIONS FOR ADDITIONAL INFORMATION REGARDING ACCENT COLORS AND LOCATIONS OF PAINT COLOR TRANSITIONS.
2. SEE SPECIFICATIONS FOR SPECIFIC COLORS AND BLENDS FOR FINISH MATERIALS NOTED IN ROOM FINISH SCHEDULE
3. SEE DOOR SCHEDULE FOR HM DOOR AND FRAME PAINT COLORS
4. ALL STRUCTURAL STEEL EXPOSED TO VIEW FROM BELOW TO BE PAINTED PT-1

FINISH SCHEDULE KEYNOTES:

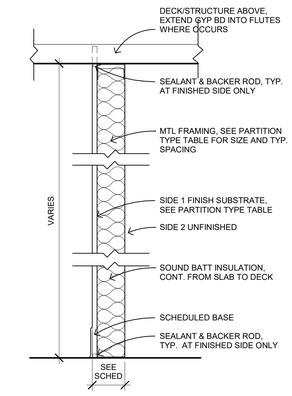
1. SEE FINISH PLAN FOR EXTENT OF ACCENT COLORS
2. ALIGN CEILING WITH TOP OF LAST FULL COURSE OF CT-2

ROOM FINISH SCHEDULE

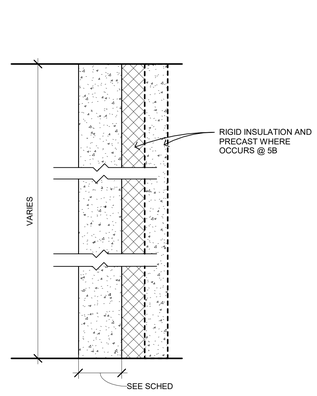
Level	ROOM NUMBER	ROOM NAME	FLOOR FINISH	BASE FINISH	NORTH WALL FINISH	NORTH WALL SUBSTRATE	EAST WALL FINISH	EAST WALL SUBSTRATE	SOUTH WALL FINISH	SOUTH WALL SUBSTRATE	WEST WALL FINISH	WEST WALL SUBSTRATE	CEILING MATERIAL	CEILING FINISH	CEILING HEIGHT
LEVEL 1	101	SHELTER	REC-1	VINYL	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	STRUCT.	NA	
LEVEL 1	102	CORRIDOR	LIN-1	VINYL	PT-1	CONC.	PT-1	GYP BD	PT-1	CONC.	PT-1	CONC.	ACT-1	NA	10'-0"
LEVEL 1	103	STORAGE	SEALED CONC.	VINYL	PT-1	CONC.	PT-1	GYP BD	PT-1	CONC.	PT-1	GYP BD	STRUCT.	NA	
LEVEL 1	104	WOMEN'S SHWR	PA FLOORING	PA BASE	EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		GYP BD		
LEVEL 1	105	WOMEN'S TOILET	PA FLOORING	PA BASE	EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		GYP BD		
LEVEL 1	106	CORRIDOR	LIN-1	VINYL	PT-1		PT-1	GYP BD	PT-1	CONC.	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 1	107	MEN'S TOILET	PA FLOORING	PA BASE	EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		GYP BD		
LEVEL 1	108	MEN'S SHWR	PA FLOORING	PA BASE	EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		GYP BD		
LEVEL 1	109	MECH.													
LEVEL 1	110	STAIRS	LIN-1	VINYL	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	ACT-1	NA	10'-0"
LEVEL 1	111	WOMEN'S LOCKERS	PA FLOORING	PA BASE	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	GYP BD		
LEVEL 1	112	MEN'S LOCKERS	PA FLOORING	PA BASE	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	GYP BD		
LEVEL 1	113	VEST.	CTP-2	VINYL	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	ACT-1	NA	10'-0"
LEVEL 1	114	CORRIDOR	LIN-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	CONC.	ACT-1	NA	10'-0"
LEVEL 1	115	VEST.	CTP-2	VINYL	PT-1	GYP BD	PT-1	CONC.	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 1	116	FACILITIES	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	CONC.	PT-1	CONC.	STRUCT.	NA	
LEVEL 1	117	OPEN OFFICE/ WORKSTATIONS	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 1	118	MEETING	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 1	119	FILES	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 1	120	BUSINESS OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 1	121	STAIRS	LIN-1	VINYL	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	ACT-1	NA	10'-0"
LEVEL 1	122	STAIR													
LEVEL 1	126	TOILET													
LEVEL 1	149	TOILET													
LEVEL 1	E101	HALLWAY													
LEVEL 1	E102	OFFICE													
LEVEL 2	202	MEZZANINE	RUBBER FLOORING	VINYL	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	ACT-1	NA	10'-0"
LEVEL 2	203	OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	204	MECH.	SEALED CONC	VINYL	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	205	STAIRS													
LEVEL 2	206	TOILET	PA FLOORING	PA BASE	EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		GYP BD		
LEVEL 2	207	TOILET	PA FLOORING	PA BASE	EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		EPOXY PT-1		GYP BD		
LEVEL 2	208	CORRIDOR	LIN-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	209	STORAGE/ MECH	SEALED CONC.	VINYL	PT-1	CONC.	PT-1	GYP BD	PT-1	CONC.	PT-1	CONC.	STRUCT.	NA	
LEVEL 2	210	MEETING	CTP-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	211	MTSS OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	212	OPEN OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	213	MEETING	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	214	ACD OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	215	HR OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	216	ED OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	217	STAIRS													
LEVEL 2	218	SKYWAY LOBBY													
LEVEL 2	219	SKYWAY													
LEVEL 2	E101M	MEZZ													
LEVEL 2	E201	OT	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	E202	TUTOR	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	E203	HALLWAY													
LEVEL 2	E204	SENSORY	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	E205	TUTOR	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	NA	10'-0"
LEVEL 2	E206	RAMP													
LEVEL 2	E207	HALLWAY													
LEVEL 3	E325	MEETING / CLASS													
LEVEL 3	E326	LOCKERS													
LEVEL 3	E332	ROOM													



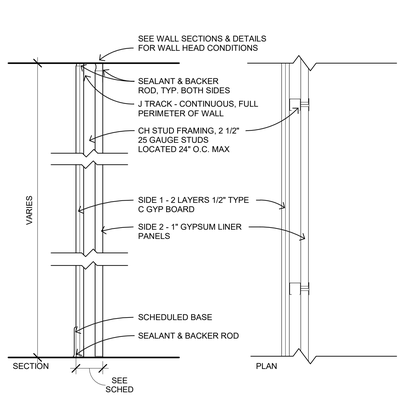
3 PARTITION TYPE 3 - CONCRETE MASONRY UNITS (BEARING)
1 1/2" = 1'-0"



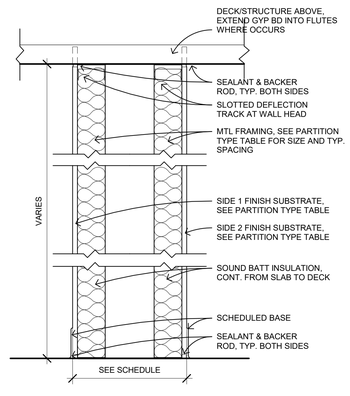
4 PARTITION TYPE 4 - MTL STUD FURRING/SHAFT (BEARING)
1 1/2" = 1'-0"



5 PARTITION TYPE 5 - INTERIOR PRECAST
1 1/2" = 1'-0"



6 PARTITION TYPE 6 - FIRE RATED - 2HR - UL U415, SYSTEM B (U438)
1 1/2" = 1'-0"



7 PARTITION TYPE 8 - TYP MTL STUD - TYP CHASE
1 1/2" = 1'-0"

PARTITION TYPE 3

TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.
3A	7 5/8"					1HR	

PARTITION TYPE 4

TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.

PARTITION TYPE 5

TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.
5A	6"						
5B	1' - 2"					2HR	

PARTITION TYPE 6

TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.

PARTITION TYPE 8

TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.

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Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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PRINT NAME

SIGNATURE

LICENSE NO.

05/07/2025
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SHEET TITLE:
ROOM FINISH SCHEDULE & PARTITION TYPES

SHEET NUMBER:
A300

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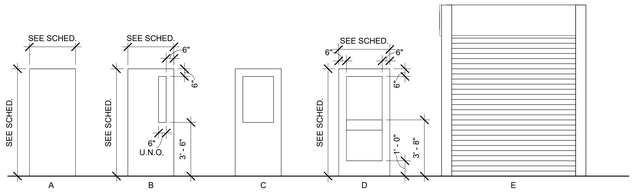
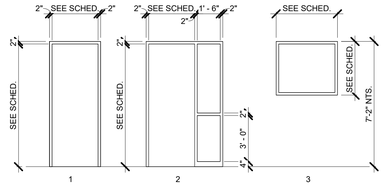
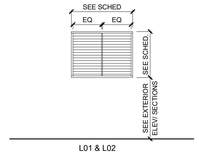


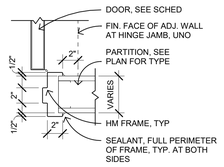
DOOR TYPES
1/4" = 1'-0"



FRAME TYPES
1/4" = 1'-0"



LOUVER TYPE
NOT TO SCALE



SEE DOOR SCHED. FOR REQ. RATED OPENING PROTECTIONS

1 TYPICAL HM DOOR JAMB (HEAD SIM.)
1 1/2" = 1'-0"

OPENING SCHEDULE KEYNOTES:

1. PAIR OF DOORS. TWO EQUAL, TOTALLING TO DIMENSION INDICATED IN SCHEDULE, UNLESS NOTED OTHERWISE
2. PROVIDE ELECTRONIC ACCESS CONTROL AND CARD READERS, SEE ELEC.
3. DOOR SHALL MEET REQUIREMENTS OF ICC 500 & FEMA 320/361, SEE SPEC FOR FEMA PACKAGE DOORS AND FRAMES FOR TORNADO SHELTERS
4. PROVIDE FIRE RATED GLAZING.
5. DOOR TO BE INSTALLED IN EXISTING MASONRY OPENING, FIELD VERIFY EXISTING OPENING SIZE
6. PROVIDE 4" FRAME HEAD

OPENING SCHEDULE GENERAL NOTES:

A. SEE PLAN FOR ALL DOOR LOCATIONS.

B. FOR WINDOW OPENING HEIGHTS, SEE HOLLOW METAL FRAME TYPES, UNLESS NOTED OTHERWISE ON DRAWINGS.

OPENING SCHEDULE

Level	OPENING NUMBER	OPENING SIZE		DOOR				FRAME			RATING	HARDWARE GROUPS	DETAILS			NOTES
		WIDTH	HEIGHT	THICKNESS	TYPE	MATERIAL	FINISH	TYPE	MATERIAL	FINISH			HEAD	JAMB	SILL/THRESHOLD	
LEVEL 1	101-1	3' - 0"	8' - 0"	1 3/4"	A	HM	POLY	1	HM	PT	X					
LEVEL 1	101-2	3' - 0"	8' - 0"	1 3/4"	A	HM	POLY	1	HM	PT	X					
LEVEL 1	101-3	3' - 0"	8' - 0"	1 3/4"	A	HM	POLY	1	HM	PT	X					
LEVEL 1	101-4	3' - 0"	7' - 0"	1 3/4"	A	HM	PT	1	HM	PT	X					
LEVEL 1	104	5' - 6"	11' - 2"	0"												
LEVEL 1	105-1	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	105-2	5' - 6"	11' - 2"	0"												
LEVEL 1	105-3	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	107-1	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	107-2	5' - 6"	11' - 2"	0"												
LEVEL 1	107-3	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	108	5' - 6"	11' - 2"	0"												
LEVEL 1	109	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	111	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	112	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	113-1	6' - 0"	8' - 0"	1 3/4"	D	ALUM		SEE ELEV	ALUM			TBD				
LEVEL 1	113-2	6' - 0"	8' - 0"	1 3/4"	D	ALUM		SEE ELEV	ALUM			TBD				
LEVEL 1	113-3	3' - 0"	8' - 0"	1 3/4"	B	HM	PT	1	HM	PT	X					
LEVEL 1	114	3' - 0"	8' - 0"	1 3/4"	B	HM	PT	1	HM	PT	X					
LEVEL 1	115-1	6' - 0"	8' - 0"	1 3/4"	D	WD		SEE ELEV	HM			TBD				
LEVEL 1	115-2	3' - 0"	8' - 0"	1 3/4"	C	WD	POLY	1	HM	HM	X					
LEVEL 1	115-3	3' - 0"	8' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 1	116	3' - 0"	8' - 0"	1 3/4"	A	HM	PT	1	HM	PT	X					
LEVEL 1	117	6' - 0"	8' - 0"	1 3/4"	D	WD		SEE ELEV	HM			TBD				
LEVEL 1	118	3' - 0"	9' - 0"	1 3/4"	A	WD		SEE ELEV	HM			TBD				
LEVEL 1	119	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	120	3' - 0"	8' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 1	179	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
LEVEL 1	180	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
LEVEL 1	E101-1	4' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	HM	X					
LEVEL 1	E101-2	4' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	HM	X					
LEVEL 1	E102	3' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	PT	X					
LEVEL 2	201-1	3' - 0"	8' - 0"	1 3/4"	A	WD		SEE ELEV	HM			TBD				
LEVEL 2	201-2	3' - 0"	8' - 0"	1 3/4"	A	WD		SEE ELEV	HM			TBD				
LEVEL 2	203	3' - 0"	7' - 0"	1 3/4"	B	HM	POLY	1	HM	PT	X					
LEVEL 2	203-1	4' - 6"	3' - 6"					3								
LEVEL 2	204	3' - 0"	7' - 0"	1 3/4"	A	HM	PT	1	HM	PT	X					
LEVEL 2	205	8' - 0"	11' - 2"	0"												
LEVEL 2	206	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 2	207	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 2	208	3' - 0"	7' - 0"	1 3/4"	B	HM	PT	1	HM	PT	X					
LEVEL 2	209	3' - 0"	8' - 0"	1 3/4"	A	HM	PT	1	HM	PT	X					
LEVEL 2	211	3' - 0"	8' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	212	3' - 0"	8' - 0"	1 3/4"	A	WD		SEE ELEV	HM			TBD				
LEVEL 2	213	3' - 0"	8' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	214	3' - 0"	8' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	215	3' - 0"	8' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	216	3' - 0"	8' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	218-1	3' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	PT	X					
LEVEL 2	218-2	3' - 0"	7' - 0"	1 3/4"	C	HM		1	HM		X	12				
LEVEL 2	219-1	3' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	PT	X					
LEVEL 2	219-2	3' - 0"	7' - 0"	1 3/4"	C	HM		1	HM		X	12				
LEVEL 2	E201	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
LEVEL 2	E202	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
LEVEL 2	E204	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
LEVEL 2	E205	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
LEVEL 2	E207-1	4' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	HM	X					
LEVEL 2	E207-2	4' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	HM	X					

LOUVER SCHEDULE

OPENING NUMBER	OPENING SIZE		DETAILS			NOTES
	WIDTH	HEIGHT	HEAD	JAMB	SILL	
L01	4' - 0"	7' - 0"				
L01	4' - 0"	7' - 0"				
L01	4' - 0"	7' - 0"				
L01	4' - 0"	7' - 0"				
L02	4' - 0"	6' - 0"				
L02	4' - 0"	6' - 0"				
L02	4' - 0"	6' - 0"				
L02	4' - 0"	6' - 0"				

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NOVA CLASSICAL ACADEMY
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ST. PAUL, MN 55102
Phone: 651.209.6320

CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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SIGNATURE

LICENSE NO.

05/07/2025
DATE

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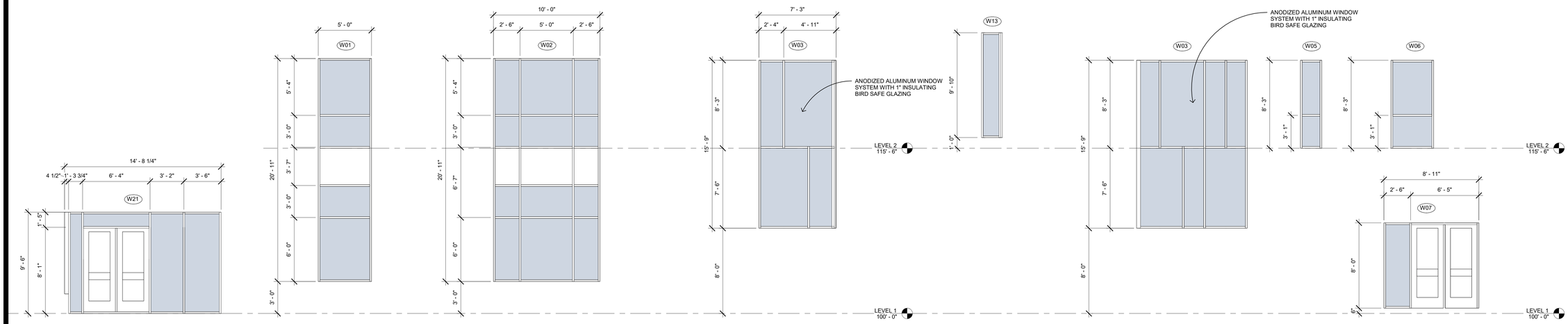
SHEET TITLE:
OPENING SCHEDULE, DOOR, FRAME, WINDOW TYPES

SHEET NUMBER:

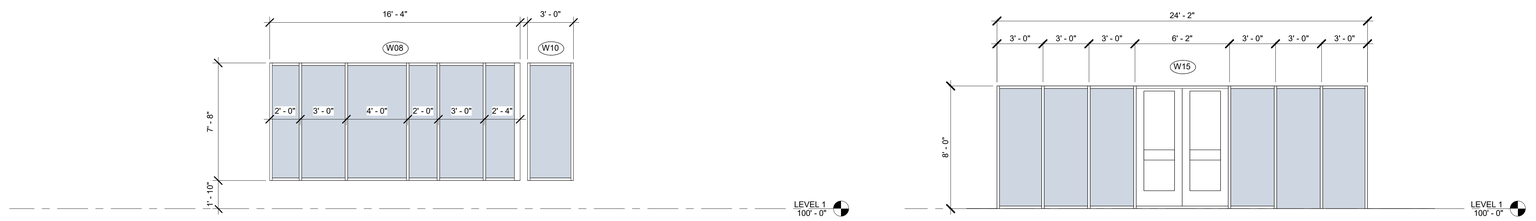
A310



1 STOREFRONT - SOUTHEAST
1/4" = 1'-0"

2 STOREFRONT - NORTHEAST
1/4" = 1'-0"

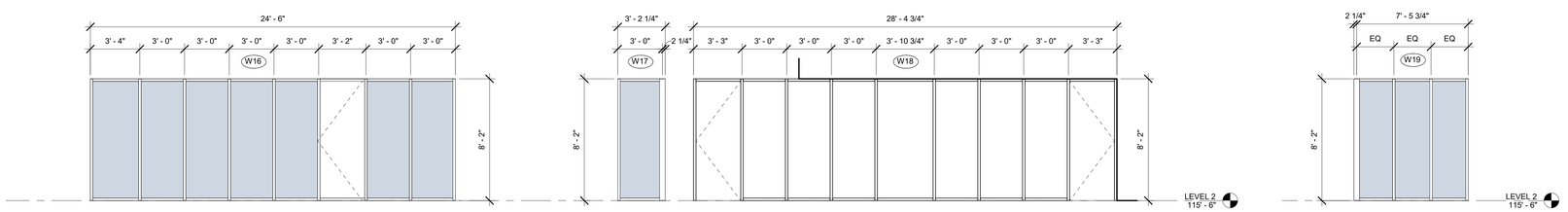
4 STOREFRONT - SKY WAY
1/4" = 1'-0"



3 STOREFRONT - SOUTHWEST
1/4" = 1'-0"

5 STOREFRONT - LEVEL 1 - HALLWAY SOUTH
1/4" = 1'-0"

6 STOREFRONT - LEVEL 1 MEETING ROOM
1/4" = 1'-0"



7 STOREFRONT - LEVEL 2 - HALLWAY SOUTH
1/4" = 1'-0"

8 STOREFRONT - LEVEL 2 - MTSS OFFICE
1/4" = 1'-0"

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SHEET TITLE:
WINDOW TYPES

SHEET NUMBER:

A311

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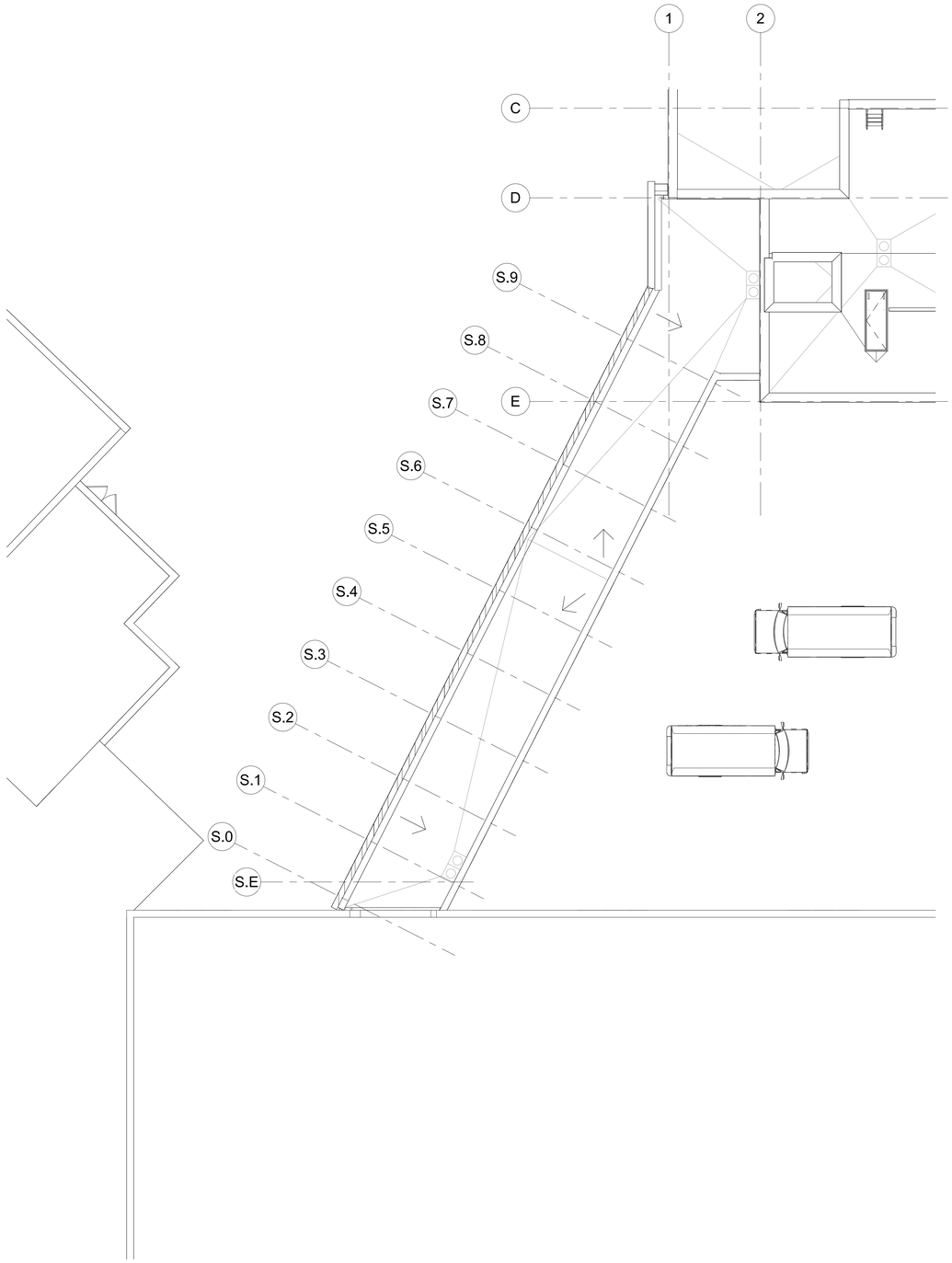
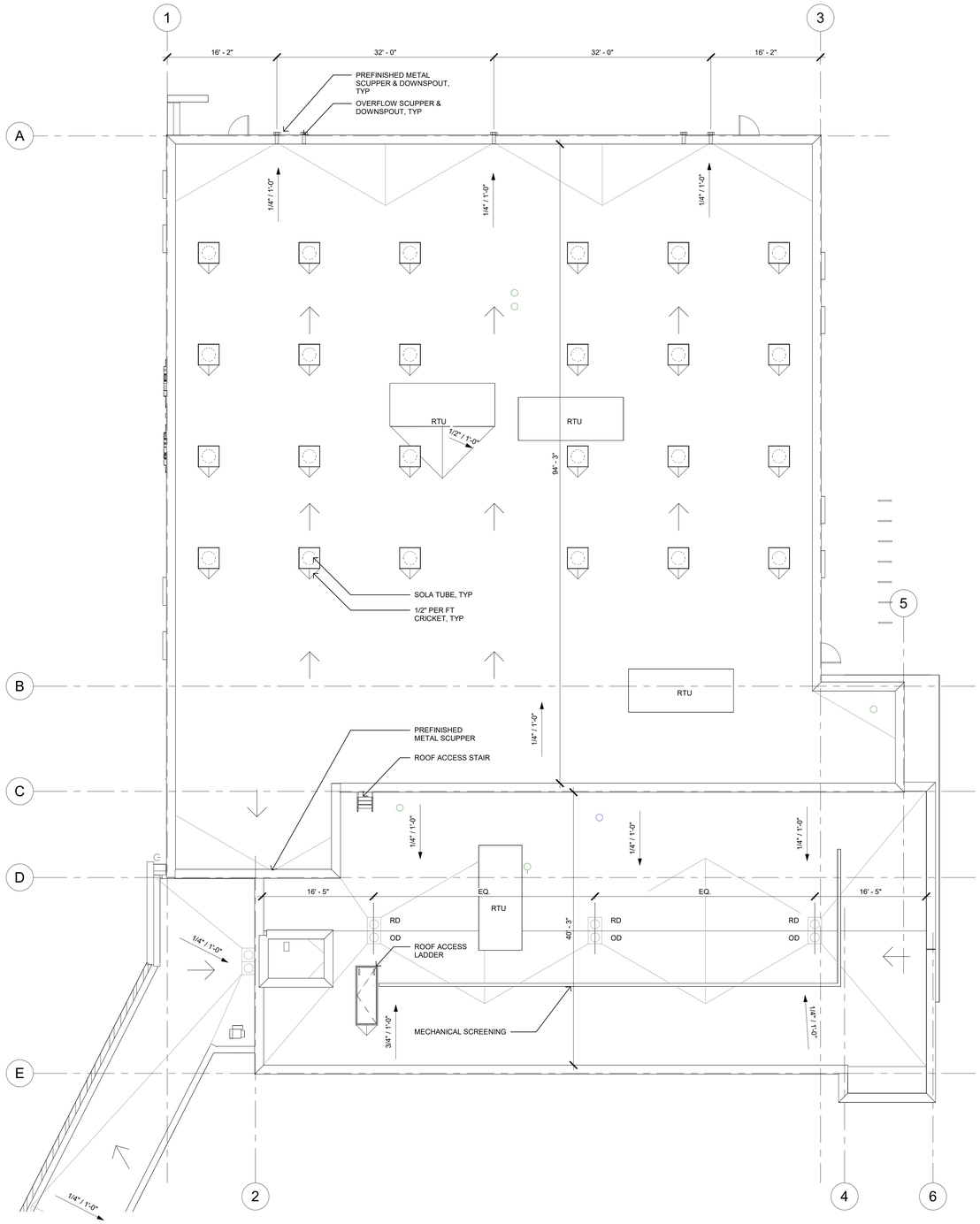


1 ROOF PLAN SKYWAY
1/8" = 1'-0"



2 ROOF PLAN SHELTER
1/8" = 1'-0"

N
PROJECT
N
TRUE

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SHEET TITLE:
ROOF PLAN - SHELTER & SKYWAY

SHEET NUMBER:

A400

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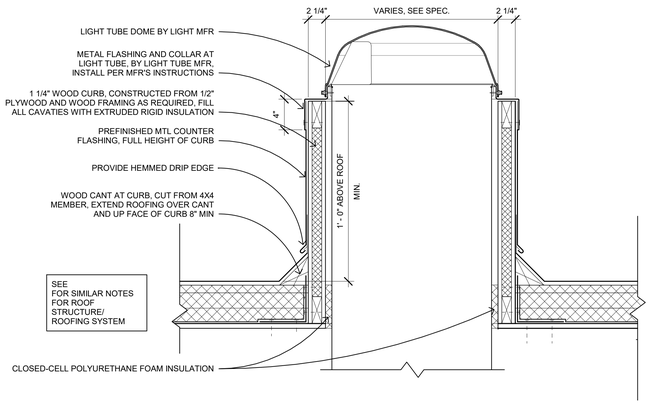
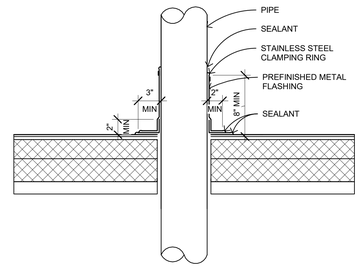
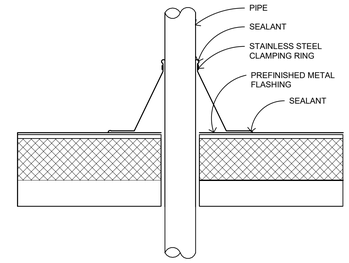


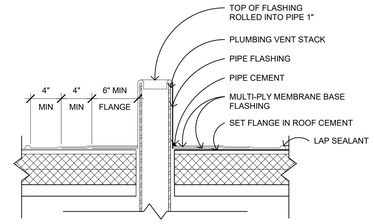
1 TUBULAR DAYLIGHTING DEVICE DETAIL
1 1/2" = 1'-0"



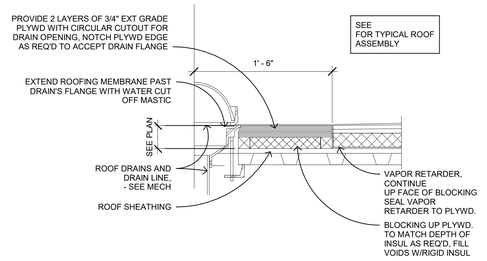
2 TYP PIPE PENETRATION - STRAIGHT BOOT
1 1/2" = 1'-0"



3 TYP PIPE PENETRATION - TAPERED BOOT
1 1/2" = 1'-0"



4 TYP VENT DETAIL
1 1/2" = 1'-0"



5 TYP. ROOF DRAIN DETAIL
1 1/2" = 1'-0"

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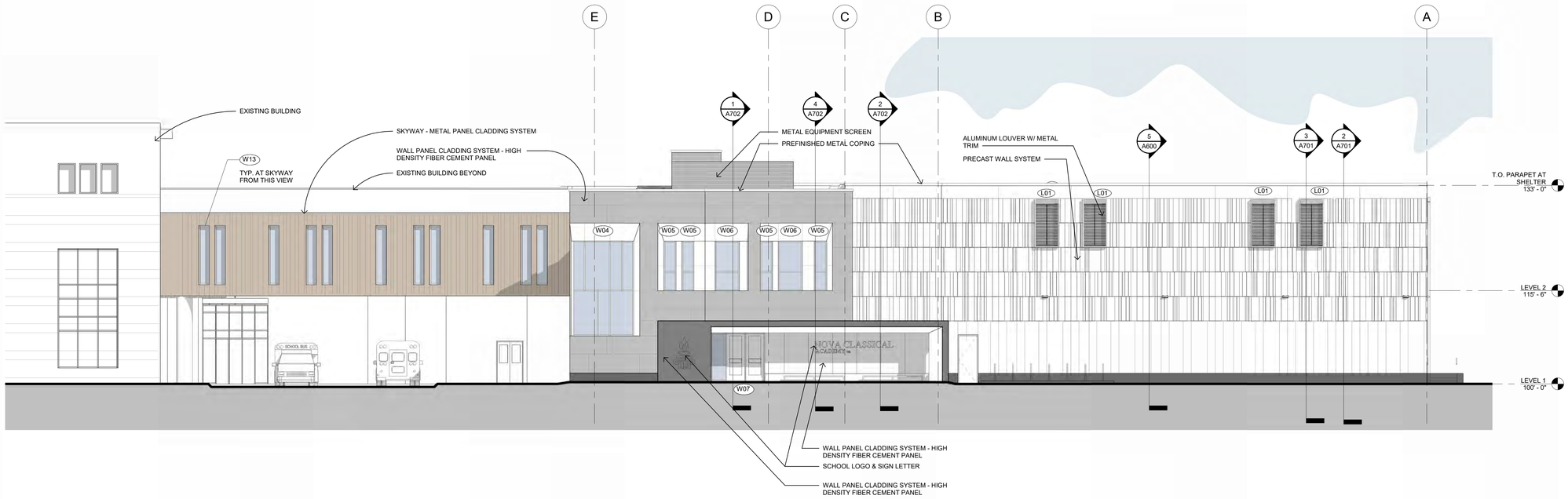
SHEET TITLE:
ROOF DETAILS

SHEET NUMBER:

A401

1 SKYWAY VIEW FROM MERCER ST.



2 ELEVATION - NORTHEAST
1/8" = 1'-0"

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CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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PRINT NAME

SIGNATURE

LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
BUILDING ELEVATIONS-NORTHEAST

SHEET NUMBER:

A501

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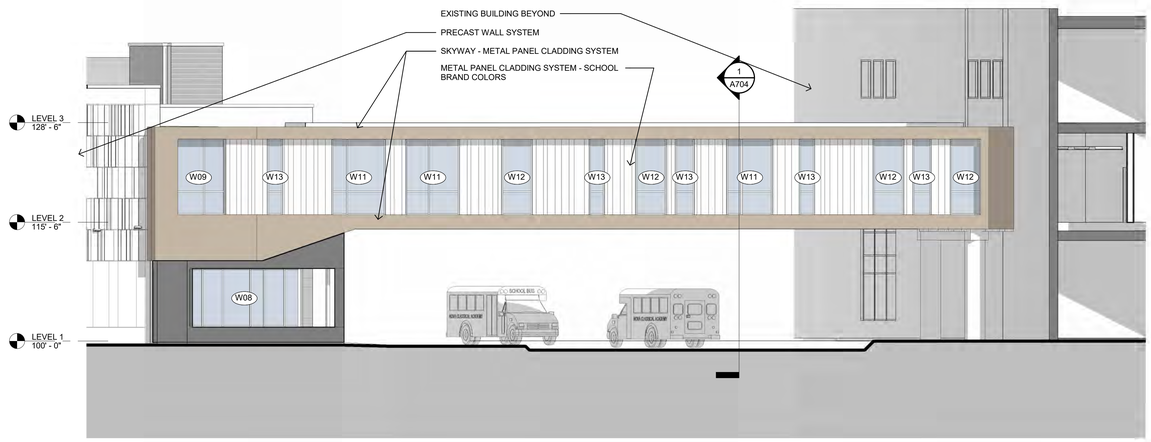
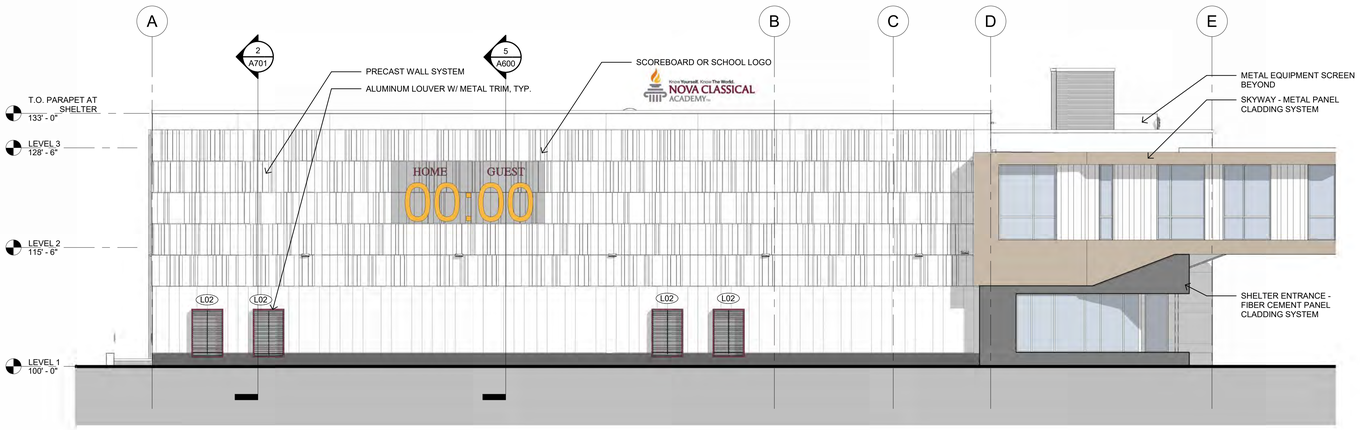
1 SKYWAY - SHELTER ENTRANCE VIEW



2 SKYWAY ELEVATION
1/8" = 1'-0"



3 ELEVATION - SOUTHWEST
1/8" = 1'-0"

4 SKYWAY - SHELTER VIEW FROM MAIN BUILDING

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St. Paul, MN 55114
Tel. 612.338.4590

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ST. PAUL, MN 55102
Phone: 651.209.6320

CONSULTANT

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SIGNATURE

LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
BUILDING ELEVATIONS - SOUTHWEST

SHEET NUMBER:

A502

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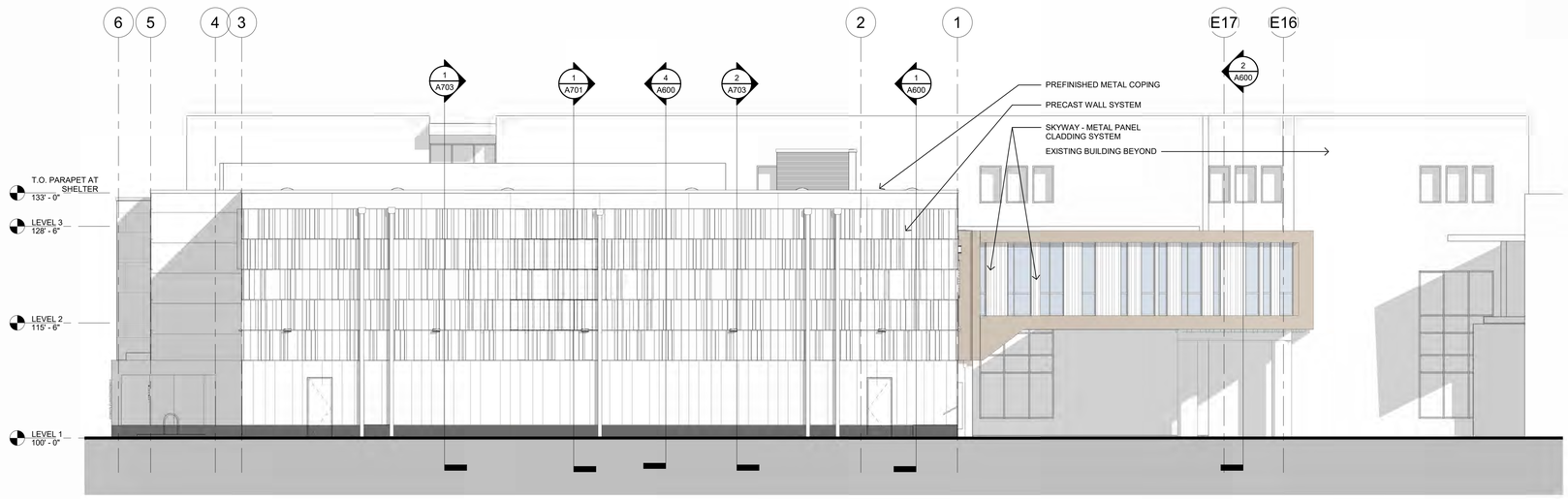
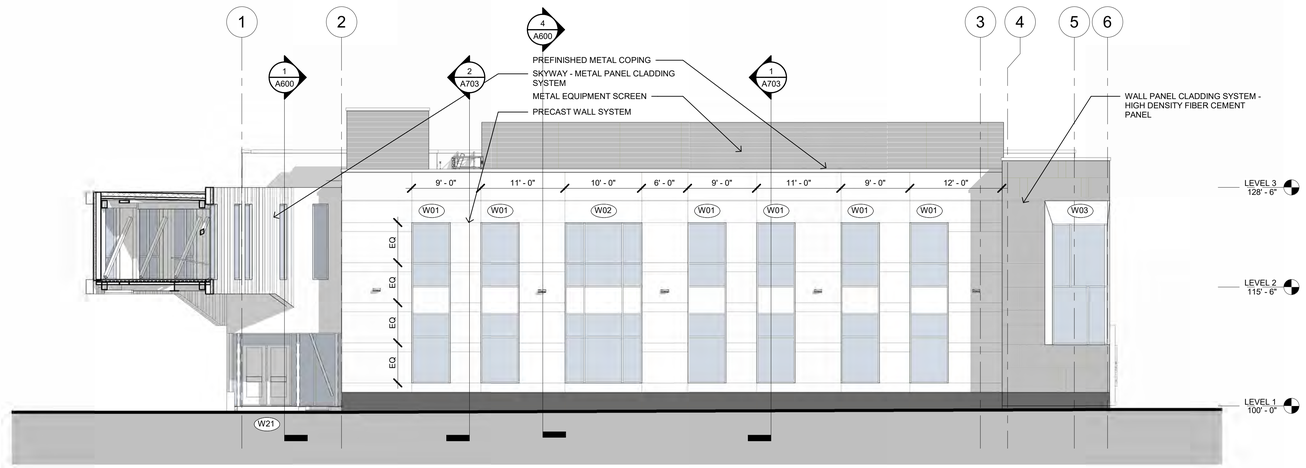
1 SKYWAY VIEW - FROM NORTH



2 ELEVATION - NORTHWEST
1/8" = 1'-0"



3 ELEVATION - SOUTHEAST
1/8" = 1'-0"

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ST. PAUL, MN 55102
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CONSULTANT

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IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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LICENSE NO.

05/07/2025
DATE

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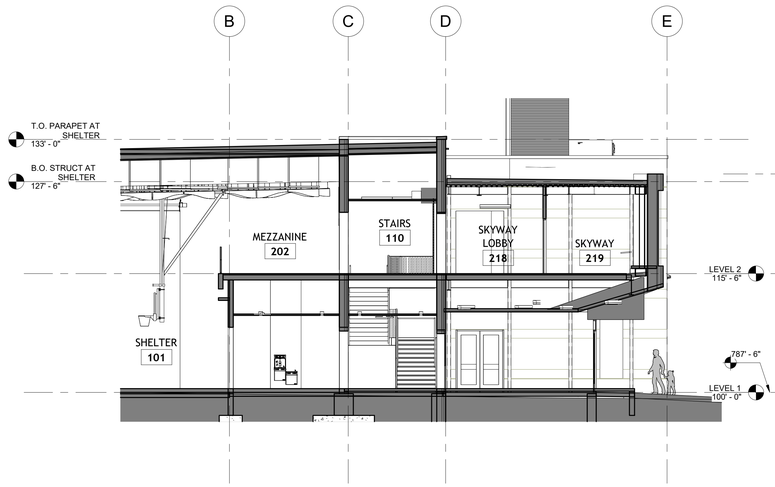
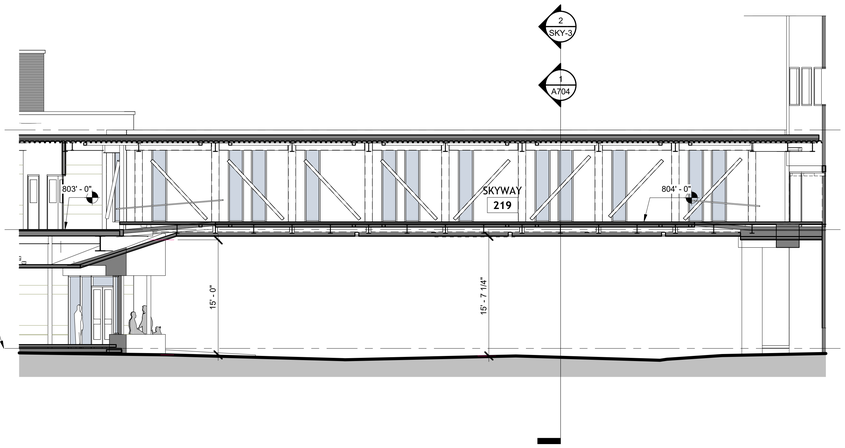
SHEET TITLE:
BUILDING ELEVATIONS - NORTH WEST & SOUTHEAST

SHEET NUMBER:

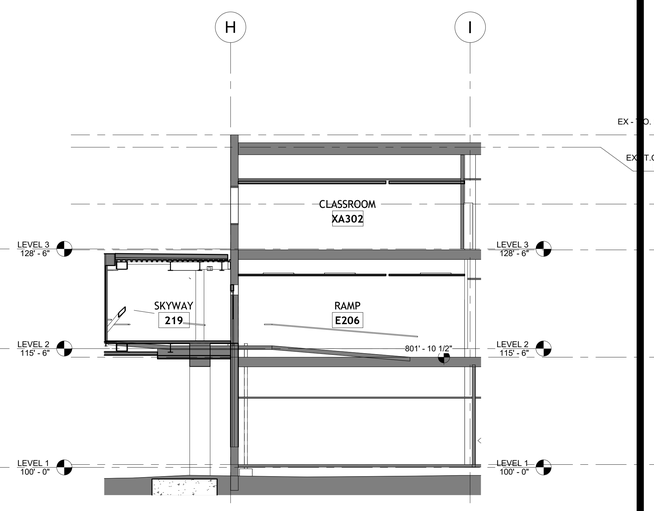
A503



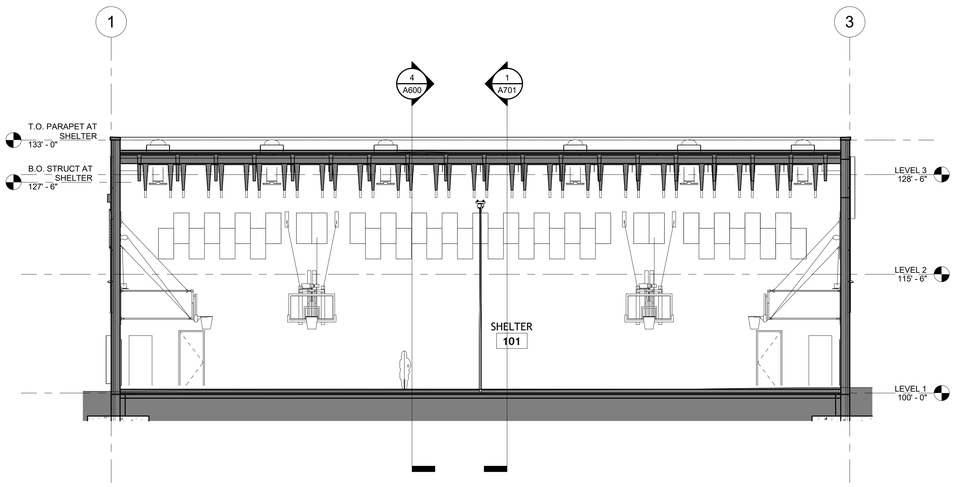
1 SKYWAY SECTION - AT NEW
1/8" = 1'-0"



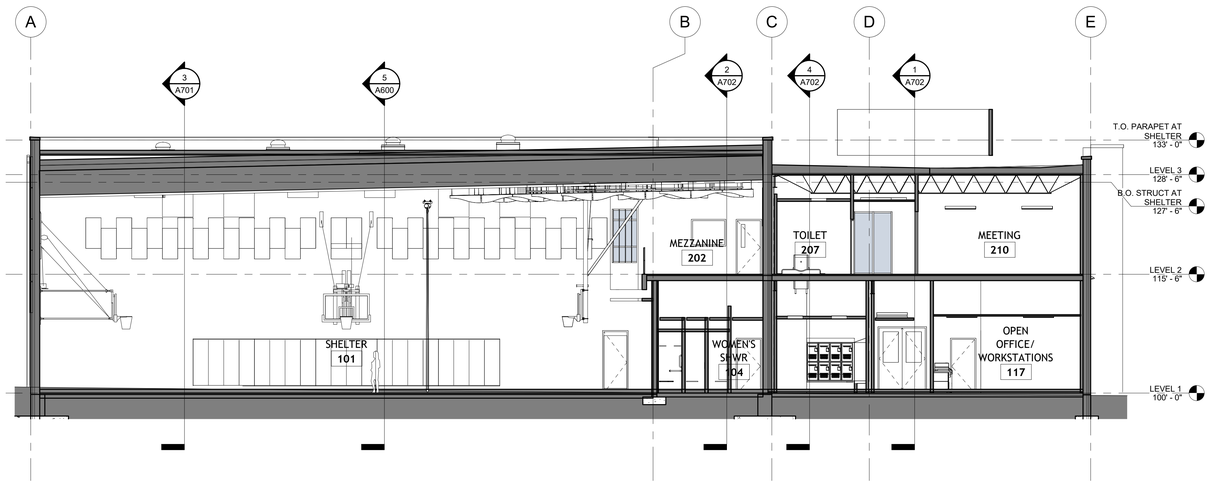
3 SKYWAY SECTION - CENTER
1/8" = 1'-0"



2 SKYWAY SECTION - AT EXISTING
1/8" = 1'-0"



5 EAST-WEST SECTION AT SHELTER
1/8" = 1'-0"



4 NORTH-SOUTH SECTION AT SHELTER
1/8" = 1'-0"

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St. Paul, MN 55114
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EX ST. PAUL, MN 55102
Phone: 651.209.6320

CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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05/07/2025
DATE

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SHEET TITLE:
BUILDING SECTIONS

SHEET NUMBER:

A600

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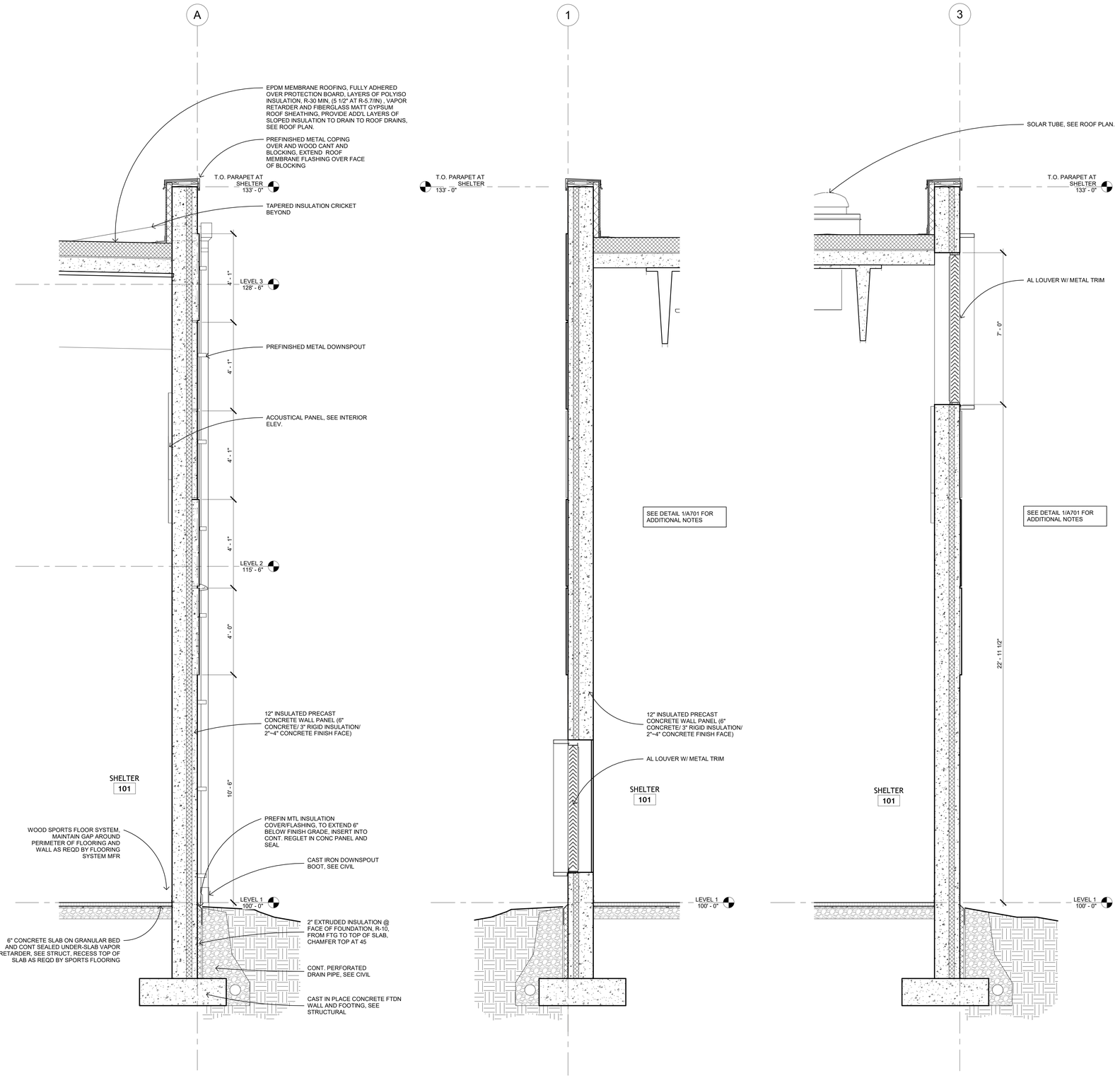

1 WALL SECTION - SHELTER TYPICAL
1/2" = 1'-0"

2 WALL SECTION - SHELTER WEST WALL
1/2" = 1'-0"

3 WALL SECTION - SHELTER EAST WALL
1/2" = 1'-0"

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SHEET TITLE:
WALL SECTIONS - SHELTER

SHEET NUMBER:

A701

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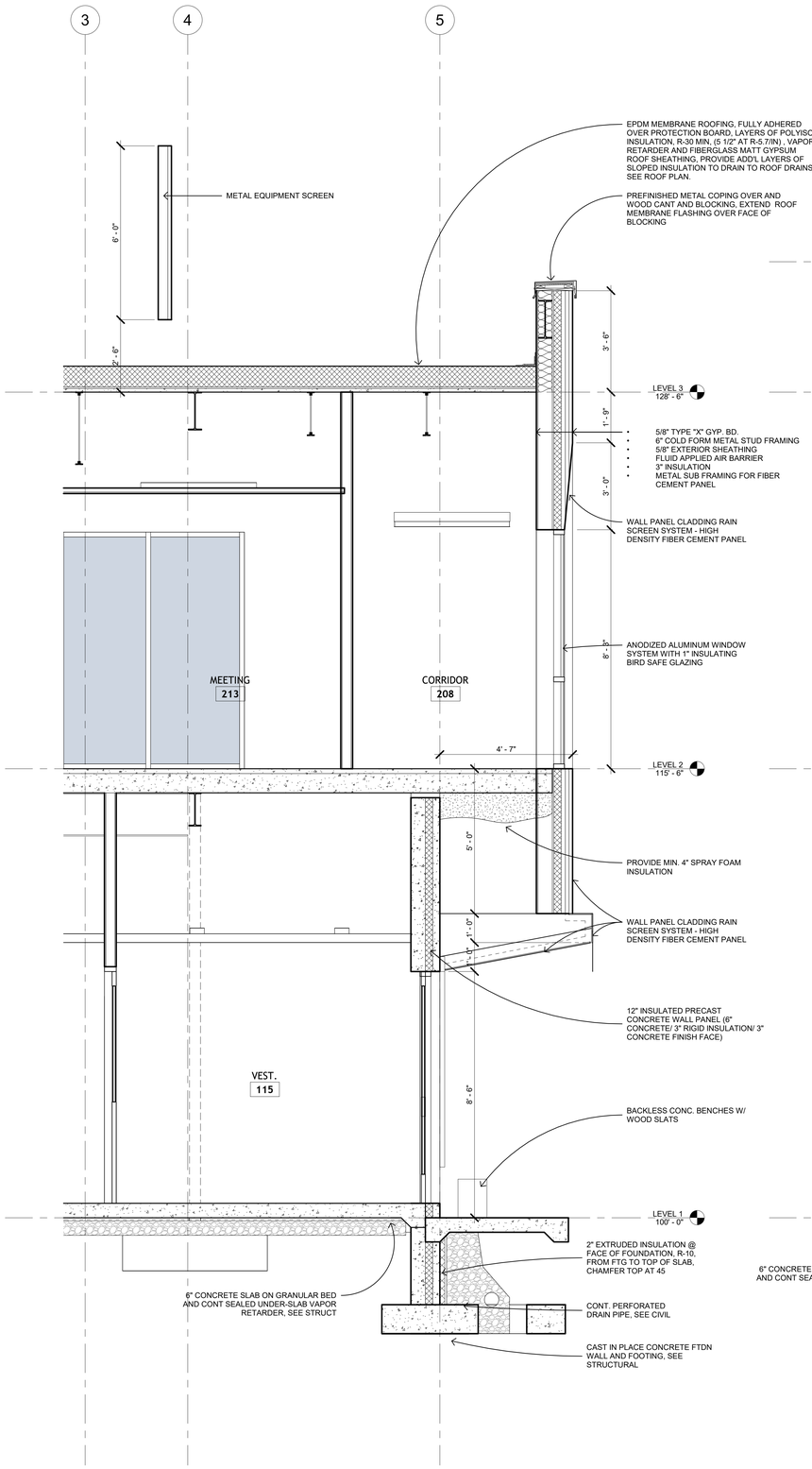
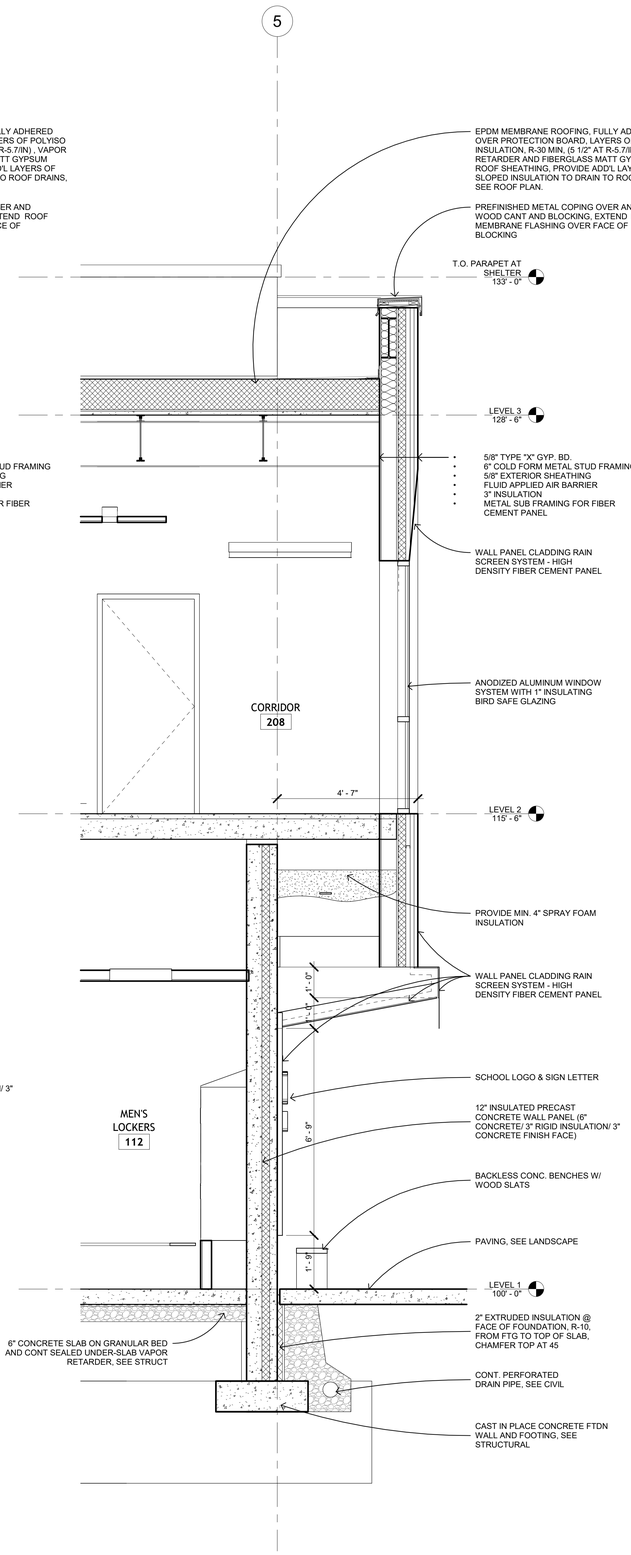
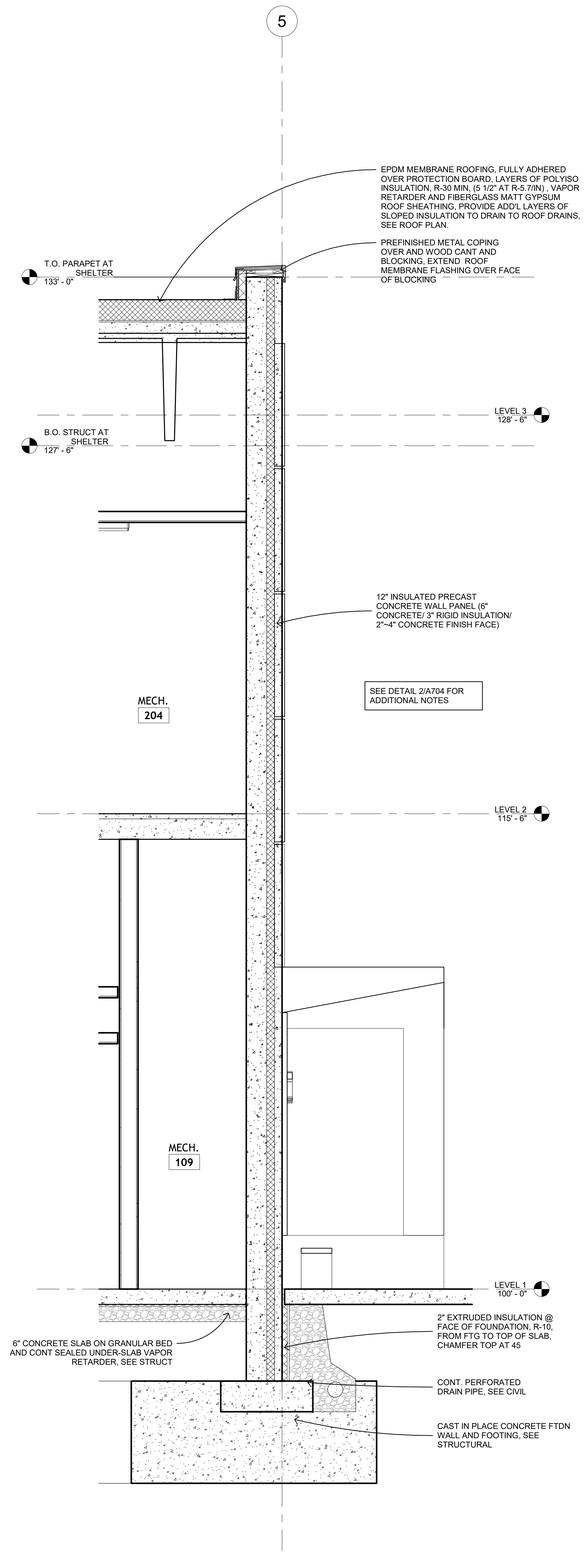


1 WALL SECTION - BUS STOP VESTIBULE
1/2" = 1'-0"



4 WALL SECTION - BUS STOP CANOPY 1
1/2" = 1'-0"



2 WALL SECTION - BUS STOP CANOPY
1/2" = 1'-0"

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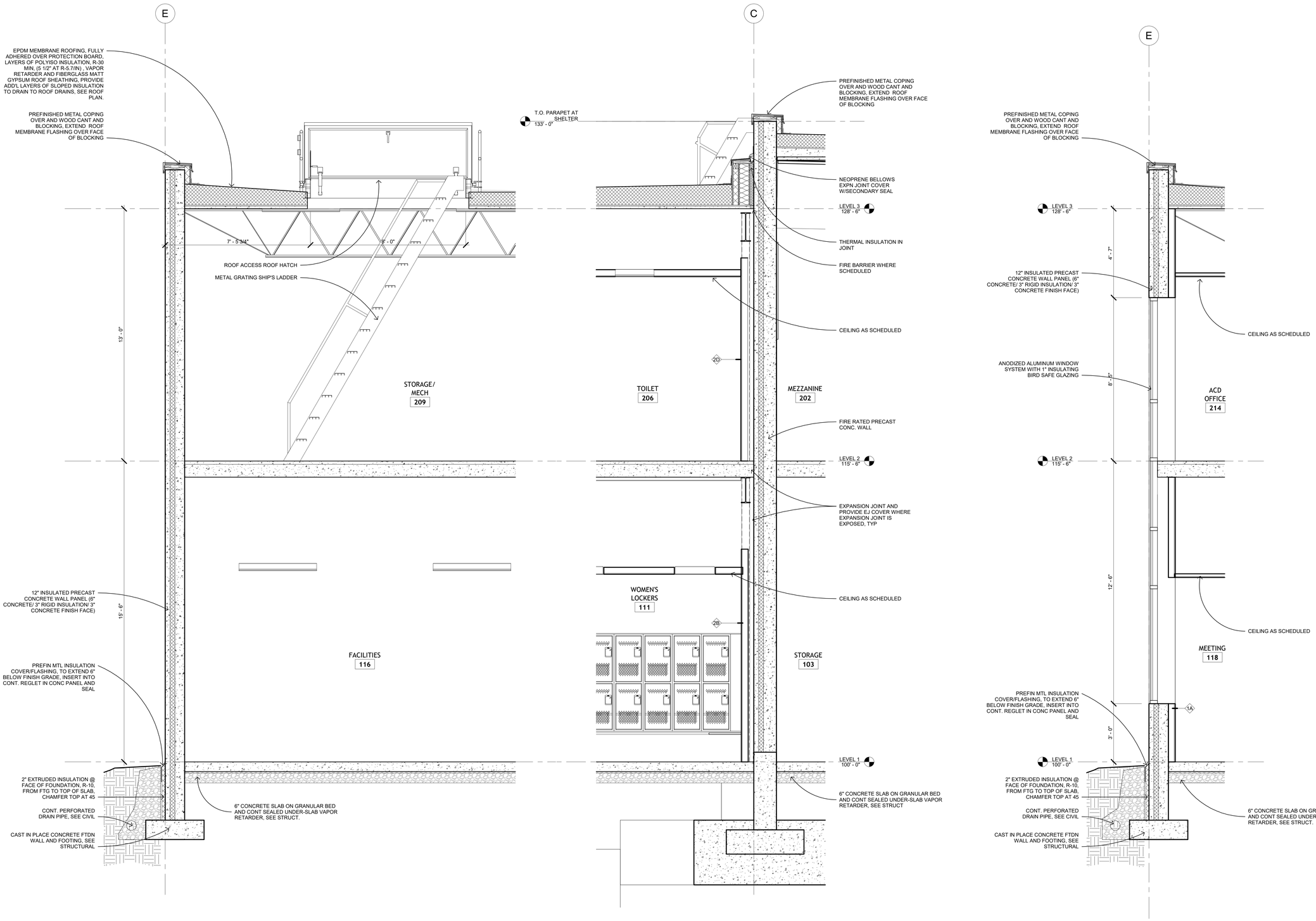
SHEET TITLE:
WALL SECTIONS - NORTHEAST WALL

SHEET NUMBER:

A702



2 WALL SECTION - SOUTH EAST
1/2" = 1'-0"

1 WALL SECTION - OFFICE, TYP.
1/2" = 1'-0"

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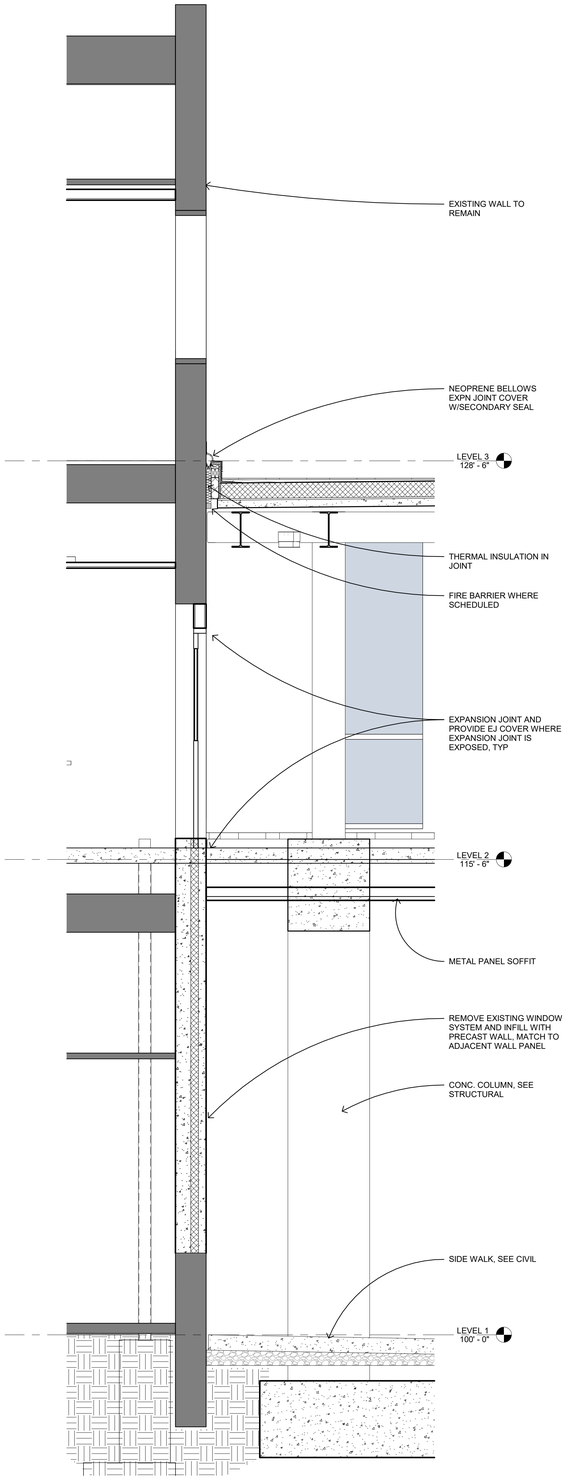
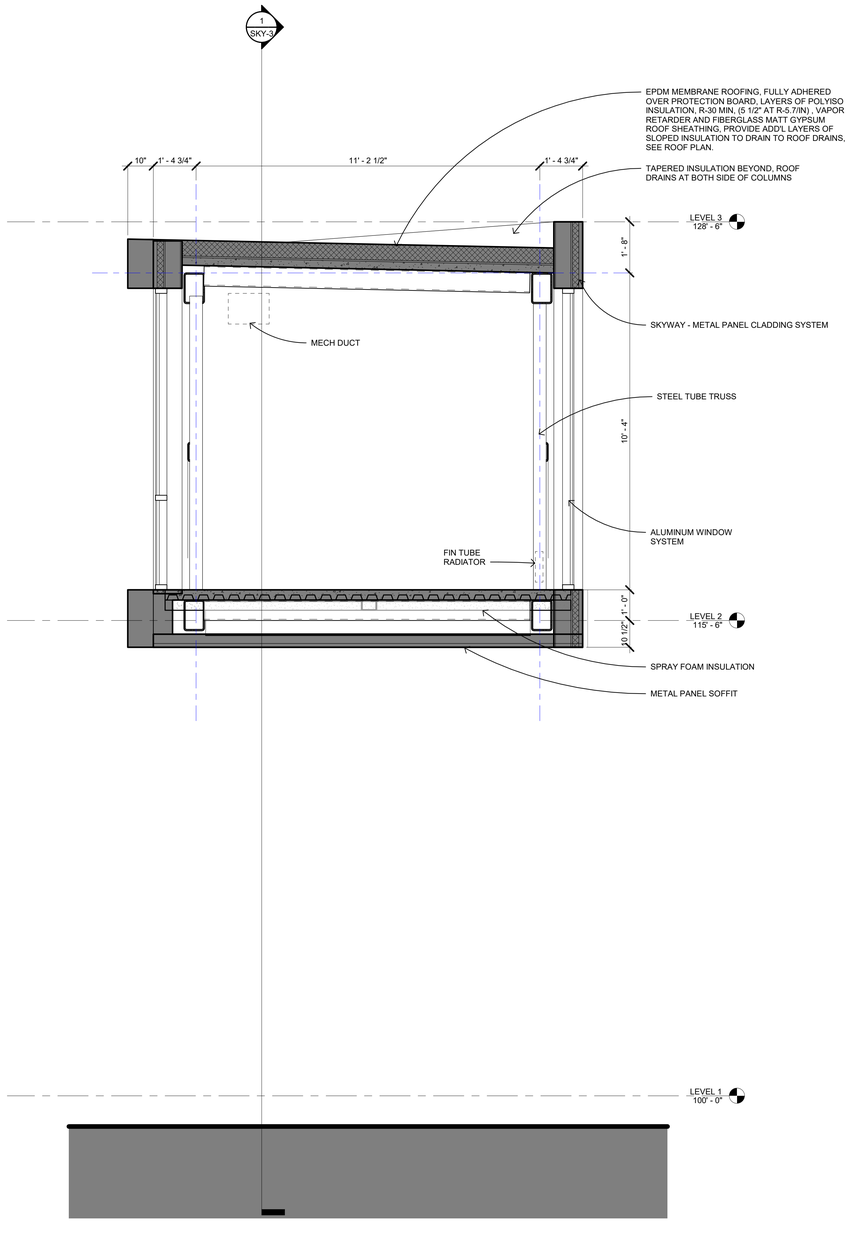
SHEET TITLE:
WALL SECTIONS - SOUTHEAST WALL

SHEET NUMBER:

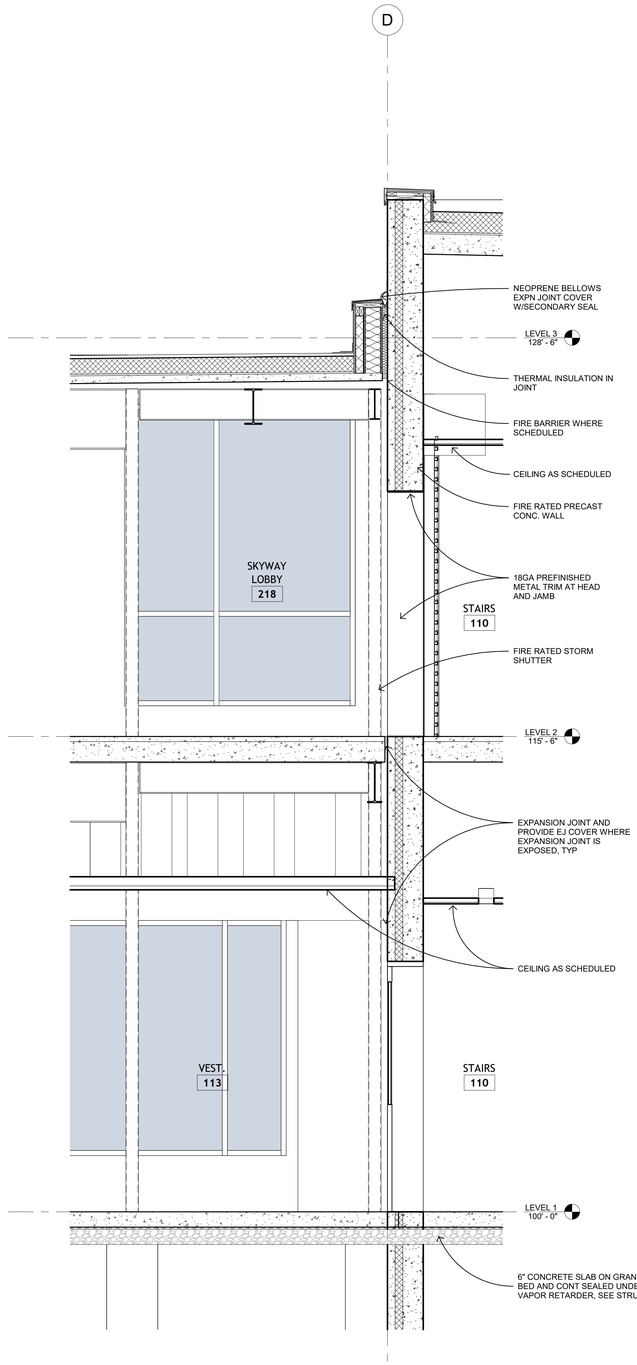
A703



4 WALL SECTION - SKYWAY AT EXISTING
1/2" = 1'-0"



1 WALL SECTION - SKYWAY SECTION
1/2" = 1'-0"



2 WALL SECTION - SKYWAY LOBBY
1/2" = 1'-0"

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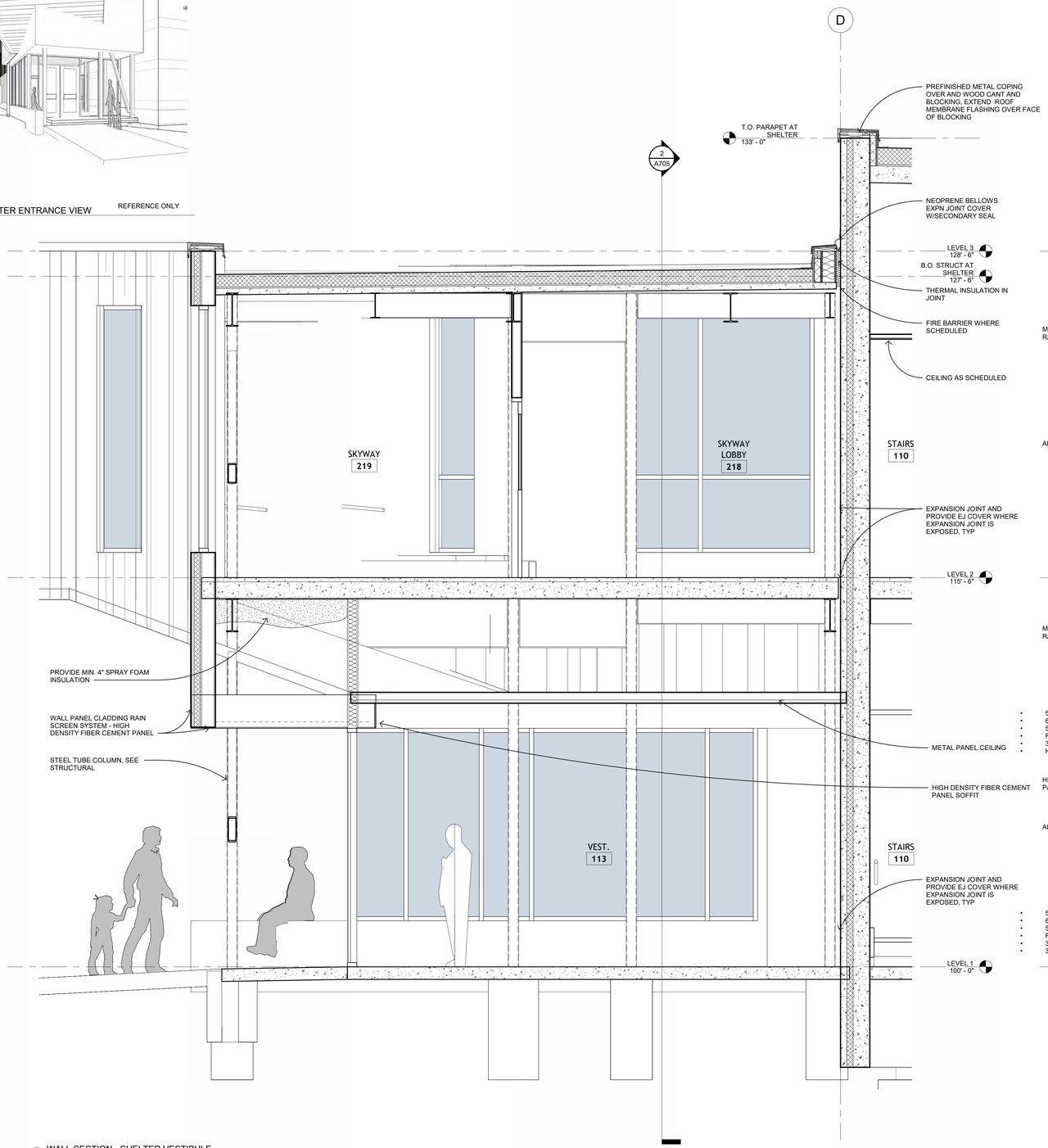
SHEET TITLE:
WALL SECTIONS - SKYWAY

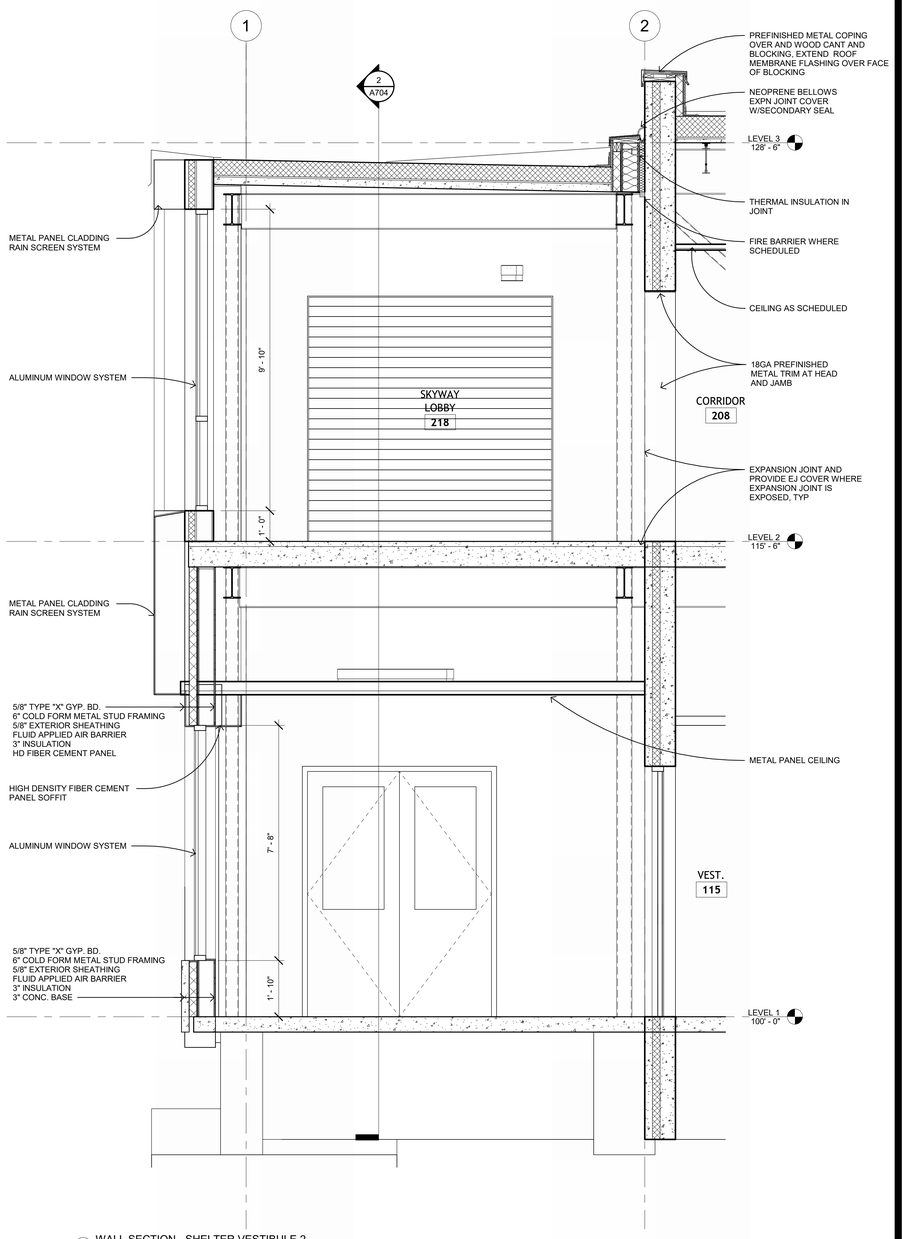
SHEET NUMBER:

A704

1 SHELTER ENTRANCE VIEW REFERENCE ONLY



3 WALL SECTION - SHELTER VESTIBULE
1/2" = 1'-0"



2 WALL SECTION - SHELTER VESTIBULE 2
1/2" = 1'-0"

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05/07/2025
DATE

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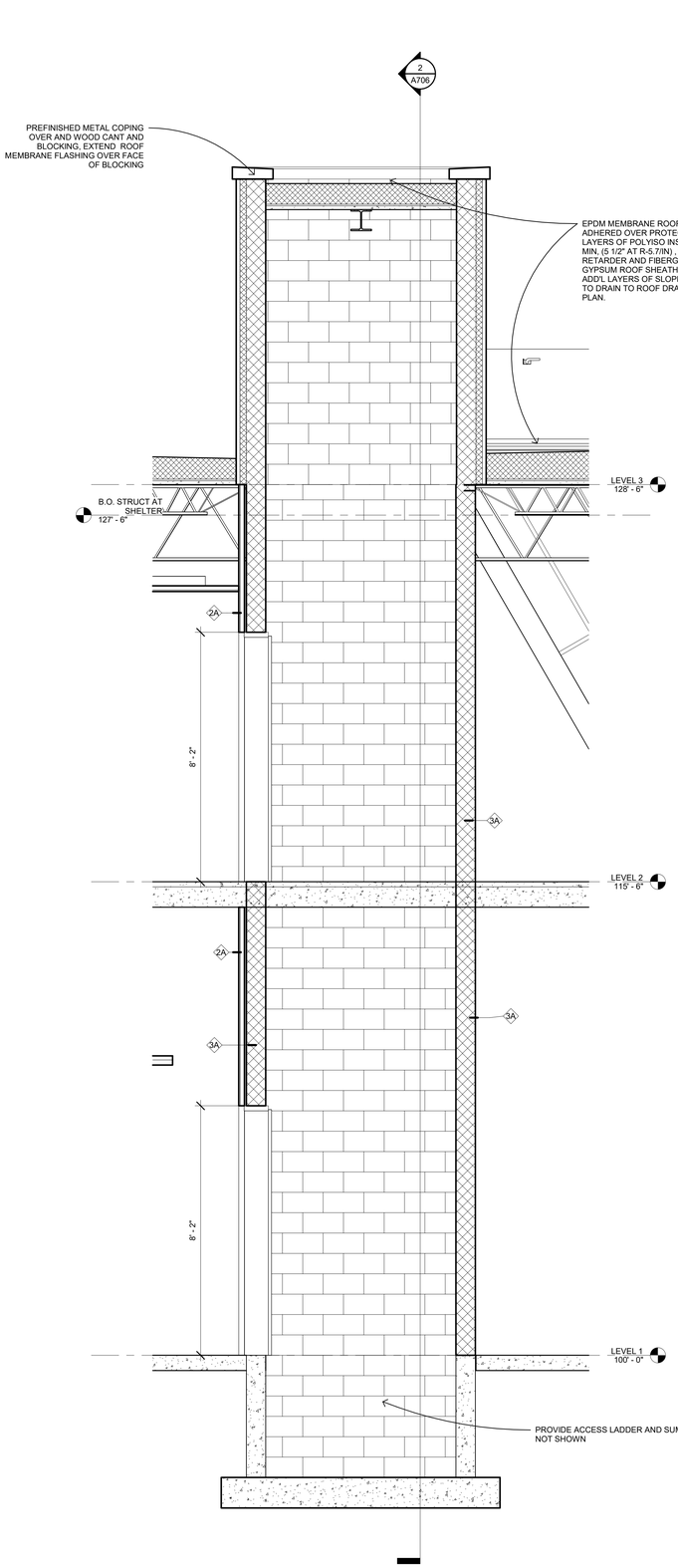
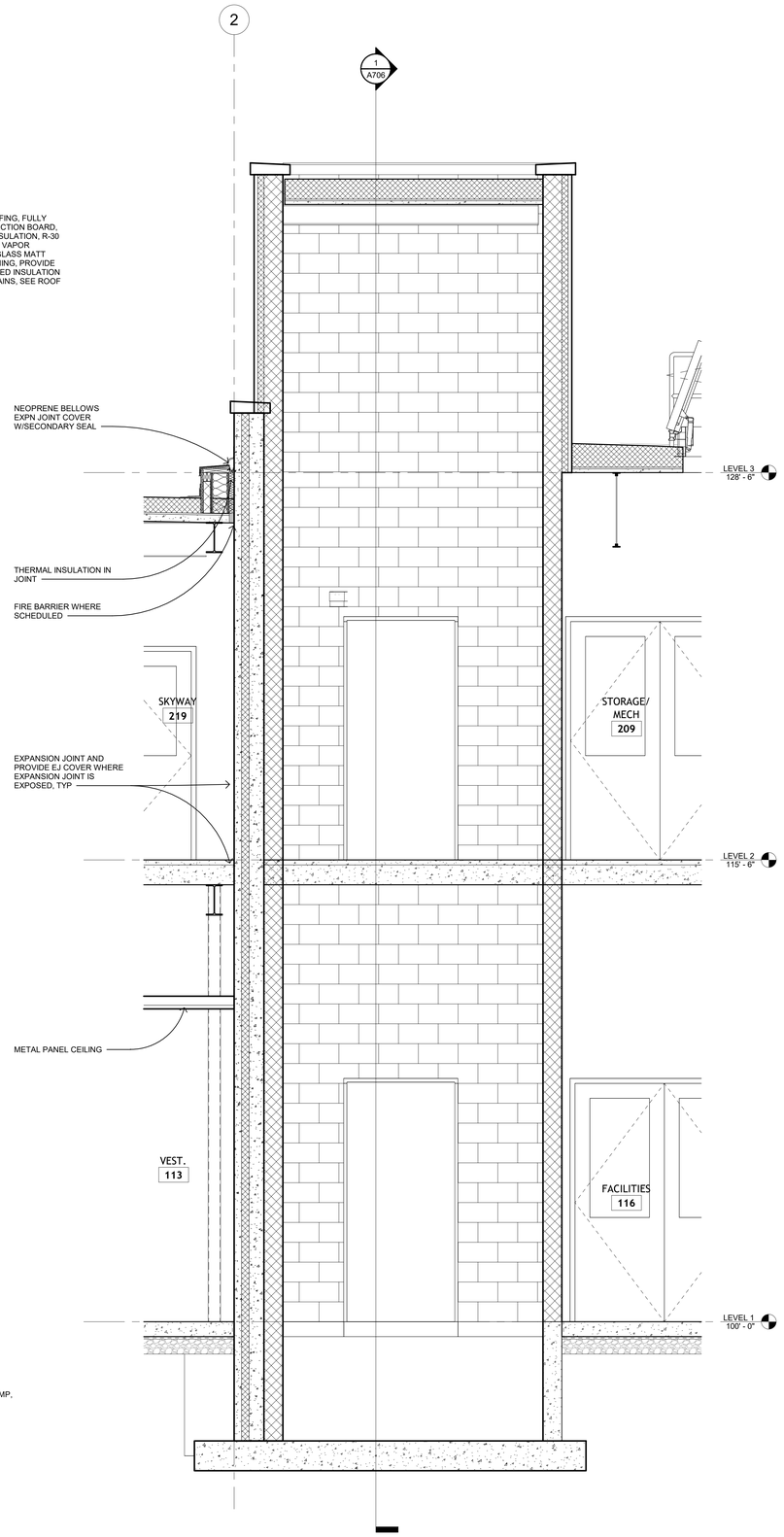
SHEET TITLE:
WALL SECTIONS - SHELTER VESTIBULE

SHEET NUMBER:

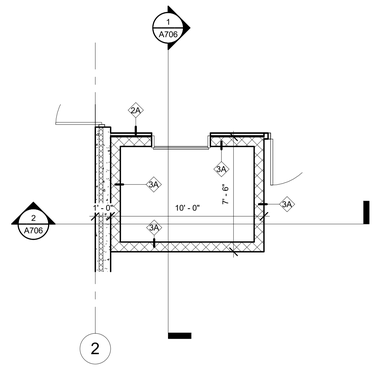
A705



1 ELEVATOR SECTION
1/2" = 1'-0"



2 ELEVATOR SECTION 2
1/2" = 1'-0"



3 ENLARGED ELEV. PLAN - 1ST FLOOR
1/4" = 1'-0"

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DD DOCUMENT Not For Construction

SHEET TITLE:
WALL SECTIONS - ELEVATOR

SHEET NUMBER:

A706

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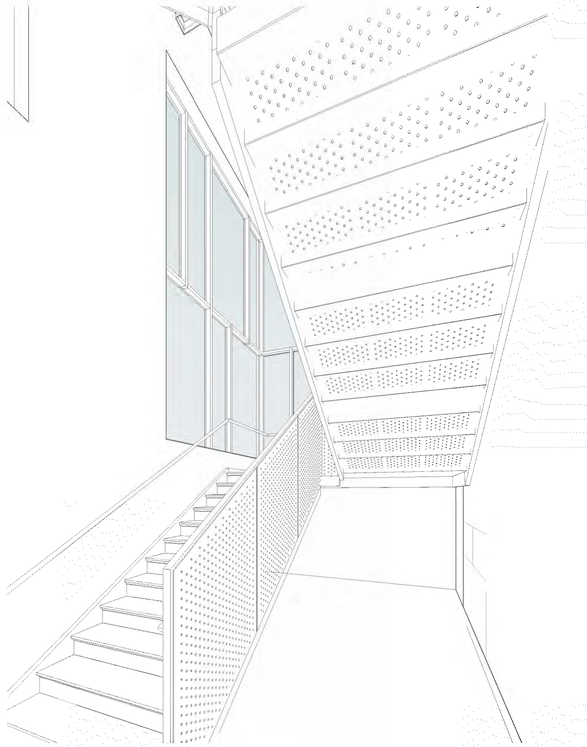
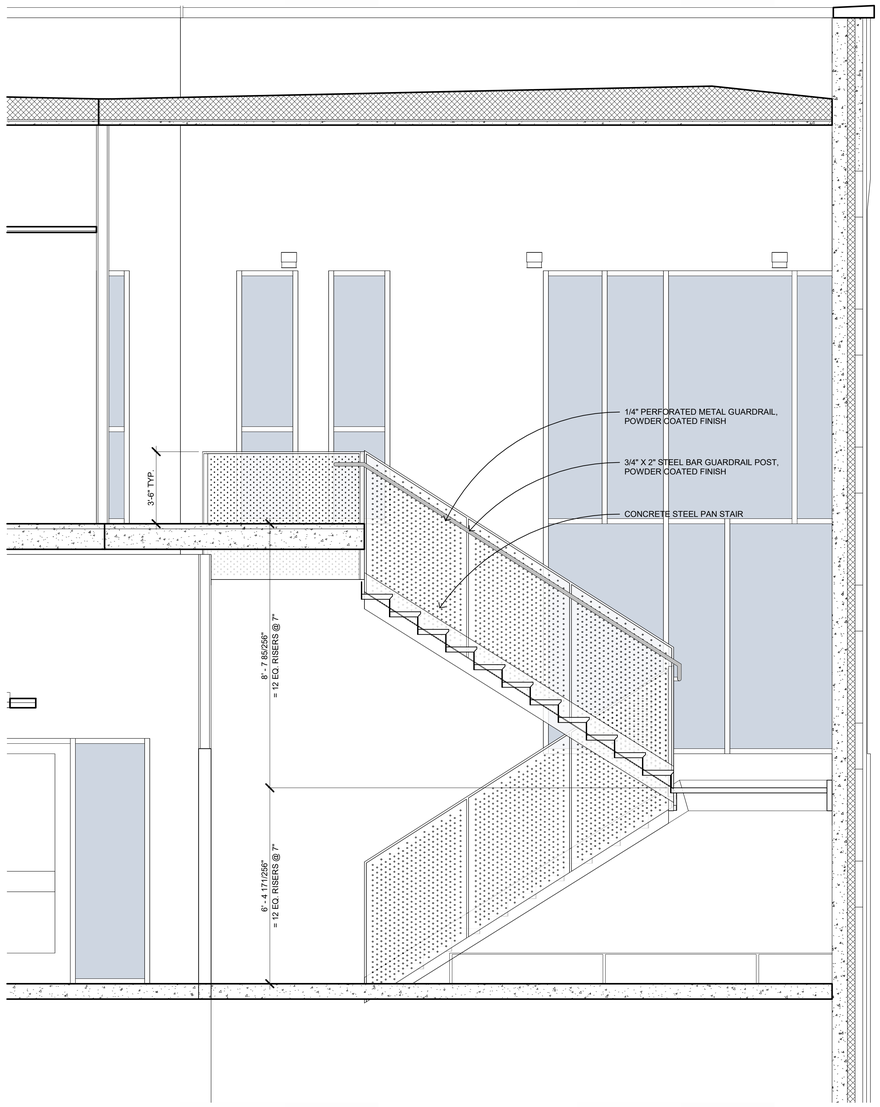
STAIR DETAIL GENERAL NOTES

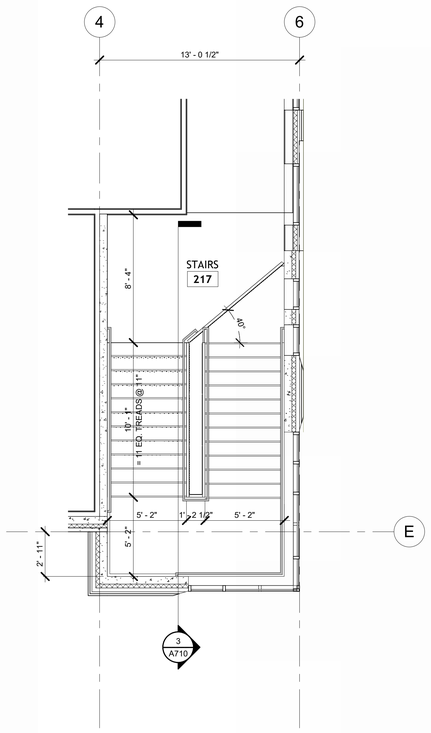
1. FOLLOW LOCAL CODE REQUIREMENTS, VERIFY ALLOWABLE DESIGN STRESSES OF RAILS AND POSTS.
2. VERIFY THE STRUCTURAL VALUE OF FASTENERS AND ANCHORAGE TO BUILDING STRUCTURE FOR BOTH VERTICAL AND LATERAL FORCES.
3. GUARDRAILS AND RAILS AT STAIR SHOULD BE DESIGNED TO PREVENT PASSAGE OF A 4" DIAMETER SPHERE, AT ANY OPENING EXCEPT TRIANGULAR OPENING AT STAIR TREADS AND RISERS TO PREVENT PASSAGE OF A 6" DIAMETER SPHERE WHERE APPLIES.
4. EXTERIOR GUARDRAILS AND HANDRAILS TO BE SHOP FABRICATED AND GALVANIZED AND POWDER COAT PAINTED.
5. INTERIOR STAIR COMPONENTS TO BE PRIMED AND POWDER COAT PAINTED U.N.O.
6. PROVIDE 1/4" PL CAP AT EXPOSED STL TUBE COLUMN AND STAIR STRINGER ENDS. U.N.O.
7. GRIND ALL WELDS SMOOTH, PREPARE FOR PAINT.
8. REFER TO SPECIFICATION SECTION DECORATIVE METAL STAIRS AND RAILINGS FOR DELEGATED DESIGN REQUIREMENTS.
9. THE GUARDRAIL/HANDRAIL IN THIS DRAWING IS FOR GRAPHIC PURPOSES ONLY. ALL STAIR DIMENSIONS MUST BE VERIFIED IN THE FIELD AND GUARDRAILS/HANDRAILS MUST BE FABRICATED TO COMPLY WITH CODE REQUIREMENTS BASED ON FIELD DIMENSIONS. ANY DISCREPANCIES WITH THE DRAWINGS SHOULD BE NOTIFIED IMMEDIATELY TO THE ARCHITECT FOR APPROVAL BEFORE PROCEEDING.



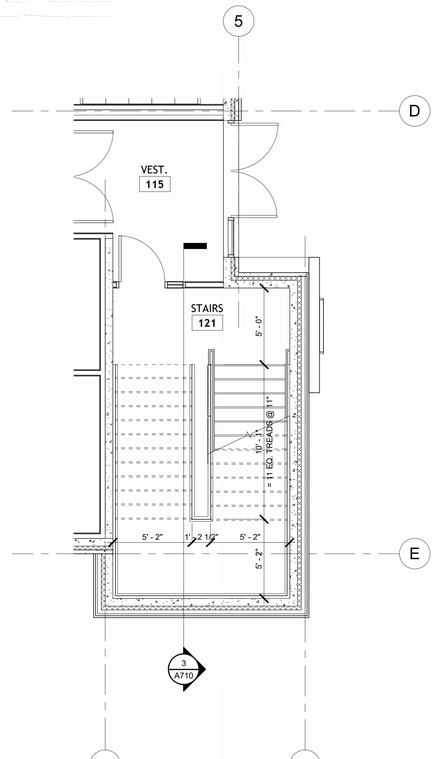
4 STAIR B113 - VIEW FROM LEVEL 1



3 STAIR B113 - SECTION2
1/2" = 1'-0"



2 STAIR B113 - LEVEL 2 ENLARGED PLAN
1/4" = 1'-0"



1 STAIR B113 - LEVEL 1 ENLARGED PLAN
1/4" = 1'-0"

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Phone: 651.209.6320

CONSULTANT

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Project Number: 23008.003
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SHEET TITLE:
STAIR B113 - FLOOR PLANS & SECTION

SHEET NUMBER:

A710

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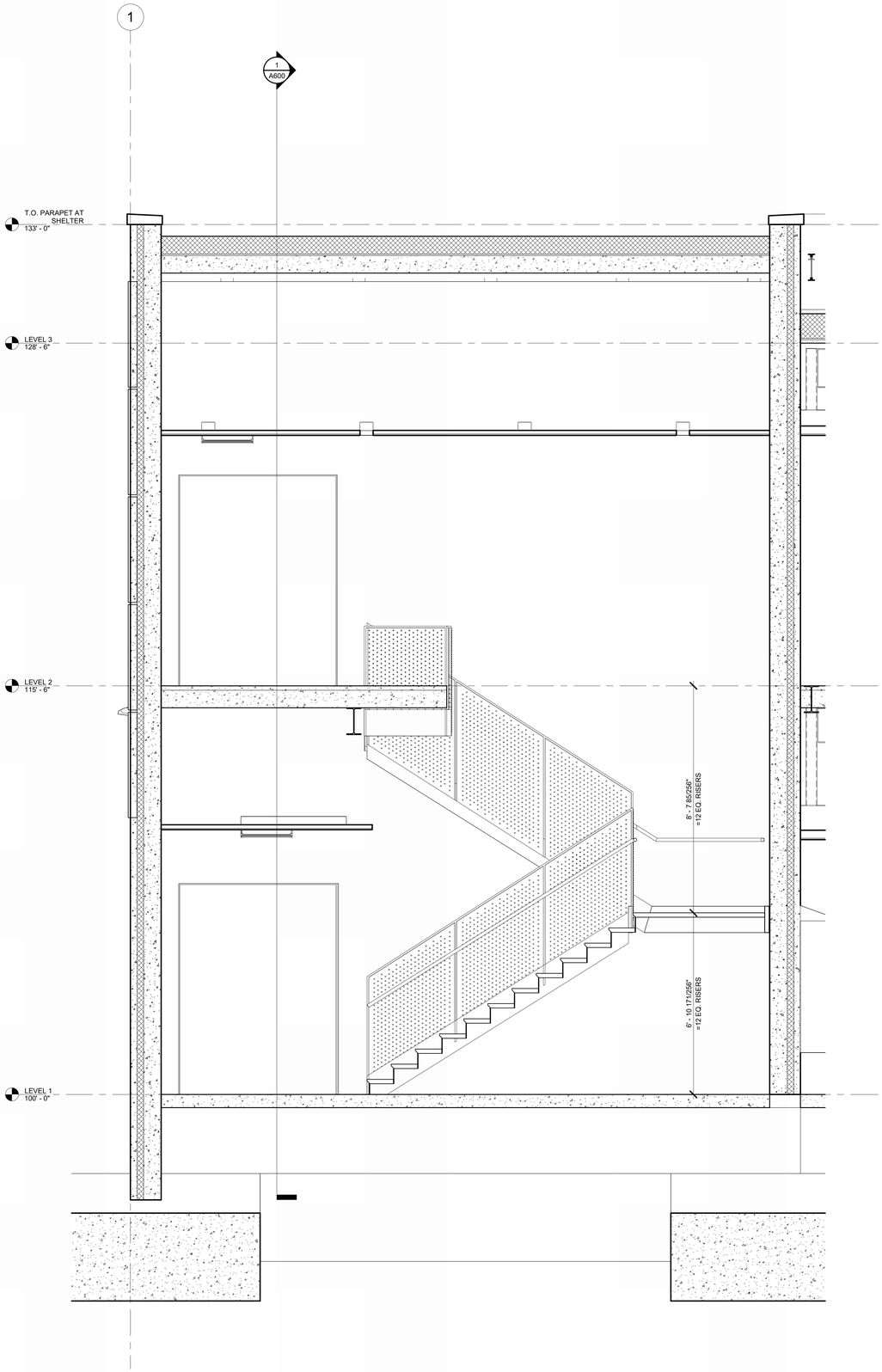
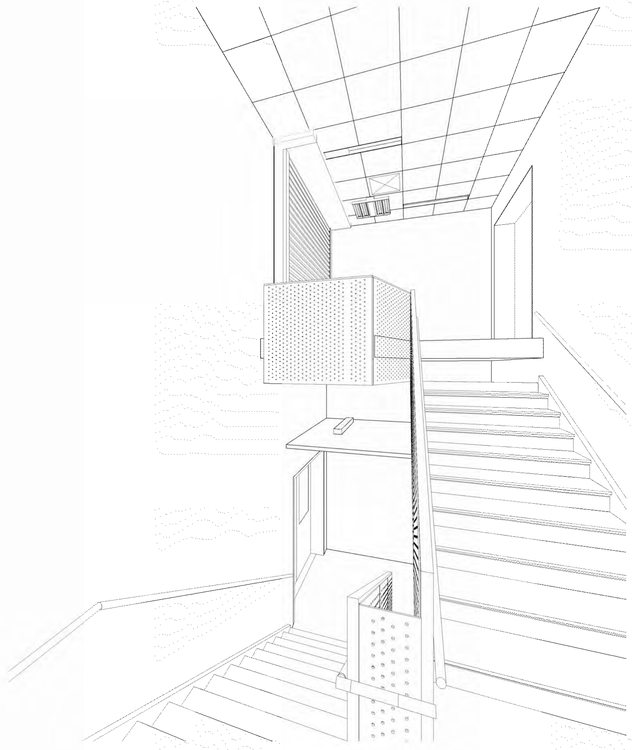


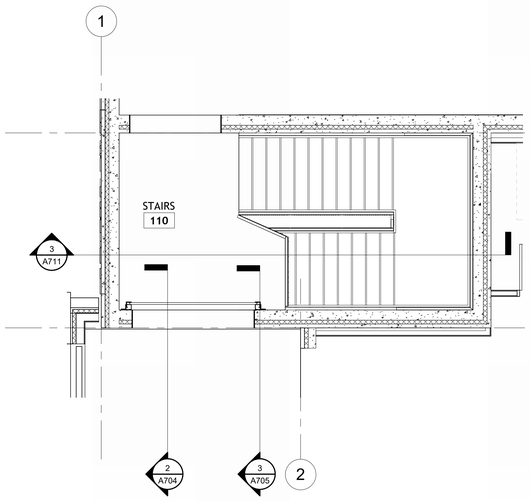
3 STAIR B107 - SECTION2
1/4" = 1'-0"



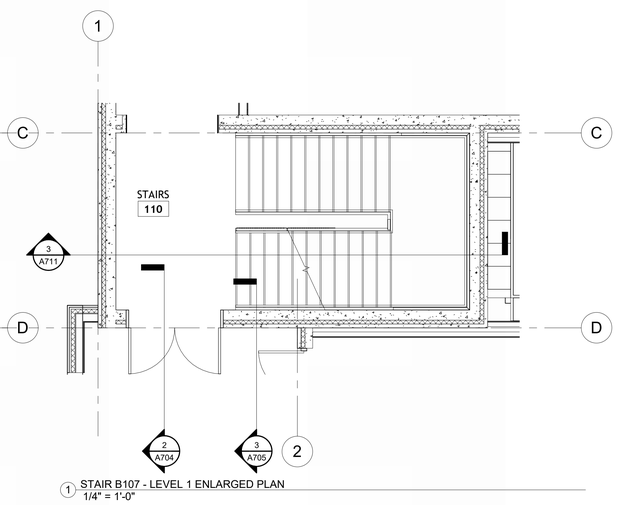
4 STAIR B107 - VIEW FROM LANDING

STAIR DETAIL GENERAL NOTES

1. FOLLOW LOCAL CODE REQUIREMENTS, VERIFY ALLOWABLE DESIGN STRESSES OF RAILS AND POSTS.
2. VERIFY THE STRUCTURAL VALUE OF FASTENERS AND ANCHORAGE TO BUILDING STRUCTURE FOR BOTH VERTICAL AND LATERAL FORCES.
3. GUARDRAILS AND RAILS AT STAIR SHOULD BE DESIGNED TO PREVENT PASSAGE OF A 4" DIAMETER SPHERE, AT ANY OPENING EXCEPT TRIANGULAR OPENING AT STAIR TREADS AND RISERS TO PREVENT PASSAGE OF A 6" DIAMETER SPHERE WHERE APPLIES.
4. EXTERIOR GUARDRAILS AND HANDRAILS TO BE SHOP FABRICATED AND GALVANIZED AND POWDER COAT PAINTED.
5. INTERIOR STAIR COMPONENTS TO BE PRIMED AND POWDER COAT PAINTED U.N.O.
6. PROVIDE 1/4" PL CAP AT EXPOSED STL TUBE COLUMN AND STAIR STRINGER ENDS. U.N.O.
7. GRIND ALL WELDS SMOOTH, PREPARE FOR PAINT.
8. REFER TO SPECIFICATION SECTION DECORATIVE METAL STAIRS AND RAILINGS FOR DELEGATED DESIGN REQUIREMENTS.
9. THE GUARDRAIL/HANDRAIL IN THIS DRAWING IS FOR GRAPHIC PURPOSES ONLY. ALL STAIR DIMENSIONS MUST BE VERIFIED IN THE FIELD AND GUARDRAILS/HANDRAILS MUST BE FABRICATED TO COMPLY WITH CODE REQUIREMENTS BASED ON FIELD DIMENSIONS. ANY DISCREPANCIES WITH THE DRAWINGS SHOULD BE NOTIFIED IMMEDIATELY TO THE ARCHITECT FOR APPROVAL BEFORE PROCEEDING.



2 STAIR B107 - LEVEL 2 ENLARGED PLAN
1/4" = 1'-0"



1 STAIR B107 - LEVEL 1 ENLARGED PLAN
1/4" = 1'-0"

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CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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05/07/2025
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SHEET TITLE:
STAIR B107 - FLOOR PLANS & SECTION

SHEET NUMBER:

A711

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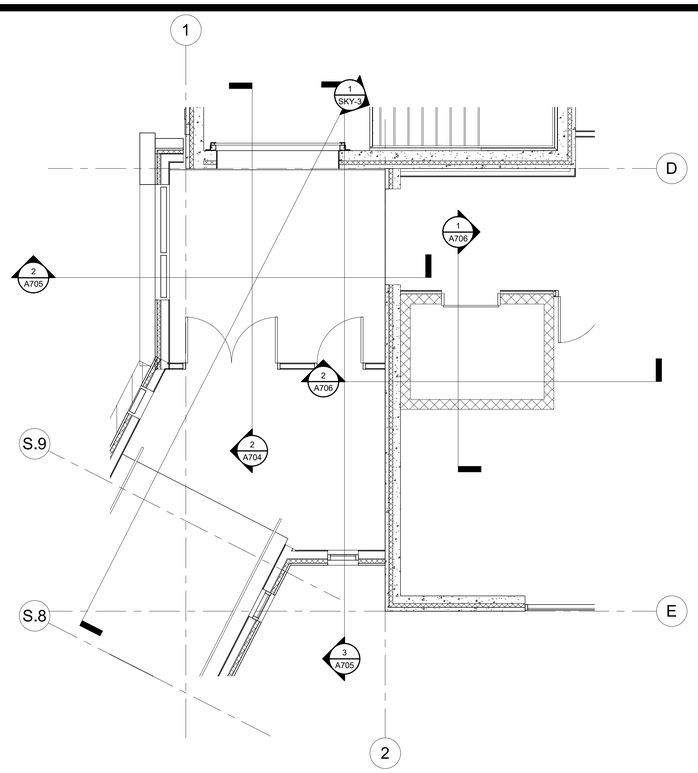
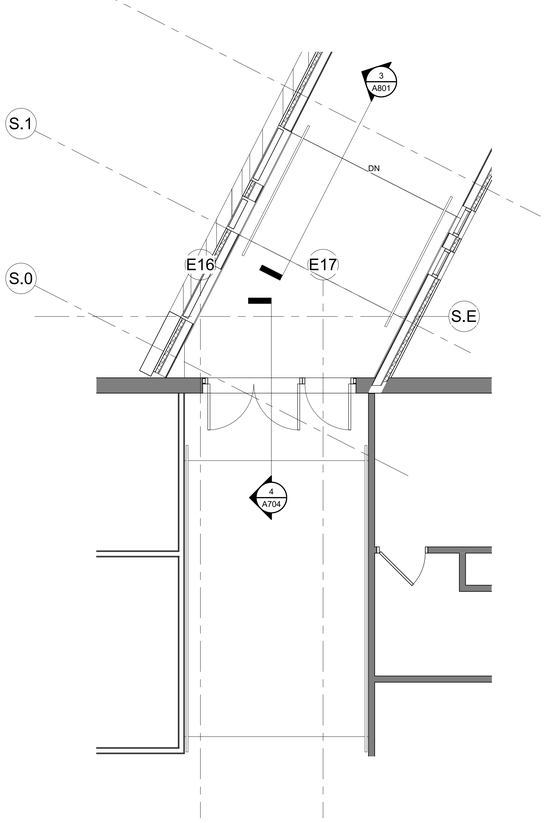
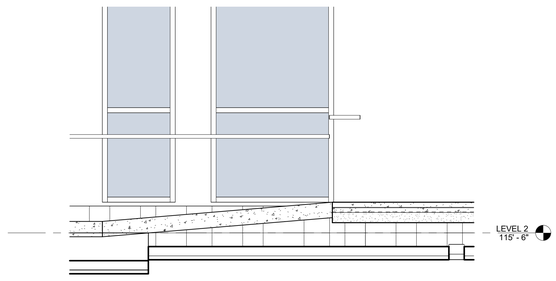




1 LEVEL 2 -SKYWAY AT EXISTING - Callout 1
1/4" = 1'-0"

2 LEVEL 2 -SKYWAY AT EXISTING - Callout 2
1/4" = 1'-0"



3 Section 25
1/2" = 1'-0"

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05/07/2025
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SHEET TITLE:
ENLARGED PLAN & DETAILS - RAMP AT SKYWAY

SHEET NUMBER:

A801

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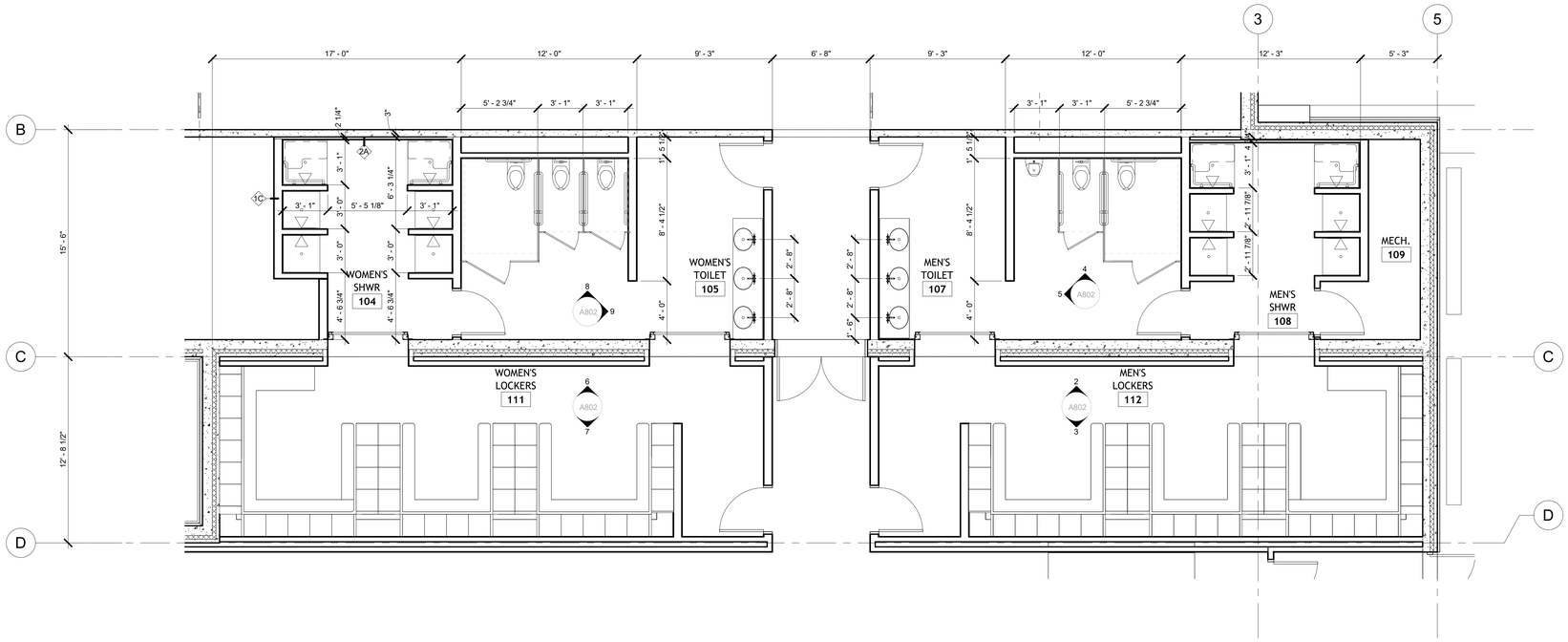
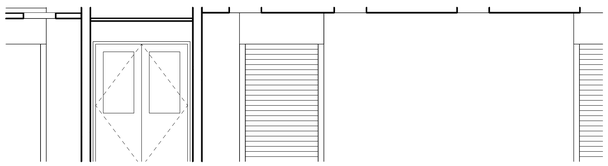
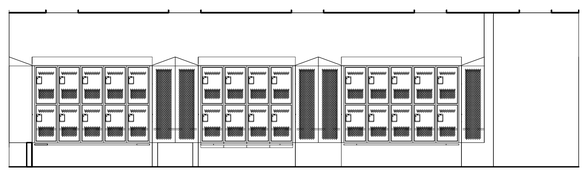


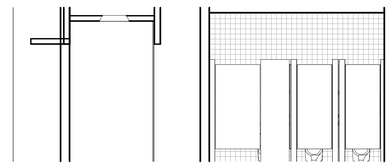
1 FIRST FLOOR PLAN - SHELTER - Callout 1
1/4" = 1'-0"



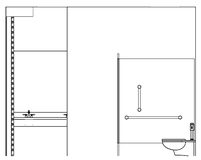
2 FIRST FLOOR - MAN'S LOCKER - NORTH WALL1
1/4" = 1'-0"



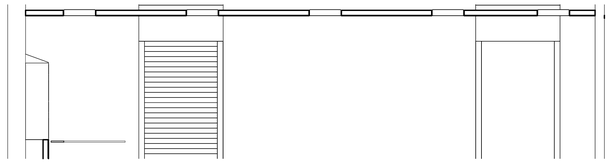
3 FIRST FLOOR - MAN'S LOCKER - SOUTH WALL
1/4" = 1'-0"



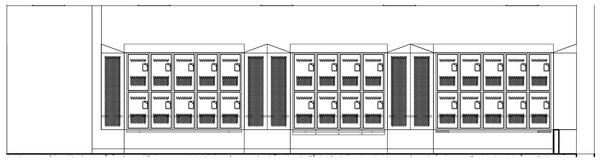
4 FIRST FLOOR - MAN'S TOILET
1/4" = 1'-0"



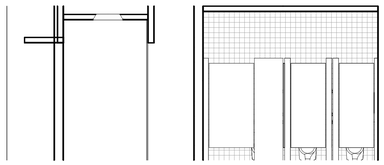
5 FIRST FLOOR - MAN'S TOILET - WEST WALL
1/4" = 1'-0"



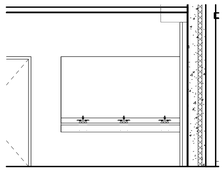
6 FIRST FLOOR - WOMAN'S LOCKER - NORTH WALL
1/4" = 1'-0"



7 FIRST FLOOR - WOMAN'S LOCKER - SOUTH WALL
1/4" = 1'-0"



8 FIRST FLOOR - WOMAN'S TOILET
1/4" = 1'-0"



9 FIRST FLOOR - WOMAN'S TOILET - EAST WALL
1/4" = 1'-0"

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CONSULTANT

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PRINT NAME

SIGNATURE

LICENSE NO.

05/07/2025
DATE

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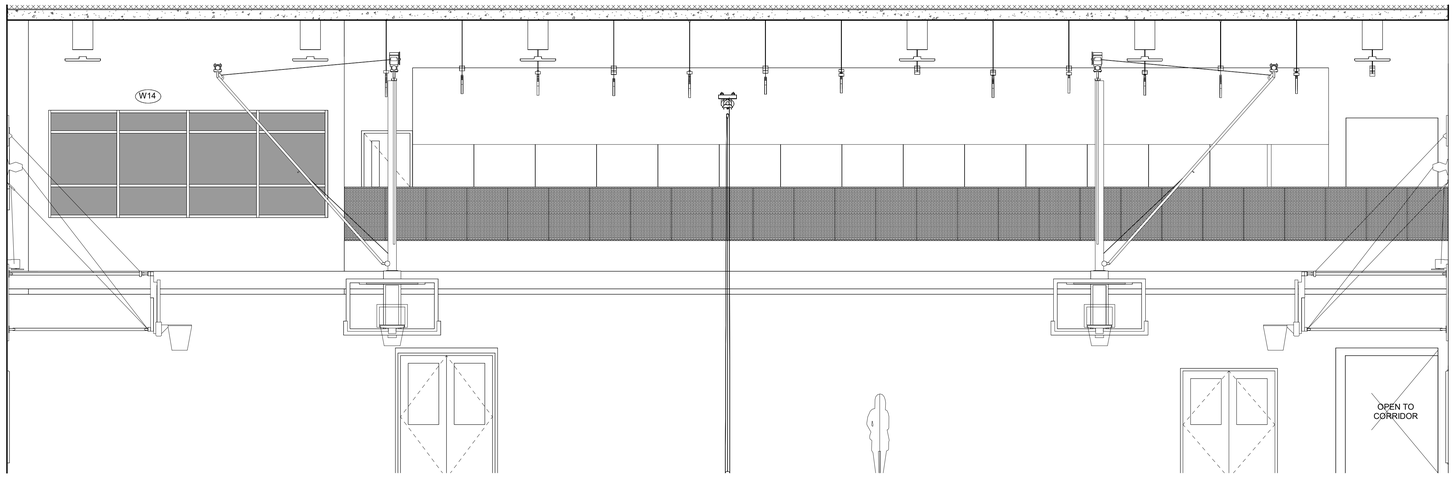
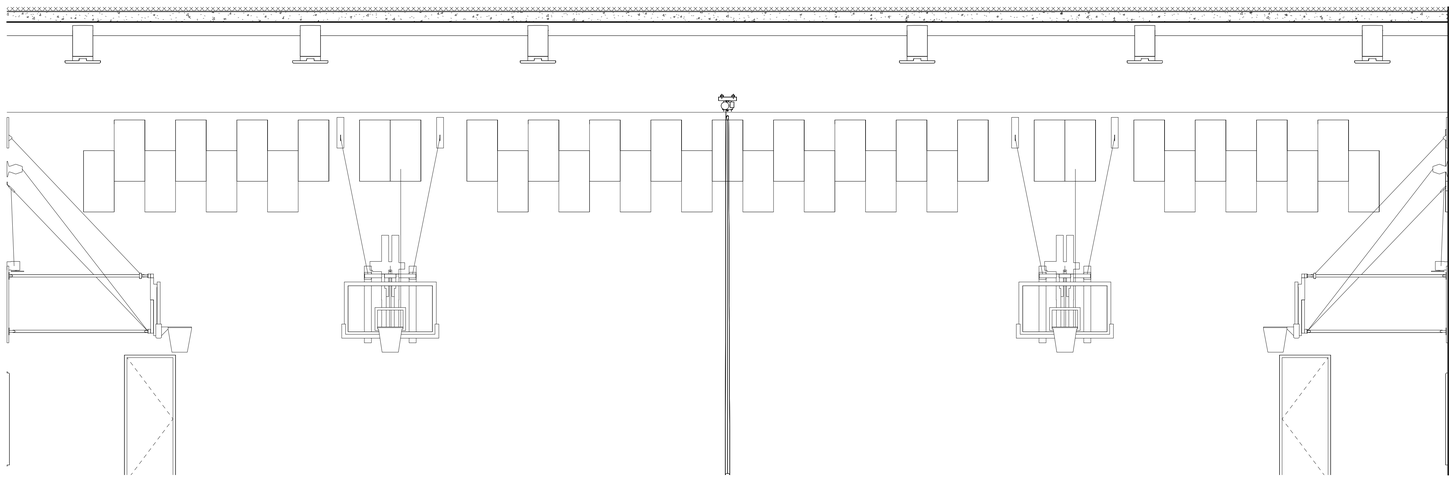
SHEET TITLE:
ENLARGED PLAN & DETAILS - LOCKERS & TOILETS

SHEET NUMBER:

A802



1 INTERIOR ELEVATION - SHELTER LOOKING SOUTH
1/4" = 1'-0"



2 INTERIOR ELEVATION - SHELTER LOOKING NORTH
1/4" = 1'-0"

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SHEET TITLE:
INTERIOR ELEVATIONS - SHELTER

SHEET NUMBER:

A805

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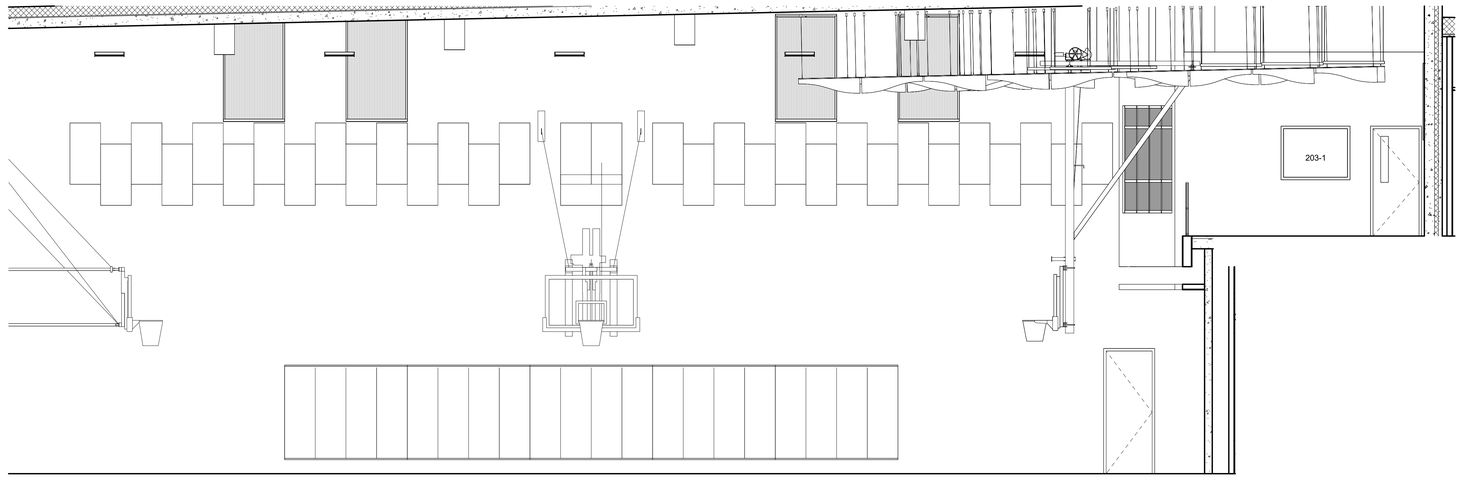
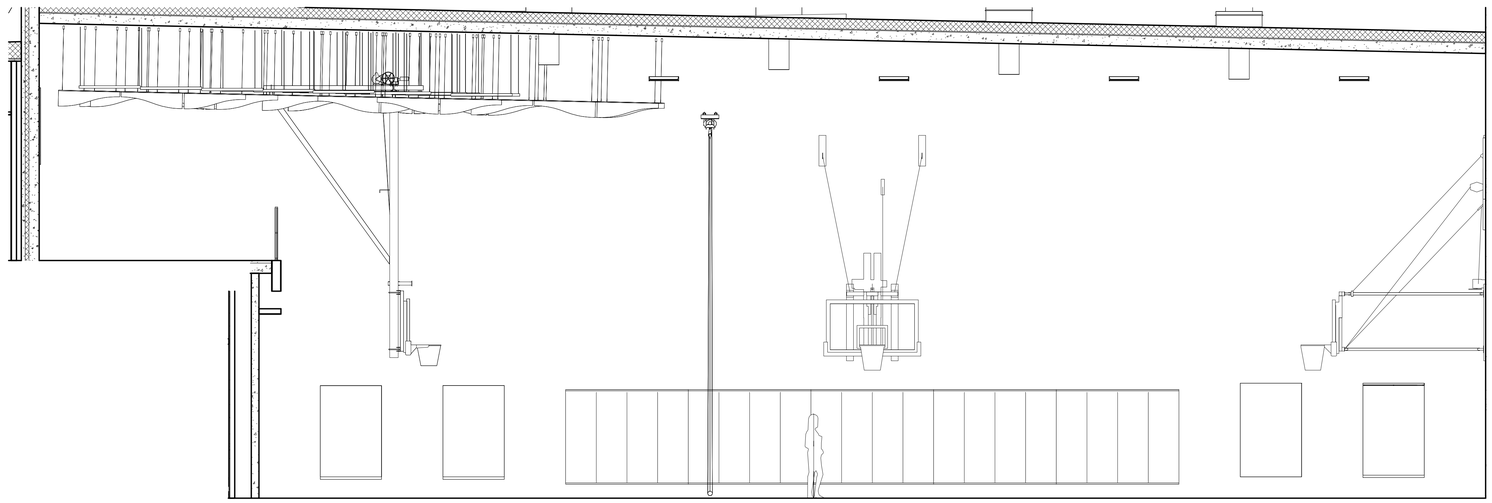


3 INTERIOR ELEVATION - SHELTER LOOKING EAST
1/4" = 1'-0"



4 INTERIOR ELEVATION - SHELTER LOOKING WEST
1/4" = 1'-0"

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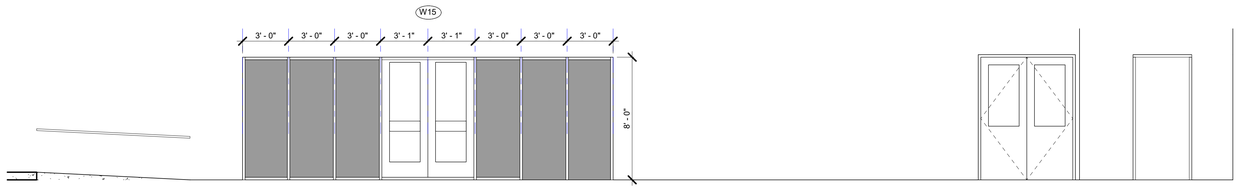
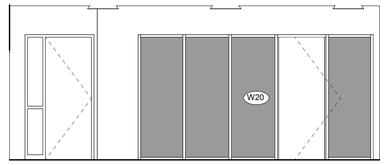
SHEET TITLE:
INTERIOR ELEVATIONS - SHELTER

SHEET NUMBER:

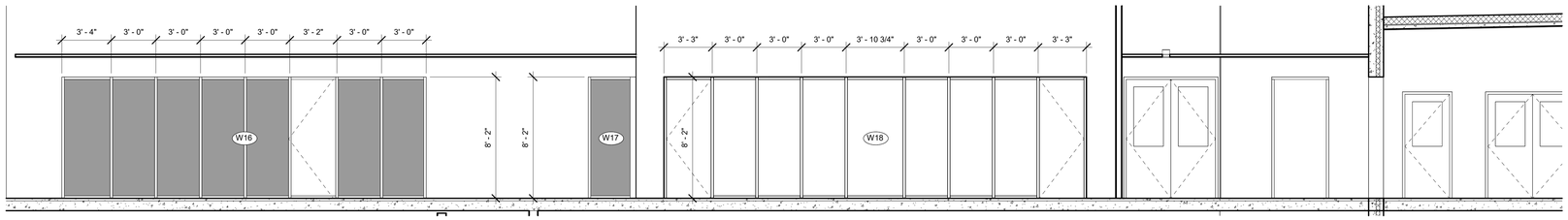
A806



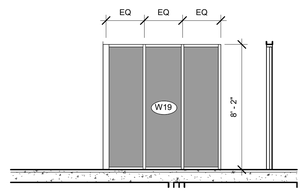
1 LEVEL 1 - HALLWAY SOUTH
1/4" = 1'-0"



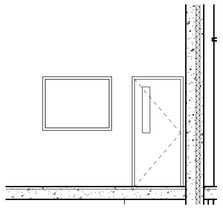
2 LEVEL 1 - MEETING ROOM
1/4" = 1'-0"



3 LEVEL 2 - HALLWAY SOUTH
1/4" = 1'-0"



4 LEVEL 2 - MTSS OFFICE
1/4" = 1'-0"



5 LEVEL 2 MEZZANINE EAST
1/4" = 1'-0"

6 LEVEL 2 HALLWAY NORTH
1/4" = 1'-0"

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SHEET TITLE:
INTERIOR ELEVATIONS

SHEET NUMBER:

A807

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STRUCTURAL SYMBOLS

DIMENSIONAL LUMBER
WOOD BLOCKING
STEEL OR METAL
CONCRETE BLOCK - HOLLOW OR SOLID
FACE OR COMMON BRICK
RIGID INSULATION
STRUCTURAL INSULATED PANELS (SIPs)
SHEATHING
EARTH, FILL OR BACKFILL
SAND
GROUT OR CONCRETE TOPPING
CONCRETE
EXISTING ELEMENT - MATERIAL VARIES
AREA DESIGNED FOR SOLAR PANEL SURCHARGE LOAD
SNOW DRIFT SURCHARGE LOAD

TOP RETURN WELD AND LENGTH
RETURN WELD SYMBOL
BOTTOM RETURN WELD AND LENGTH

SECTION NUMBER
DRAWING NUMBER WHERE SECTION IS FOUND
DETAIL NUMBER
DRAWING NUMBER WHERE DETAIL IS FOUND
ELEVATION NUMBER
DRAWING NUMBER WHERE ELEVATION IS FOUND

BP1 — BEARING PLATE MARK - SEE SCHEDULE
CJ — CMU CONTROL JOINT
SC1 CC1 PC1 — COLUMN MARK - STEEL, CONCRETE, OR PRECAST - SEE SCHEDULE
XXX PLF — DESIGN DIAPHRAGM SHEAR FORCE TO BE RESISTED BY PRECAST WALL PANEL OR COLD-FORMED STEEL SHEAR WALL. SEE PLAN NOTES FOR LOAD TYPE.
DP1 — DRILLED PIER MARK - SEE SCHEDULE
EP1 — EMBED PLATE MARK - SEE SCHEDULE
CF4.0 — FOOTING MARK FOR COLUMNS - SEE SCHEDULE
WF2.0 — FOOTING MARK FOR WALLS - SEE SCHEDULE
1 — KEY NOTES - SPECIFIC NOTES KEYED TO AN ELEMENT OR AREA. SEE SCHEDULE
ML1 SL1 CL1 — LINTEL MARK - MASONRY, STEEL, OR CONCRETE - SEE SCHEDULE
MP1 CP1 — PIER MARK - MASONRY OR CONCRETE - SEE SCHEDULE
PC1 — PILE CAP MARK - SEE SCHEDULE
1 — REVISION MARK - INDICATES A CHANGE AFTER CONTRACT DOCUMENT ISSUE
SW1 — SHEAR WALL MARK - SEE SCHEDULE
SR1 — STUD RAIL MARK - SEE SCHEDULE
MW1 CW1 — WALL REINFORCING MARK - MASONRY OR CONCRETE - SEE SCHEDULE
WW1 — STRUCTURAL WOOD WALL MARK - SEE SCHEDULE
WW 6 16 — NON-TYPICAL STRUCTURAL WOOD WALL MARK
A — GRID BUBBLE

MATCHLINE
EXISTING BUILDING LINE
HIDDEN EXISTING BUILDING LINE
BREAK LINE
DIRECTION OF SLOPE
BEAM OR COLUMN SPLICE
BEAM CONTINUOUS OVER SUPPORT
MOMENT CONNECTION FOR BEAM
LOCATION OF BEAM BRACE
SPAN OF STRUCTURAL ELEMENT
HIGH END OF BRACE
LOW END OF BRACE
LOCATION OF BRACED FRAME
SLAB REINFORCING - TOP BARS
SLAB REINFORCING - BOTTOM BARS
DIMENSION LINES
MATERIAL LIMIT LINES
MATERIAL NOT INCLUDED IN LIMIT LINES
FOOTING STEP
WS — TOP OF WALL STEP
℄ — CENTERLINE
PIPE
TOP OF SLAB ELEVATION CHANGE (STEPPED OR SLOPED)
TOP OR BOTTOM OF SLAB ELEVATION CHANGE (STEPPED)

STRUCTURAL ABBREVIATIONS

#	Pound or Number
&	And
/	Per
@	At
Ø	Diameter
AB	Anchor Bolt
ADDN'L	Additional
AFF	Above Finished Floor
ALT	Alternate
ARCH	Architect or Architectural
B/	Bottom of Element
BB	Bond Beam
BLDG	Building
BM	Beam
BOT	Bottom
BP	Bearing Plate or Bent Plate
BRG	Bearing
BSMT	Basement
BTWN	Between
C	Channel
C&C	Components and Cladding
CANT	Cantilever
CFS	Cold-Formed Steel
CGS	Center of Gravity of Steel
CIP	Cast in Place
CJ	Control Joint
CJP	Complete Joint Penetration
CL	Center Line
CLR	Clear
CMU	Concrete Masonry Unit
CNXN	Connection
COL	Column
COMP	Composite
CONC	Concrete
CONN	Connection
CONST	Construction
CONT	Continuous
CTR	Center
CTRD	Centered
DBA	Deformed Bar Anchor
DEFL	Deflection
DIA	Diameter
DIAG	Diagonal
DIM	Dimension
DL	Dead Load
DTL	Detail
DWG(S)	Drawing(s)
DWL(S)	Dowel(s)
E	East
EA	Each
EF	Each Face
EJ	Expansion Joint
EL	Elevation
ELEC	Electrical
ELEV	Elevator
EOR	Engineer of Record
EQ	Equal
EW	Each Way
E-W	East - West
EXP	Expansion
EXT	Exterior
FDN	Foundation
Fe	Effective Force (P.T.)
FFE	Finished Floor Elevation
FLG	Flange
FLR	Floor
FRT	Fire Retardant Treated
FS	Far Side
FT	Foot
FTG	Footing
FV	Field Verify
GA	Gauge
GALV	Galvanized
GB	Grade Beam
GC	General Contractor
GLU-LAM	Glue Laminated Wood
GSN	General Structural Notes
H	H Shaped Column
HAS	Headed Anchor Stud
HDG	Hot-Dip Galvanized
HK	Hook
HORIZ	Horizontal
HS	Headed Stud(s)
HSS	Hollow Structural Section
ID	Inside Diameter
IE	Invert Elevation
IF	Inside Face
IN	Inch
INFO	Information
INSUL	Insulation
INT	Interior
JST(S)	Joist(s)
JT	Joint
K	Kips
KIP	1 Kip = 1,000 lbs
KLF	Kips per Linear Foot
KSF	Kips per Square Foot
KSI	Kips per Square Inch
L	Angle
LL	Live Load
LLH	Long Leg Horizontal
LLV	Long Leg Vertical
LSH	Long Side Horizontal
LSL	Laminated Strand Lumber
LSV	Long Side Vertical
LVL	Laminated Veneer Lumber
LWC	Light Weight Concrete
M	Moment
MAS	Masonry
MAT	Material
MAX	Maximum
MC	Miscellaneous Channel
MECH	Mechanical
MEP	Mechanical, Electrical, and Plumbing
MEZZ	Mezzanine
MFG	Manufacturer or Manufacturing
MIN	Minimum
MISC	Miscellaneous
MO	Masonry Opening
MPH	Miles per Hour
N	North
NO	Number
NOM	Nominal
N-S	North - South
NS	Near Side
NTS	Not To Scale
NWC	Normal Weight Concrete
OC	On Center
OD	Outside Diameter
OF	Outside Face
OPNG	Opening
OPP	Opposite
PAF	Power Actuated Fasteners
PC	Precast
PCF	Pounds per Cubic Foot
PDF	Power Driven Fasteners
PERP	Perpendicular
PJP	Partial Joint Penetration
PL	Plate
PLF	Pound per Linear Foot
PSF	Pound per Square Foot
PSI	Pound per Square Inch
PSL	Parallel Strand Lumber
PT	Post-Tensioned/Tensioning
REBAR	Reinforcing Bar
REINF	Reinforcing or Reinforce
REQ'D	Required
RXN	Reaction
S	South
SCH	Schedule
SHT	Sheet
SIM	Similar
SIPs	Structural Insulated Panels
SL	Snow Load
SOG	Slab on Grade
SPEC	Specification
SPA	Spaces
SQ	Square
STD	Standard
STL	Steel
STRUCT	Structure
T&B	Top and Bottom
T/	Top of Element
TEMP	Temporary or Temperature
THRU	Through
TOB	Top of Beam
TOF	Top of Footing
TOS	Top of Slab
TYP	Typical
UNO	Unless Noted Otherwise
V	Shear
VER	Verify
VERT	Vertical
VIF	Verify in Field
W	West or Wide Flange
W/	With
W/O	Without
WD	Wood
WL	Wind Load
WND	Window
WP	Workpoint
WS	Wall Step
WT	Weight
WWF	Welded Wire Fabric

GENERAL STRUCTURAL NOTES

These notes are provided for typical conditions. See plans and details for specific requirements in other areas.

DEFERRED STRUCTURAL SUBMITTALS
Deferred submittals are those portions of the design which are not submitted at the time of permit application but are to be submitted to the building official prior to installation. Deferred submittals are governed by Minnesota State Building Code section 1300.0130. The following items are to be issued as deferred submittals:
- Precast concrete units
- Steel connections for Skyway
- Steel joists: special joists, and bridging
- Cold-formed steel framing
- Curtainwall systems
- Steel stairs and landings, railings
- Fabricated steel protective elements for storm shelter

For all deferred structural submittals, include design and calculations prepared and certified by a Professional Engineer licensed in the state in which the project is located as part of the submittal documents. See specification for additional shop drawing requirements. Provide deferred submittals a minimum of 30 days prior to installation, and after contractor's review, to the architect for review for general conformance to the contract documents. After architect's review, submit to building official for review and approval. Do not install deferred submittal items until submittal documents have been reviewed and approved by the building official.

Refer to architectural, civil, mechanical, and electrical drawings for additional deferred submittal components.

EXISTING CONDITIONS
Verify all dimensions, elevations, and details of existing structure where they affect this construction.
Notify engineer if there are any deviations from the contract documents.
Obtain prior approval from Structural Engineer before cutting openings or recesses or making other modifications to existing structure not shown on structural drawings.

COORDINATION -- ARCHITECTURAL, MECHANICAL AND ELECTRICAL ITEMS
Verify all depressions, dimensions, elevations, openings, equipment supports, and details and coordinate by reference to architectural, mechanical, and electrical drawings.
At non-bearing masonry walls shown on architectural drawings, brace top of wall to structure per architectural drawings.

OPENINGS
Verify size and location of all openings with architectural, mechanical, and electrical drawings. Structural drawings do not necessarily show all openings.
Place openings in floor and roof not shown on structural drawings between structural members. Notify Structural Engineer before openings larger than 12" in any dimension are added. See specific material sections for required clear spacing between openings.
Obtain prior approval from Structural Engineer before making any openings through structural members if the openings are not shown on the structural drawings.

DESIGN CODES AND STANDARDS
International Building Code (IBC) 2018 – As amended by the *Minnesota State Building Code 2020*
American Society of Civil Engineers (ASCE) *7-16 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures*
International Code Council (ICC) 500-14 – *ICC/NSSA Standard for the Design and Construction of Storm Shelters*
American Concrete Institute (ACI) 318-14 – *Building Code Requirements for Structural Concrete*
American Institute of Steel Construction 360-16 – *Specification for Structural Steel Buildings* (AISC 360)
American Institute of Steel Construction – *Steel Construction Manual* – Fifteenth Edition (AISC 15th)
American Welding Society D1.1-2015 – *Structural Welding Code – Steel* and D1.3-2008 – *Structural Welding Code – Sheet Steel* as modified by AISC Specifications
Steel Joist Institute (SJI) 100-2020 – *Standard Specification for K-Series, LH-Series, and DLH-Series Open Web Steel Joists and for Joist Girders*
Steel Deck Institute RD-2017 – Standard for Steel Roof Deck (SDI RD)
American Iron and Steel Institute (AISI) S100-16 – *North American Specification for the Design of Cold-Formed Steel Structural Members*

DESIGN STRESSES
Reinforcing Steel (F_y)
- 60,000 psi (A615, Grade 60)
- 50,000 psi for stud/rail studs

Concrete (f'_c) (28-day compressive strength)
- 5,000 psi for exterior concrete
- 4,000 psi unless noted
- 4,000 psi for interior slab on grade
- 3,000 psi for footings and topping
- 5,000 psi for non-shrink grout (ASTM C1107)

Macro Fiber Minimum Residual Strength (f_{e3})
- 100 psi for topping

Structural Steel (F_y)
- 50,000 psi (A992 or A572 Grade 50) for W shapes
- 36,000 psi (A36) for bars, plates, angles, and other shapes
- 50,000 psi (A500, Grade C) for rectangular structural tubing
- 46,000 psi (A500, Grade C) for round structural tubing
- 35,000 psi (A53, Type E or S, Grade B) for pipes
- 55,000 psi (F1554, Grade 55) for anchor rods
- 65,000 psi F_u (A108) for headed studs
- 70,000 psi (E70XX) for welding electrodes

DESIGN LOADS
Roof Loads:
- Roof Dead Load: 20 psf superimposed.
  - Includes allowance for ballasted roof. Limit dead load to 12 psf for roof uplift calculation to allow for fully-adhered membrane roof system.
- Solar-Ready Roof: __ psf additional dead load
  - See roof plan for designated areas. Do not include solar panel load in uplift calculation.
- Roof Snow Load Parameters
  - Ground Snow Load: 50 psf
  - Exposure Factor (C_e):1.0
  - Occupancy Importance Factor: 1.1
  - Thermal Factor (C_t): 1.0
  - Flat-Roof Snow Load (P_f): 38.5 psf
- Snow Drift Loads: In accordance with ASCE 7 Chapter 7.
- Penthouse/Mechanical Room: Snow load + 20-psf hanging load
- Gym Roofs: Snow load + 10-psf hanging load.

Floor Live Loads:

Typical Floors:	80 psf + 15 psf for partitions (Reduced per IBC Section 1607.11)
Mechanical Rooms:	150 psf
Stairs and Corridors:	100 psf
Public Areas:	100 psf
Light Storage:	125 psf
Stair Treads:	300 # concentrated load

Wind Loads:
- ASCE 7 Directional Procedure Parameters:
  - Risk Category: III
  - Exposure: C
  - Basic design wind speed: 120 MPH (3 second gust)
  - Allowable stress design wind speed: 93 MPH
  - Wind Directionality Factor (K_d): 0.85
  - Topographic Factor (K_{zt}): 1.0
  - Ground Elevation Factor (K_e): 0.97
  - Internal Pressure Coefficient (GC_{pi}): +/-0.18
- Components and Cladding Wind Loads (ultimate):
  - Roof Uplift:
    - Interior Zones: __ psf
    - Edge Zones: __ psf (within __'-__" of edge, beyond corner zone)
    - Corner Zones: __ psf (within __'-__" of corner and __'-__ of edge)
    - Overhangs: __ psf
  - Walls:
    - Interior Zones: __ psf
    - Corner Zones: __ psf (within __'-__" of corner)

Seismic Loads
- Seismic design not required per MSBC 1305.0011 Subparagraph 4.

COMMUNITY TORNADO SHELTER
These documents include plans and specifications for a *community tornado shelter* (storm shelter) as defined by ICC 500. The storm shelter is structurally separated from the *host building*. Wind design for the shelter conforms to the provisions of the 2014 ICC/NSSA "Standard for the Design and Construction of Storm Shelters."
The following design information is provided below as required by ICC 500 Section 107.2.1.
Storm Shelter Roof Loads:
- Roof Dead Load:20 psf superimposed (does not include topping)
  - When calculating net roof uplift, use a superimposed dead load of zero.
- Roof Live Load: 100 psf

Storm Shelter Wind Loads:
- ASCE 7 Directional Procedure Parameters:
  - Risk Category: III
  - Exposure: C
  - Basic design wind speed: 250 MPH (3 second gust)
  - Allowable stress design wind speed: 194 MPH
  - Wind Directionality Factor (K_d): 1.0
  - Topographic Factor (K_{zt}): 1.0
  - Ground Elevation Factor (K_e): 0.97
  - Internal Pressure Coefficient (GC_{pi}): +/-0.55 (Partially Enclosed)
- Components and Cladding Wind Loads (ultimate):
  - Roof Downward Pressure:
    - All Zones: 99 psf
  - Roof Uplift Pressure:
    - All Zones: 257 psf
  - Walls:
    - All Zones: 177 psf
  - Parapets:
    - The parapet on the storm shelter is designed to resist typical wind loads and to break away from the storm shelter beyond these loads.

Concrete Slabs on Grade
The slab on grade in the storm shelter is a reinforced structural slab used to resist lateral loads. No control joints are to be placed in the structural slab. Macro fiber reinforcing is not required.

Precast Concrete Walls
Special inspection of fabrication of precast walls to be used for the storm shelter shall be provided as required by ICC 500 Section 106.2.1.
Precast wall design to comply with debris impact test missile requirements of ICC 500.
Precast walls used for storm shelter walls shall have a maximum gap between panels of 3/4" per ICC 500-2020 Section 306.5. Joints shall be sealed with joint material complying with ASTM C920. The precast supplier may provide joints greater than 3/4" if protection of joints is provided with products/installation techniques complying with ICC 500 Section 305. Testing and documentation shall be submitted to the architect, EOR, and code official at the expense of the precast supplier.
Precast supplier shall coordinate design, location, and detailing of embeds in wall panels to facilitate doors, windows, MEP opening, and associated protection/baffling of openings.
See PRECAST CONCRETE UNITS section for additional requirements.

Penetrations and Openings in Storm Shelter Structural Components
Submit all proposed MEP penetrations and openings through storm shelter structural components (foundations, walls, floor, roof) for review by Architect and Structural Engineer. Submit a minimum of 30 days prior to installation.

Quality Assurance Plan Submitted by EOR
The quality assurance plan covers the components set forth in ICC 500 section 107.3.1. Construction document references for each are provided below.
1. Roof cladding, soffits and roof framing connections: See ___ for roof framing connections and architectural drawings for roof cladding and soffits.
2. Wall connections to roof and floor diaphragms and framing: See ___.
3. Roof and floor diaphragm systems, including connectors, drag struts and boundary elements: See ___.
4. Main wind force-resisting systems, including braced frames, moment frames and shear walls: See ___.
5. Main wind force-resisting system connections to the foundation: See ___.
6. Fabrication and installation of components and assemblies of the shelter envelope required to meet missile impact test requirements of Chapter 3: See ___.
7. Wall cladding and wall cladding connections: See architectural drawings.
8. Corrosion resistance or protection of exposed metal connectors providing load path continuity: N/A.
9. Critical support systems and connections and debris impact protection of the components and connections: N/A.
10. Foundation design: See ___.
11. Prefabricated shelter installation requirements, including anchor location and minimum required capacity for each type of anchor: N/A.
12. Prefabricated shelter minimum foundation capacity requirements: N/A.

Wind loads are resisted by insulated precast concrete walls that are braced by a reinforced slab-on-grade, and a precast concrete plank/double tee roof. The precast roof framing (rigid diaphragms) transfers the lateral wind loads to precast concrete shear walls, which are anchored to a concrete foundation system. Uplift connections will be designed and coordinated by the precast wall panel supplier. The reinforced concrete roof slabs meet previously tested debris impact test missile assembly thickness and reinforcement requirements (Texas Tech University, *Construction Materials Threshold Testing*, 2004).
All special inspections and testing required by IBC chapter 17 and by the EOR shall extend to the components of the storm shelter. Structural observations required by ICC 500 Section 106.4 are in addition to and shall not replace or reduce the requisite special inspections.
ICC 500 structural observations shall be performed by a third-party engineer during the phases of construction of the storm shelter listed below. The third-party engineer performing the structural observations shall be a professional engineer licensed in the state in which the project is located. The contractor shall contact the third-party engineer and EOR a minimum of one week prior to the following milestones to coordinate a time for structural observations:
- Concrete footing and stem wall reinforcing, prior to concrete placement
- Precast wall erection and connections to below grade stem wall
- Slab on grade reinforcing and connections to walls, prior to concrete placement
- Precast roof plank and double tee installation and connections to precast walls
- Concrete roof topping slab reinforcing, prior to concrete placement

SOLAR-READY ROOFS
Portions of the roof have been designed for a ballasted solar panel system. The solar panel system is to include tube spreaders below the ballast racks to obtain a uniform load on the primary structure.

TEMPORARY BRACING
This structure is a non-self-supporting steel frame that requires interaction with slabs, steel deck, and masonry or concrete walls to provide the required lateral stability. Provide required temporary bracing for structural steel until permanent bracing, slabs, steel deck, and walls are in place.
Provide temporary bracing for all walls (concrete, masonry, cold formed steel, or wood) until they are of adequate design strength and are properly anchored in final form.

GEOTECHNICAL INFORMATION
The foundation design is based on the recommendations contained in Geotechnical Report number B2408132 prepared by Braun Intertec and dated October 16, 2024. Allowable foundation pressures are to be verified in field by a licensed professional geotechnical engineer. Foundation design requires the use of granular backfill outlined in the geotechnical report. Foundation design parameters are as follows:
- Net soil bearing capacity
  - Strip footings: 4,000 psf
  - Spread footings: 4,000 psf
- Lateral Soil Pressure (equivalent fluid pressure)
  - Lateral pressure on foundation walls: 60 pcf/ft (assumed for DD)
  - Lateral pressure on cantilever retaining walls: 40 pcf/ft (assumed for DD)
  - Passive soil pressure: 375 pcf/ft (assumed for DD)
- Coefficient of friction: 0.50 (assumed for DD)

NOTE: Geotechnical recommendations include soil corrections/overexcavation for the entire building site to a depth of 4'-0" below footing elevations.

BACKFILLING
Backfill and materials behind foundation and retaining walls shall be as outlined in the Geotechnical Report.
Do not backfill or compact earth against walls retaining earth until supporting slabs have reached 75% of their design strength or adequate bracing is in place. Provide bracing drawings designed and certified by an Engineer licensed in the state in which the project is located for record only.
Backfill evenly on both sides of foundation walls to prevent overturning or lateral wall movement.

SHORING
Provide temporary shoring for existing construction until new construction is in place and properly anchored in final form.
Shoring loads for existing structure are shown in the documents. Provide shoring drawings including shoring loads designed and certified by an Engineer licensed in the state in which the project is located for record only.

UNDERPINNING
Underpin existing footings in _____ maximum widths. Crib and brace excavations to limit unsupported footing lengths (_____ maximum).
Provide cribbing and cribbing bracing designed and certified by an Engineer licensed in the state in which the project is located. Submit drawings to Structural Engineer for record only.
Contractor may submit alternative underpinning methods for review and approval to the Structural Engineer. Reimburse Engineer for all costs associated with the review.

CONCRETE REINFORCING GENERAL
Provide standard hooks where hook lengths are not specified.
See Class 'A' and 'B' Tension Lap Splice Tables on sheet S401 for required reinforcing splice lengths.
Provide epoxy coated reinforcing for all concrete exposed to weather such as retaining walls, and exterior walls, piers, columns, slabs, and paving. Epoxy coated reinforcing is not required for building foundation walls unless specifically noted.
Support slab reinforcing for its entire length and independent of beam steel.

CONCRETE COVER ON REINFORCING

Footings:	3" clear bottom and sides
	2" clear top
Walls:	1½" clear outside face and surfaces exposed to earth or weather (2" for #6 bars or larger)
	3/4" clear inside face
Columns, Piers:	1½" clear to ties or stirrups
Slab on Grade:	Place reinforcing in upper third of slab (minimum 3/4" clear top)
Topping Slab & Concrete :	Place reinforcing in upper third of slab (minimum 3/4" clear top)

FOOTINGS
For wall footings, provide 32 bar diameter lap at reinforcing splices and full crossing lap at intersections.
Center wall footings under walls and column footings under piers and columns.
Footing elevations shown on plan are to top of footing (TOF).
Hook wall and column dowels at 3" clear bottom of footing.

CONCRETE SLABS ON GRADE
See COMMUNITY TORNADO SHELTER section of general structural notes for additional information.
See detail 4/S301 for control/construction joints.
If control joints are not shown on plan, place control/construction joints at columns and provide additional joints to meet the spacings indicated below:
- Exterior slabs, 10'-0" oc maximum
- Interior slabs, 12'-0" oc maximum

"L" shaped panels and rectangular panels (with length to width ratio greater than 1.5) are not allowed.
All control/construction joints must be continuous and not staggered or offset.
See detail 9/S301for typical slab on grade step.
See Specification for micro fiber reinforcing options where micro fiber reinforcing is noted on plan.

POURED CONCRETE WALLS
See detail 8/S301 for horizontal reinforcing at intersecting walls.
See detail 12/S301 for openings in walls up to 12" wide.
All openings larger than 12" shall have:
- 1 - #4 x 4'-0" each face diagonal at each corner
- 1 - #5 each face, each side of opening, extend 2'-0" beyond opening
- Maintain minimum 12" of wall above openings.

Groups of openings shall be reinforced as a single opening unless clear spacing between openings is at least 16".
Notify EOR of openings (or groups of openings) wider than 40" in concrete walls where not shown on structural drawings.
Wall reinforcing is continuous through columns, unless detailed otherwise.
See detail 7/S301 for typical vertical control/construction joints.

PRECAST CONCRETE UNITS
See COMMUNITY TORNADO SHELTER section of general structural notes for additional information.
The design of all precast concrete units shall conform to ACI 318.
Precast units shall sustain the superimposed loads indicated on the plans in addition to all other dead loads.
Precast floor framing is to be designed to meet the fire rating requirement specified, see Architectural. Any framing assumed to be restrained for fire rating is to be indicated in shop drawings.
Submit complete shop drawings to Architect/Engineer for review, showing the erection plan, all bearing conditions, and anchorage details
Design of precast units and anchorages shall be prepared by an engineer licensed in the state in which the project is located. Design loads used shall be indicated on the shop drawings.
Provide necessary headers at floor or wall openings.
Upon installation, plank shall be essentially past the effects of deformation due to creep and shall have camber not over 1/360 of the span. Camber shall be uniform from plank to plank with similar spans and loading.
Place openings not shown on plans between webs in precast plank units. Verify acceptability with precast supplier.
For precast bearing on concrete construction, design connection to limit bearing stress on concrete in accordance with ACI 318.
Precast concrete walls shall be anchored to foundation walls, to all floor and roof levels, and to each other at stairs and corners. The anchorages shall provide a positive direct connection capable of resisting the loading from the following conditions:
- A. IBC minimum per IBC 1604.8.2/ASCE 7 1.4.4 or 12.11.
- B. Required design reaction from lateral loading.
- C. ACI 16.2.4.3(b) and 16.3.3.1 requirements of two connections per wall panel with a tensile capacity of 10,000 pounds per connection.

Provide precast assemblies/sizes as noted on the drawings unless approved by the Architect and Engineer prior to bidding.

STRUCTURAL STEEL
Structural steel fabrication and construction shall conform to the AISC "Manual of Steel Construction" and the AISC "Code of Standard Practice for Steel Buildings and Bridges".
Galvanize structural steel exposed to weather and brick support angles in exterior walls according to ASTM A123. Provide galvanized steel fasteners for use with galvanized structural steel.
Do not field cut or alter structural members without approval of the Structural Engineer.

LATERAL LOAD RESISTING SYSTEM FOR STRUCTURAL STEEL BUILDINGS
The following elements comprise the primary lateral load resisting system:
Roof Diaphragm: Steel roof decking.
Floor Diaphragm: Composite steel deck and concrete, grouted precast plank, concrete slab.
Collector elements/drag struts: See plan.
Lateral load resisting system: Steel bracing, steel moment frames, precast walls,

STRUCTURAL STEEL CONNECTIONS
Typically, provide welded or bolted shop connections and bolted field connections.
Typical bolts are 3/4" Ø A325-N bolts in standard or short slotted holes.
Provide shear connections according to the standard Connection Tables on sheet S401 and as follows:
- Use double angles for all girders and for all beams W24 and larger.
  -OR-
  Use single plate connections for all beams that connect to HSS columns. Double angle connection or single plate connection may be used for other beams.
- For skewed girder connections, use a single plate connection with a capacity equal to or greater than the double angle connection for that beam size. Beams that connect to a column or wall on either end and support the load from another beam are considered girders. Beams supporting precast plank floors are considered girders.
- Beams requiring a non-typical connection will be noted on the drawings as DA-X for double angle connections or SP-X for single plate connections (where X denotes the number of bolt rows in the connection).

Design bracing, moment, and other connections at Skyway as noted on the drawings for the loads indicated. Submit calculations for these connections.

STEEL JOISTS AND BRIDGING
Design steel joists in accordance with AISC and SJI Standard Specifications.
Fabricate in accordance with AISC Specification.
Bridging shall conform to SJI Specifications.
Weld "K" series joists to beams and bearing plates with two ¼" fillet welds 2½" long.
Weld "LH02-06" series joists to beams and bearing plates with two 3/16" fillet welds 2½" long. Weld "LH07-17" and "DLH10-17" series joists to beams and bearing plates with two ¼" fillet welds 2½" long. Weld "LH/DLH18-25" series joists to beams and bearing plates with two ½" fillet welds 4" long. Weld "LHSP" and "DLHSP" series joists to beams and bearing plates. Joist supplier to specify welded connection where not detailed in the drawings.
Positively anchor all bridging to walls and beams parallel to joists.
Provide horizontal bridging in last joist space. See detail 10/S321 for anchorage of bridging to precast.
Supplier shall design joist headers to support 100% of joist reaction for supported joist capacity at given span or reaction from special joist designed by supplier.
Supplier shall incorporate joist header reaction on adjacent joists as an add-load and coordinate panel points or design for bend-check.
See detail 5/S321 for reinforcing at concentrated loads (piping, mech rooftop equip curbs, etc.) at joists.
Typical joist top and bottom chords to be designed for a 100-lb bend-check load anywhere along span.
Joists designated as "KSP" have joist self-weight included in designation.
Joists designated as "LHSP" and "DLHSP" do not have joist self-weight included in designation. Joist supplier to include joist self-weight in joist design.

COMPOSITE STEEL DECK SLABS
Weld composite steel deck to supports with __ (5/8") dia. puddle welds at __ (12") oc. Screw side laps at __ (36") max oc. with #10 TEK screws. Weld side margins to supports with __ (3/8" x 1½") seam welds at __ (36") max. oc. Deck flutes and ribs must line up from one span of deck to the next.
Locate deck splices at supports.
Do not cut openings in deck until concrete has reached its design strength. Provide 2-#5 @ 12" located on each side of openings up to __ (2'-0") wide perpendicular to deck span. Locate bars parallel to deck span ¾"clear from the bottom of flute and extend to support purlins. Locate perpendicular bars ½" clear from the top of deck and extend 1'-6" past edge of opening. For openings wider than 2'-6", provide steel frame per detail 3/S321. Weld deck to angle frames at 12" oc. Multiple smaller openings spaced less than 2'-0" on center shall be treated as one large opening. Pour composite slabs to a constant thickness.

STEEL ROOF DECK
See detail 1/S321 for deck fastening.
Locate deck splices at supports.
Provide reinforcing at openings that cut vertical flute webs, including, but not limited to, roof drains, mechanical duct work, and piping. See detail S401 for reinforcing at 1½" wide rib deck. For openings in all other deck types, see detail 2/S321 for angle frames.
Weld deck to angle frames with __ (5/8") diameter puddle welds at 12"OC.
Allowable point loads applied to steel deck are controlled by the following:
- Maximum of 250 pounds in any 5'-0"x5'-0" square area.
- Maximum of 100 pounds on any individual hanger location.

The total mechanical load applied to a deck-supporting member shall not exceed 5 pounds per square foot uniform load (typical) or 25 pounds per square foot in mechanical rooms.

LOOSE ANGLE BRICK LINTELS
Bear lintel a minimum of 8" each side of opening. Locate vertical leg a maximum of 2" from back face of masonry veneer assembly.
Provide minimum lintels as follows based on opening width:

Up to 4'-0"	8 x 5½ x 3/8 bent plate (LLV) for up to 16'-8" brick height.
4'-0" to 8'-0"	8 x 5½ x 3/8 bent plate (LLV) for up to 8'-0" brick height.

Provide longer horizontal leg, if needed, to extend to between 1/2" and 1" clear outside face of brick.
See details or notify engineer for lintels outside of the above parameters.

COLD-FORMED STEEL FRAMING
Design and construct cold-formed steel framing according to AISI *Specification for Design of Cold-formed Steel Structural Members*. Gravity and lateral loads shall be according to IBC Chapter 16. Provide calculations, prepared and certified by an engineer licensed to practice in the state in which the project is located, and detailed shop drawings for review.
The drawings are intended to express the minimum design performance. Alternate design of equivalent capacity will be considered if compatible with architectural requirements and if calculations and detailed shop drawings are submitted for review.
The cold-formed steel framing resists lateral loads only and provides lateral stability for exterior materials. Provide connections that transfer loads to the primary structural frame and allow for a minimum deflection of floor and roof framing of L/360.

SHEET INDEX

S000	STRUCTURAL TITLE SHEET
S210A	FIRST FLOOR FOUNDATION PLAN - SHELTER
S210B	FIRST FLOOR FOUNDATION PLAN - SKYWAY
S211A	SECOND FLOOR FRAMING PLAN - SHELTER
S211B	SECOND FLOOR FRAMING PLAN - SKYWAY
S212A	ROOF FRAMING PLAN - SHELTER
S212B	ROOF FRAMING PLAN - SKYWAY
S301	SECTIONS AND DETAILS
S311	SECTIONS AND DETAILS
S321	SECTIONS AND DETAILS
S331	SECTIONS AND DETAILS
S341	SECTIONS AND DETAILS
S401	SCHEDULES AND DETAILS

REQUIRED STRUCTURAL SPECIAL INSPECTIONS

IN ADDITION TO THE REGULAR INSPECTIONS, THE FOLLOWING STRUCTURAL ITEMS REQUIRE SPECIAL INSPECTION IN ACCORDANCE WITH SECTIONS 1704 AND 1705 OF THE INTERNATIONAL BUILDING CODE. SEE SPECIFICATION SECTION 014533 AND MATERIAL SPECIFICATION SECTIONS FOR SPECIFIC REQUIREMENTS. CONSTRUCTION NOT ASSOCIATED WITH THE STRUCTURAL SYSTEM MAY REQUIRE SPECIAL INSPECTION BUT IS NOT LISTED HERE.

ITEM	REQUIRED?	REMARKS
1. Soils compliance prior to foundation construction	YES	Reference IBC 1705.6
2. Column footings	NO	Building is 3 stories or less in height
2a. Column footings for host building	NO	Building is 3 stories or less in height
2b. Column footings for storm shelter	YES	Reference IBC table 1705.3
3. Wall footings	NO	Footing concrete designed for f'c 2500 psi. Building is 3 stories or less in height
3a. Wall footings for host building	NO	Footing concrete designed for f'c 2500 psi. Building is 3 stories or less in height
3b. Wall footings for storm shelter	YES	Reference IBC table 1705.3
4. Structural concrete	YES	Reference IBC table 1705.3 and MSBC 1305.1705
5. Reinforcing steel	YES	Reference IBC table 1705.3
6. Bolts installed in concrete	YES	Reference IBC table 1705.3
7. Post-installed anchors	YES	Reference IBC table 1705.3
8. Structural steel fabrication	YES	May be performed by fabricator if fabricator is AISC certified. Reference IBC 1705.2 and AISC 360 Chapter N
9. Structural steel field welding and high strength bolting	YES	Reference IBC 1705.2.1 and AISC 360 Chapter N
10. Open web steel joist and joist girder installation	YES	Reference IBC table 1705.2.3
11. Steel decking	YES	Reference IBC 1705.2.2 and SDI QA/QC
14. Precast concrete fabrication	YES	May be performed by fabricator provided precast manufacturing plant is certified by the PCI Plant Certification Program Category C3A. Submit certificate of compliance to the building official in accordance with IBC 1704.2.5.1
15. Precast concrete erection	YES	Reference IBC 1705.3
16. Reinforcing steel welding	YES	Reference IBC table 1705.3
22. Seismic Resistance	NO	Reference MSBC 1305.0011 Subp. 4

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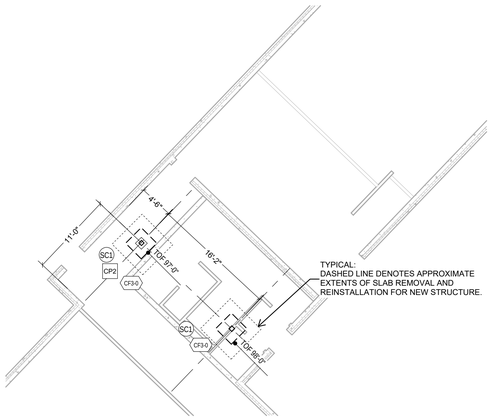
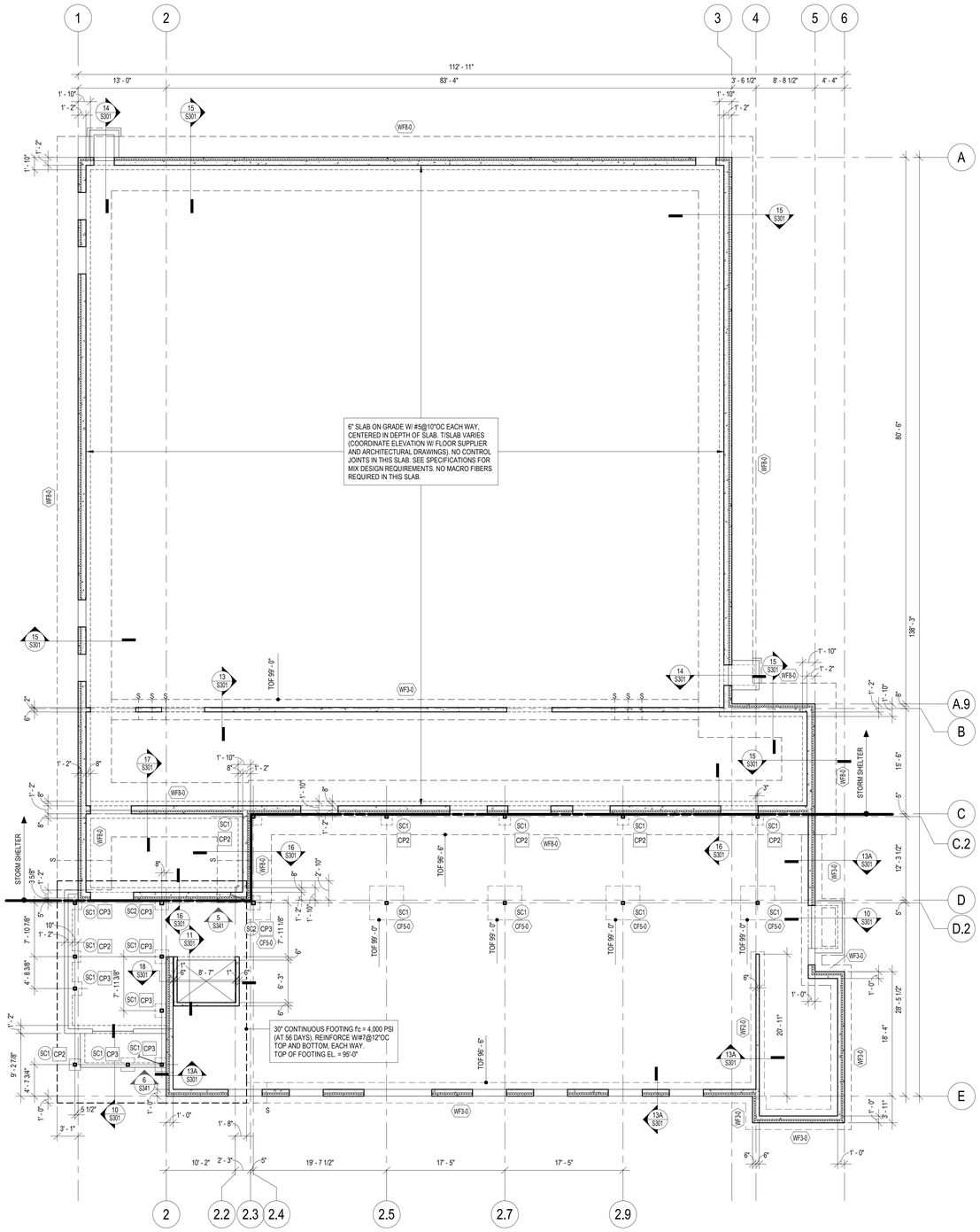


2 / S210A FOOTING AND FOUNDATION PLAN - MEZZANINE

UNLESS NOTED OTHERWISE:

1. SEE SHEET 1/S210A FOR TYPICAL PLAN NOTES.



1 / S210A FIRST FLOOR FOUNDATION PLAN - SHELTER

UNLESS NOTED OTHERWISE:

1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES, ABBREVIATIONS AND SYMBOLS.
2. SEE SHEET S301 FOR TYPICAL FOOTING AND FOUNDATION DETAILS.
3. SEE SHEET S401 FOR SCHEDULES.
4. PROVIDE 4" SLAB ON GRADE W/MICRO FIBER REINFORCING (SEE SPECIFICATION FOR DOSAGE). AT STEEL STAIR STRINGER/POST LOCATIONS, THICKEN SLAB TO 12" OVER 24"x24" AREA CENTERED UNDER STRINGER/POST. PROVIDE 3-#4 EACH WAY. COORDINATE LOCATIONS WITH STAIR SUPPLIER PRIOR TO PLACEMENT.
5. TOP OF SLAB ELEVATION = 100'-0".
6. TOP OF EXTERIOR FOOTING ELEVATION (TOF) AT WALLS AND COLUMNS = 96'-6".
7. TOP OF INTERIOR FOOTING ELEVATION (TOF) AT WALLS AND COLUMNS = 99'-0".
8. PROVIDE SLEEVES FOR ALL PIPES THAT INTERSECT BUILDING FOUNDATIONS. FOR PIPES THAT CROSS BELOW TOP OF FOOTING, STEP OR THICKEN FOOTINGS AS SHOWN IN SECTION 1/S301 AND DETAIL 2/S301. SEE 3/S301 FOR PIPES RUNNING ADJACENT TO FOOTINGS. PIPES SHOWN ON PLAN ARE FOR REFERENCE ONLY. COORDINATE LOCATIONS AND ELEVATIONS WITH CIVIL AND MECHANICAL.
9. TOP OF FOUNDATION WALL ELEVATION = 100'-0", TOP OF FOUNDATION WALL AT PRECAST WALL PANELS (SHELTER) = 99'-0".
10. TOP OF CONCRETE PIER ELEVATION = 99'-0".
11. PROVIDE THE FOLLOWING CONCRETE FROST WALL REINFORCING:
    - 6" WALLS: #4@18"OC VERTICAL, #4@16"OC HORIZONTAL CENTERED IN WALL
    - 8" WALLS: #4@18"OC VERTICAL, #4@12"OC HORIZONTAL CENTERED IN WALL
    - 12" WALLS: #4@18"OC VERTICAL EACH FACE, #4@16"OC HORIZONTAL EACH FACE
    - 14" WALLS: #4@18"OC VERTICAL EACH FACE, #4@14"OC HORIZONTAL EACH FACE
    - 22" WALLS: #4@12"OC VERTICAL EACH FACE, #5@12"OC HORIZONTAL EACH FACE
    - 30" WALLS: #5@12"OC VERTICAL EACH FACE; #5@10"OC HORIZONTAL EACH FACE

    LAP REINFORCING AS FOLLOWS:
    - #4: 1'-8"
    - #5: 2'-1"

    PROVIDE DOWELS FROM FOOTING INTO CONCRETE WALLS TO MATCH VERTICAL WALL REINFORCING SIZE AND SPACING. PROJECT INTO WALL TO MATCH VERTICAL REINFORCING LAP SPLICE. SEE GENERAL STRUCTURAL NOTES FOR ADDITIONAL INFORMATION.
12. FOOTINGS FOR WALLS NOT NOTED SHALL BE 12" THICK WITH A MINIMUM PROJECTION OF 4" EACH SIDE. REINFORCE WITH 2-#5 CONTINUOUS. ADD 1-#5 CONTINUOUS FOR EACH 6" WIDTH OVER 24".
13. PLACE ALL STOOP SLABS ON CLEAN GRANULAR FILL MATERIAL THAT EXTENDS DOWN TO BOTTOM OF FOOTING.
14. SEE ARCHITECTURAL DRAWINGS FOR FIRE RATINGS OF STRUCTURAL MASONRY WALLS AND FOR LOCATIONS AND FIRE RATINGS OF NON-BEARING MASONRY WALLS.
15. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF RAMPS, SLAB SLOPES, STEPPED SLABS AND PARTITION WALLS. SEE 9/S301 FOR STEPPED SLAB DETAIL.
16. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION AND DIMENSIONS.

KEYNOTES

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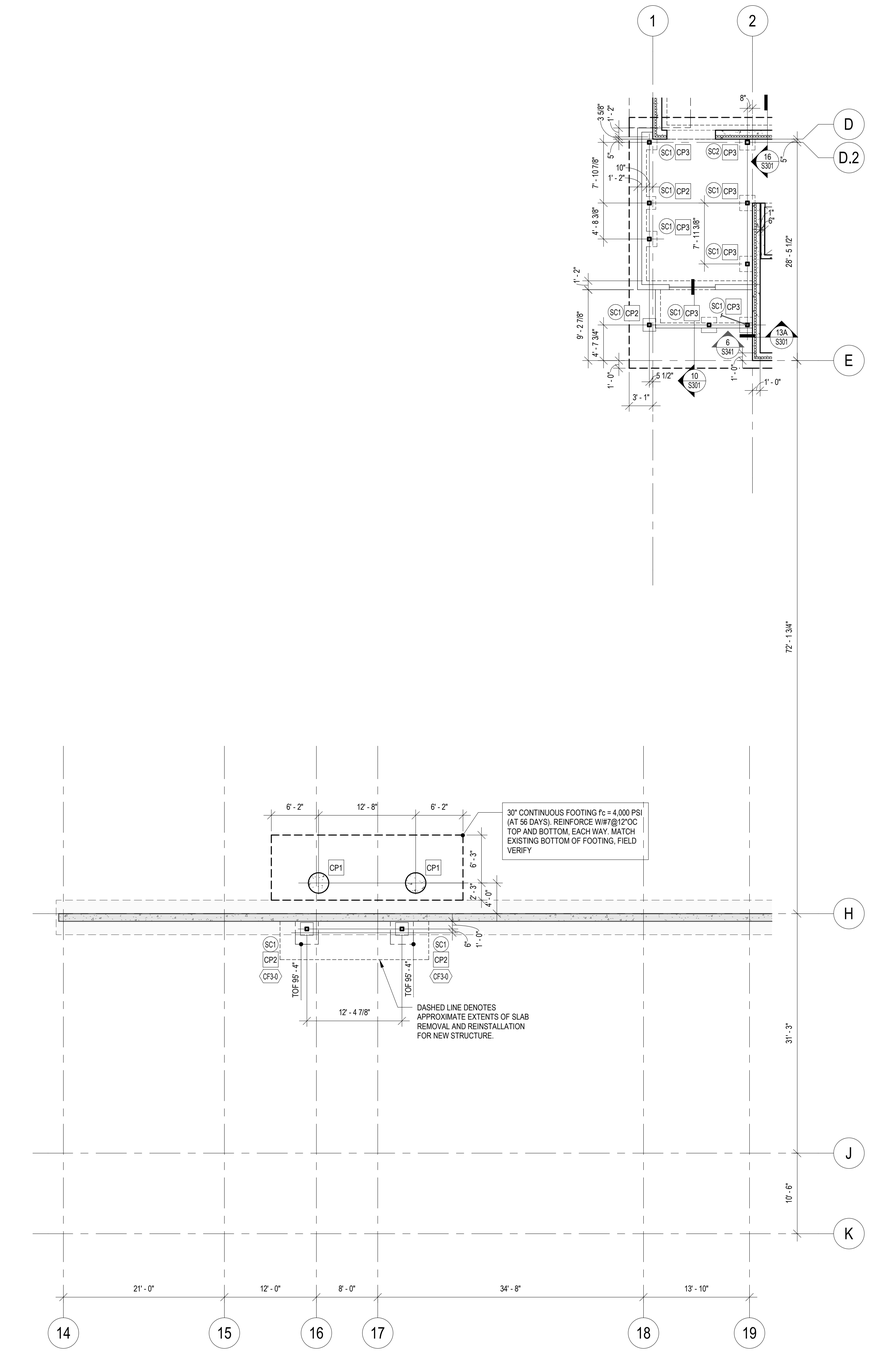
SHEET TITLE:
FIRST FLOOR FOUNDATION PLAN - SHELTER

SHEET NUMBER:

S210A



1 S210B FIRST FLOOR FOUNDATION PLAN - SKYWAY

UNLESS NOTED OTHERWISE:
1. SEE SHEET 1/S210A FOR TYPICAL PLAN NOTES.

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SHEET NUMBER:

S210B

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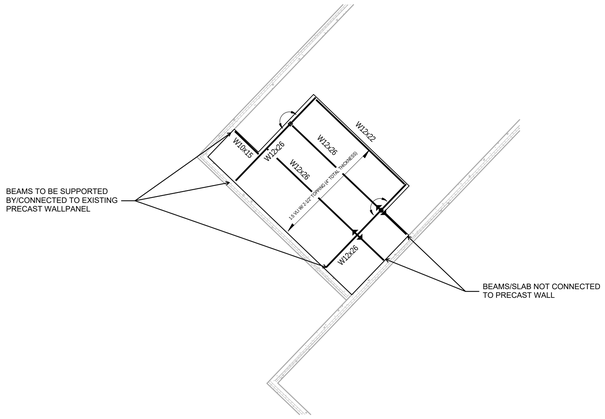
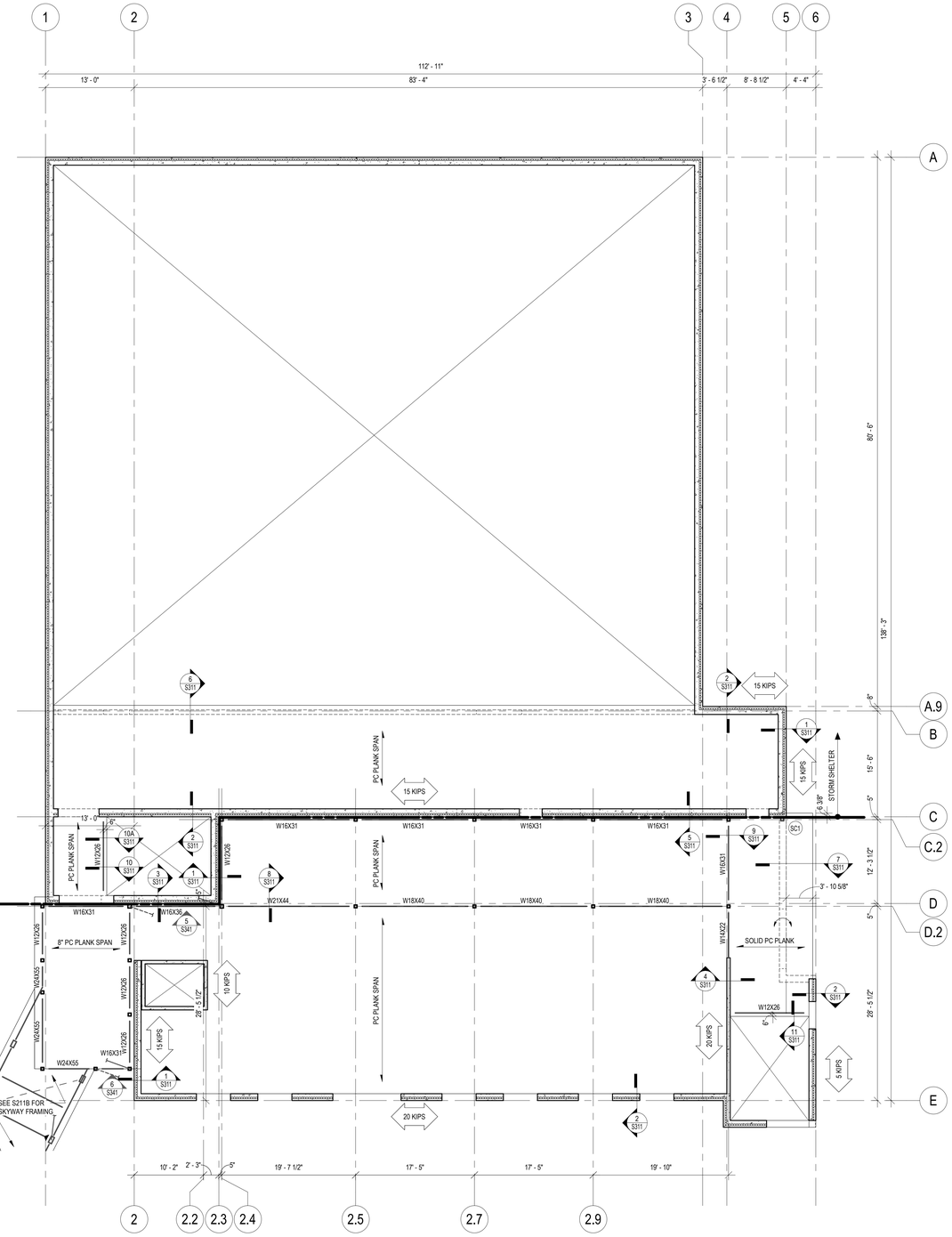


2 S211A MEZZANINE FRAMING PLAN

UNLESS NOTED OTHERWISE:
1. SEE SHEET 1/S211A FOR TYPICAL PLAN NOTES.



1 S211A LEVEL 2 FRAMING PLAN - SHELTER

UNLESS NOTED OTHERWISE:
1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES, ABBREVIATIONS, AND SYMBOLS.
2. SEE SHEET S401 FOR SCHEDULES.
3. 6" PRECAST CONCRETE PLANK W/2" NON-STRUCTURAL TOPPING, REINFORCE WITH SYNTHETIC MACRO FIBER REINFORCING (SEE GENERAL STRUCTURAL NOTES FOR MINIMUM STRENGTH). SEE ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE RATING OF PRECAST PLANK.
4. TOP OF PRECAST CONCRETE PLANK ELEVATION = 114'-10".
5. SUPERIMPOSED DEAD LOAD (DOES NOT INCLUDE TOPPING AND PARTITION WALLS) = 10 PSF. SEE GENERAL STRUCTURAL NOTES FOR LIVE AND SNOW LOADS.
6. SEE SHEET S311 FOR TYPICAL PRECAST CONCRETE PLANK BEARING DETAILS.
7. FOR ALL MECHANICAL OPENINGS IN MASONRY BEARING WALLS, SEE STRUCTURAL UNIT MASONRY LINTELS SECTION IN GENERAL STRUCTURAL NOTES.
8. DIAPHRAGM SHEAR LOADS SHOWN ON PLAN ARE DUE TO WIND.
9. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF RAMPS, SLAB SLOPES, STEPPED SLABS AND PARTITION WALLS.
10. REFER TO ARCHITECTURAL DRAWINGS AND/OR COORDINATE WITH ARCHITECT REGARDING ANY DIMENSIONS.

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SHEET NUMBER:

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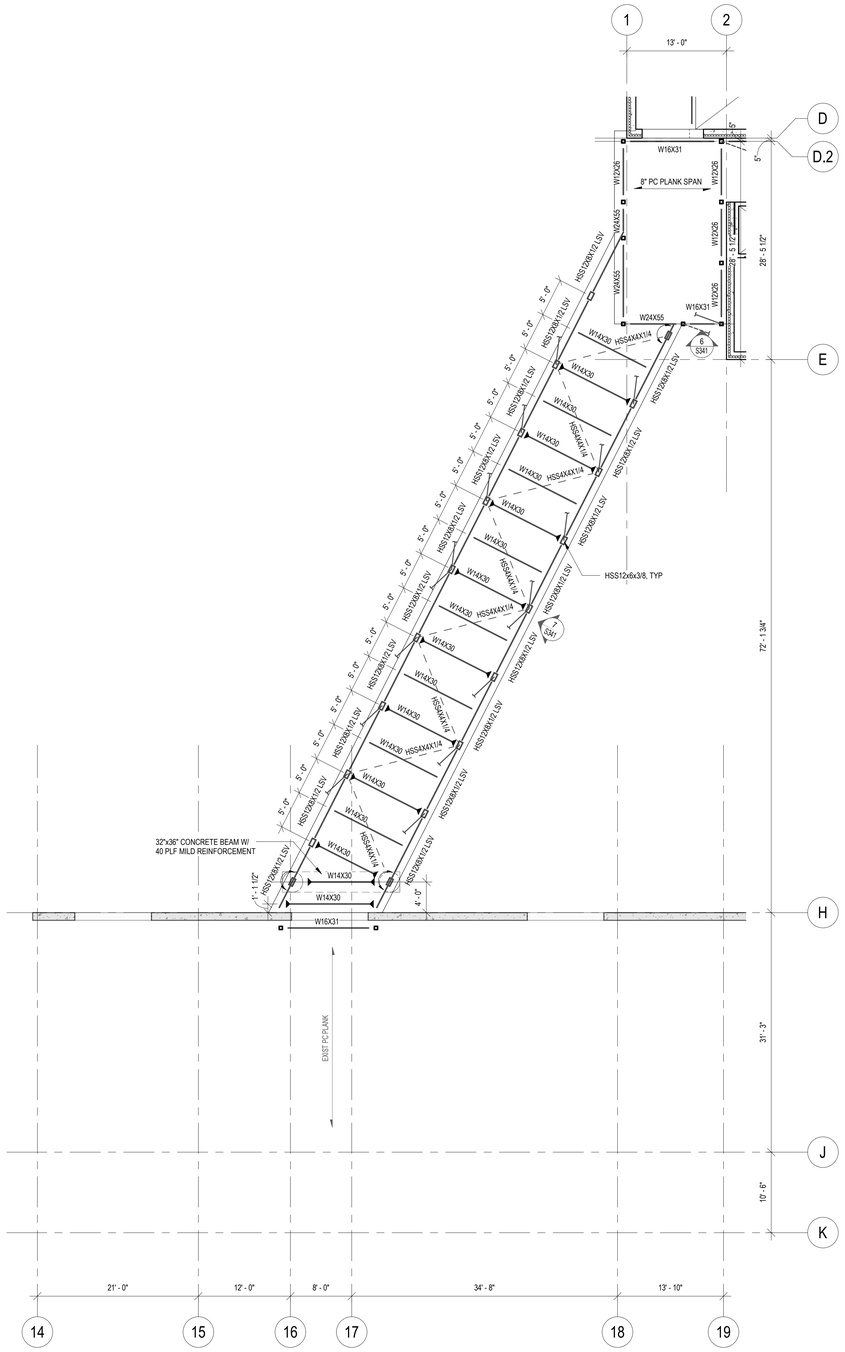

2 / S211B SECOND FLOOR FRAMING PLAN - SKYWAY

UNLESS NOTED OTHERWISE:

1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES, ABBREVIATIONS, AND SYMBOLS.
2. SEE SHEET S401 FOR SCHEDULES.
3. SKYWAY SLAB TO BE 1 1/2"-20GA COMPOSITE DECK W/ 2 1/2" NORMAL WEIGHT CONCRETE (4" TOTAL THICKNESS). REINFORCE WITH SYNTHETIC MACRO FIBER REINFORCGING PER THE SPECIFICATIONS.
4. TOP OF SKYWAY SLAB ELEVATION = ___'-"_ AT LOW END; ___'-__" AT HIGH END, VERIFY WITH ARCHITECT.
5. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF RAMPS, SLAB SLOPES, STEPPED SLABS AND PARTITION WALLS.
6. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION AND DIMENSIONS.

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SHEET NUMBER:

S211B

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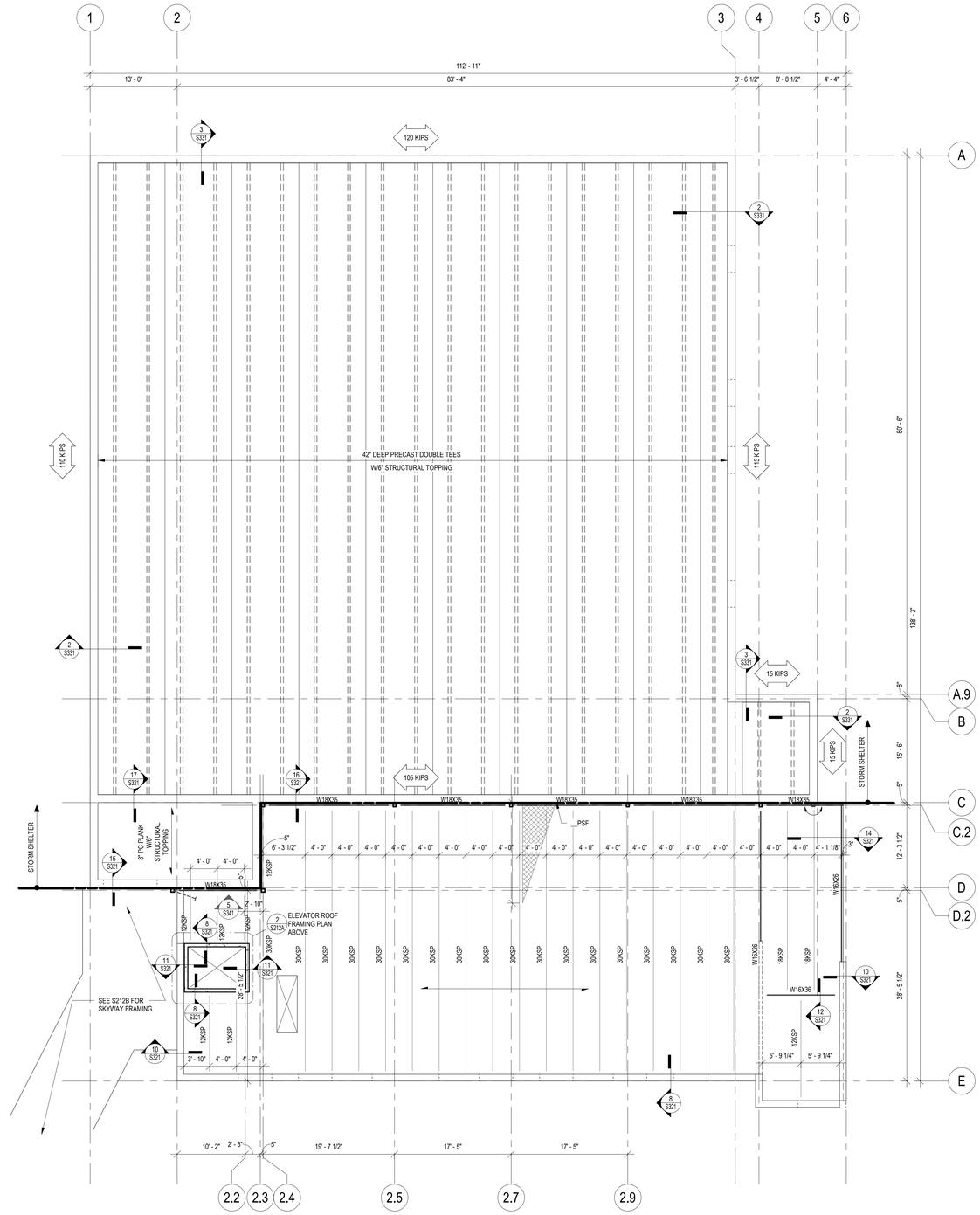

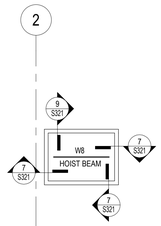

2 S212A ELEVATOR ROOF FRAMING PLAN - SHELTER

UNLESS NOTED OTHERWISE:
1. SEE SHEET 1/S212 FOR TYPICAL PLAN NOTES.
2. 1 1/2" - 20GA. WIDE RIB ROOF DECK.
3. TOP OF DECK ELEVATION = 137'-1 1/2". COORDINATE WITH ELEVATOR SUPPLIER.

1 S212A ROOF FRAMING PLAN - SHELTER

UNLESS NOTED OTHERWISE:
1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES, ABBREVIATIONS, AND SYMBOLS.
2. SEE SHEET S401 FOR SCHEDULES.
3. 1 1/2" - 20GA. WIDE RIB ROOF DECK.
4. TOP OF DECK ELEVATION = 1'2E-1 1/2".
5. SEE 1/S321 FOR TYPICAL DECK ATTACHMENT TO SUPPORTS.
6. PROVIDE 2-5/16" WEB STIFFENER PLATES AT STEEL BEAMS RUNNING OVER COLUMNS OR WALLS. CENTER ON SUPPORT.
7. AT ALL COLUMNS THAT SUPPORT JOISTS, SEE SECTIONS 18/S321-20/S321. AT ALL COLUMNS NOT SUPPORTING JOISTS, PROVIDE 1/2" CAP PLATE AND EXTEND COLUMN TO DECK BEARING ELEVATION. WELD DECK W/ 4-5/8"Ø PUDDLE WELDS, 6" GAGE EACH WAY.
8. FOR ALL MECHANICAL OPENINGS IN MASONRY BEARING WALLS, SEE STRUCTURAL UNIT MASONRY LINTELS SECTION IN GENERAL STRUCTURAL NOTES.
9. DIAPHRAGM SHEAR LOADS SHOWN ON PLAN ARE DUE TO WIND.
10. SEE GENERAL STRUCTURAL NOTES FOR TYPICAL ROOF FRAMING AT OPENINGS WIDER THAN 6". COORDINATE WITH ARCHITECTURAL/MECHANICAL DRAWINGS FOR OPENING LOCATION AND SIZE.
11. JOIST SUPPLIER TO DESIGN JOISTS FOR:
    TOTAL LOAD/LIVE LOAD (PSF) NOTED IN JOIST DESIGNATION.
    MECHANICAL POINT LOADS AND SNOW DRIFT LOADS SHOWN ON PLAN.
    LOADS SHOWN ON DETAILS.
12. JOIST SEAT DEPTHS:
    K-SERIES: 2 1/2".
13. SEE GENERAL STRUCTURAL NOTES FOR CONCENTRATED LOADS (PIPING, MECHANICAL ROOF TOP EQUIPMENT, CURBS, ETC) ON JOISTS.
15. 42" DEEP PRECAST DOUBLE TEES W/6" STRUCTURAL TOPPING SLAB. POUR TOPPING SLAB TO A CONSTANT THICKNESS.
16. TOP OF PRECAST DOUBLE TEE EL. = 130'-8".
17. SEE "COMMUNITY TORNADO SHELTER" SECTION OF STRUCTURAL NOTES FOR SUPERIMPOSED DEAD LOAD, LIVE LOAD, SNOW LOAD, AND WIND LOADS ON PRECAST DOUBLE TEES.
18. ROOF DIAPHRAGM DESIGN BY THE PRECAST SUPPLIER. ROOF DIAPHRAGM TO BE DESIGNED TO RESIST ALL LATERAL WIND LOADS NOTED ON THE DRAWINGS. AT PRECAST SUPPLIER'S OPTION, THEY MAY PERFORM THEIR OWN WIND ANALYSIS TO DETERMINE LOADS, INCLUDE ANY ANALYSIS IN CALCULATION SUBMITTAL. THE TOPPING SLAB, PRECAST DOUBLE TEES, OR COMPOSITE OF THE TWO MAY BE USED FOR THE ROOF DIAPHRAGM DESIGN. THE PRECAST SUPPLIER IS RESPONSIBLE FOR THE DESIGN OF ALL DIAPHRAGM CHORDS, COLLECTORS, AND/OR DRAG STRUTS, AND ANY CONNECTIONS NECESSARY TO PROVIDE CONTINUOUS LOAD PATHS OVER THESE ELEMENTS. PRECAST SUPPLIER TO DESIGN DIAPHRAGM ELEMENTS AND ANY CONNECTIONS TO RESIST ALL NECESSARY SHEAR LOADS IN DIAPHRAGM.
19. PRECAST SUPPLIER TO PROVIDE CAST-IN #4 U-BARS @4'-0"OC MAX EACH WAY, SEE 1/S331 FOR ADDITIONAL INFORMATION. PRECAST SUPPLIER TO DESIGN U-BAR EMBEDMENT IN DOUBLE TEE STEMS FOR 5 KIP UPWARD TENSION LOAD (COMPONENTS AND CLADDING WIND, STRENGTH LEVEL). IF ADDITIONAL REINFORCEMENT IS REQUIRED ACROSS DOUBLE TEE AND TOPPING INTERFACE FOR PRECAST DESIGN (HORIZONTAL SHEAR TRANSFER FOR COMPOSITE ACTION UNDER GRAVITY OR UPLIFT LOADING, HORIZONTAL SHEAR TRANSFER FOR COMPOSITE DIAPHRAGM ACTION, OR ANY OTHER LOADING), THE DESIGN AND SUPPLY OF THE ADDITIONAL REINFORCEMENT IS BY THE PRECAST SUPPLIER. IF TOPPING SLAB IS USED AS COMPOSITE WITH DOUBLE TEES IN ANY CONDITION WHERE TENSION EXISTS ACROSS DOUBLE TEE AND TOPPING INTERFACE (POTENTIALLY DURING WIND UPLIFT LOAD CONDITIONS), PRECAST SUPPLIER TO DESIGN AND PROVIDE TRANSVERSE REINFORCEMENT PER ACI 318 16.4.1.2.
20. 6" STRUCTURAL TOPPING SLAB TO HAVE MINIMUM REINFORCEMENT OF #4@12"OC EACH WAY, CENTERED IN DEPTH OF TOPPING SLAB. THREAD REINFORCEMENT THROUGH U-BARS CAST-IN TO DOUBLE TEES, SEE 3/S333 FOR ADDITIONAL INFORMATION. THIS MINIMUM REINFORCEMENT AND SLAB THICKNESS MEET MISSILE IMPACT TEST ASSEMBLY REQUIREMENTS (REFERENCE "DEBRIS IMPACT RESISTANCE OF BUILDING ASSEMBLIES", NIST, 2006). THIS MINIMUM REINFORCEMENT HAS BEEN DESIGNED SUCH THAT THE TOPPING SLAB CAN SPAN BETWEEN U-BAR ANCHORAGE POINTS UNDER COMPONENTS AND CLADDING WIND UPLIFT LOADS. TOPPING SLAB MUST BE SUFFICIENTLY ANCHORED TO PRECAST DOUBLE TEES SUCH THAT IT CAN REMAIN IN-PLACE DURING WIND UPLIFT LOADING, IN ORDER TO MAINTAIN MISSILE IMPACT PROTECTION.
21. IF ANY INCREASE IN TOPPING SLAB REINFORCEMENT IS REQUIRED FOR THE PRECAST DESIGN AND/OR ROOF DIAPHRAGM DESIGN, PRECAST SUPPLIER TO DESIGN AND SUPPLY THE ADDITIONAL REINFORCEMENT. PRECAST SUPPLIER TO COORDINATE THE INSTALLATION OF ANY ADDITIONAL REINFORCEMENT IN THE TOPPING SLAB WITH THE CONTRACTOR RESPONSIBLE FOR PLACING THE TOPPING SLAB REINFORCEMENT.
22. XX KIPS — INDICATES IN-PLANE LATERAL LOAD (MAIN WIND) FORCE RESISTING SYSTEM, STRENGTH LEVEL) TO BE TRANSFERRED FROM ROOF DIAPHRAGM TO ADJACENT PRECAST SHEAR WALL. PRECAST SUPPLIER TO DESIGN ALL WALL PANELS IN ADJACENT WALL LINE TO ACT AS PART OF SHEAR WALL. PRECAST SUPPLIER TO DESIGN CONNECTIONS BETWEEN WALL PANELS SUCH THAT ALL PANELS IN WALL LINE ACT COMPOSITELY AS A SINGLE SHEAR WALL.
23. PRECAST SUPPLIER TO DESIGN ROOF DIAPHRAGM FOR 4,120 PLF LOAD (MAIN WIND FORCE RESISTING SYSTEM, STRENGTH LEVEL) IN EAST-WEST DIRECTION AND _____ PLF (MAIN WIND FORCE RESISTING SYSTEM, STRENGTH LEVEL) LOAD IN NORTH-SOUTH DIRECTION. PRECAST SUPPLIER TO DESIGN ROOF DIAPHRAGM FOR ALL WIND LOAD CASES IN ASCE 7 FIG. 27.3-8.
24. SEE SHEET S331 FOR TYPICAL PRECAST CONCRETE DOUBLE TEE DETAILS.
25. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF RAMPS, SLAB SLOPES, STEPPED SLABS AND PARTITION WALLS.
26. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION AND DIMENSIONS.

KEYNOTES

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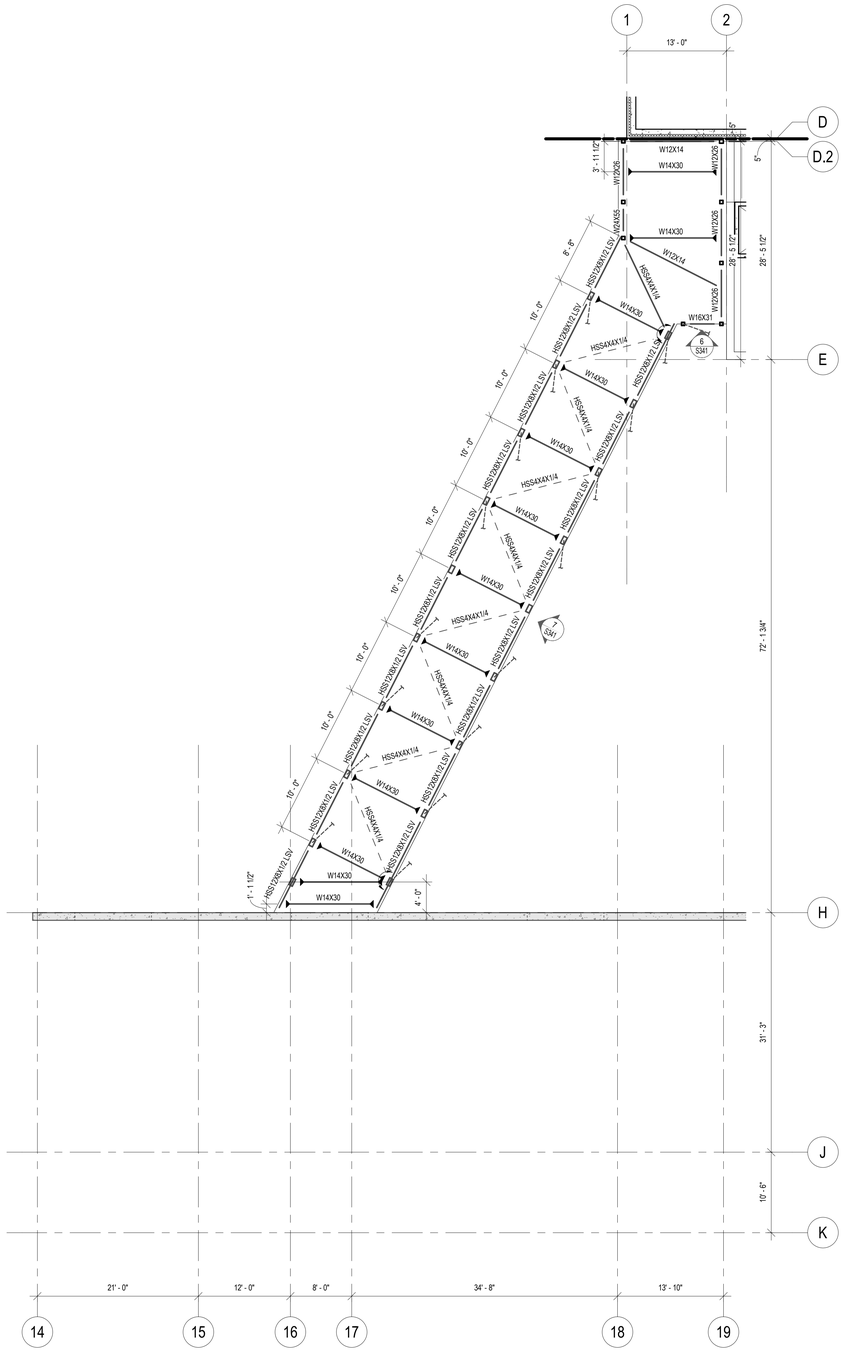
SHEET TITLE:
ROOF FRAMING PLAN - SHELTER

SHEET NUMBER:

S212A

23008.1001 DOBBS, P.A. - CONSTRUCTION



1 S212B ROOF FRAMING PLAN - SKYWAY

UNLESS NOTED OTHERWISE:

1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES, ABBREVIATIONS, AND SYMBOLS.
2. SEE SHEET S401 FOR SCHEDULES.
3. 3"-20GA WIDE RIB ROOF DECK.
4. TOP OF SKYWAY ROOF DECK ELEVATION = ___'-"_ AT LOW END; ___'-__" AT HIGH END, VERIFY WITH ARCHTECT.
5. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF RAMPS, SLAB SLOPES, STEPPED SLABS AND PARTITION WALLS.
6. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION AND DIMENSIONS.

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BKBM Project No. 24426.00

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Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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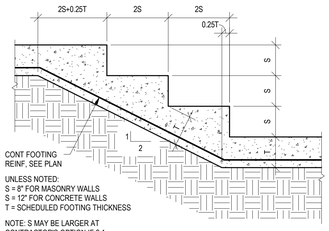
SHEET TITLE:
ROOF FRAMING PLAN - SKYWAY

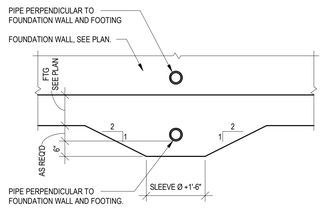
SHEET NUMBER:

S212B

2308 HAY DOBBS, P.A. - C:\Users\mcfarlin\...

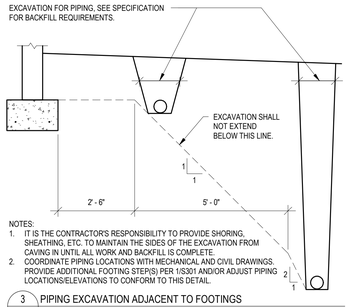


1 S301 TYPICAL FOOTING STEP SECTION



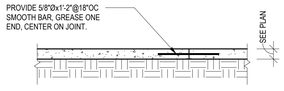
NOTES:
1. FOR PIPES BELOW FOOTING PROVIDE SLEEVE AND THICKEN CONCRETE FOOTING AS SHOWN OR STEP FOOTING BELOW PIPE PER 1/S301.
2. FOR PIPES WITHIN FOOTING DEPTH STEP FOOTING PER 1/S301 SO PIPES PASS THROUGH WALL. PROVIDE SLEEVE AND GROUT INTO WALL.
3. SLEEVE DIAMETER TO BE 2" GREATER THAN PIPE OUTSIDE DIAMETER.
4. COORDINATE PIPING LOCATIONS WITH MECHANICAL DRAWINGS.

2 S301 DETAIL



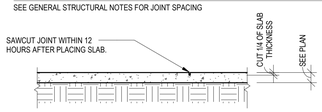
NOTES:
1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SHORING, SHEATHING, ETC. TO MAINTAIN THE SIDES OF THE EXCAVATION FROM CAVING IN UNTIL ALL WORK AND BACKFILL IS COMPLETE.
2. COORDINATE PIPING LOCATIONS WITH MECHANICAL AND CIVIL DRAWINGS. PROVIDE ADDITIONAL FOOTING STEP(S) PER 1/S301 AND/OR ADJUST PIPING LOCATIONS/ELEVATIONS TO CONFORM TO THIS DETAIL.

3 S301 PIPING EXCAVATION ADJACENT TO FOOTINGS



TYPICAL CONSTRUCTION JOINT

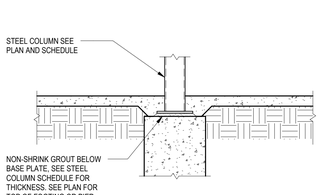
SEE GENERAL STRUCTURAL NOTES FOR JOINT SPACING



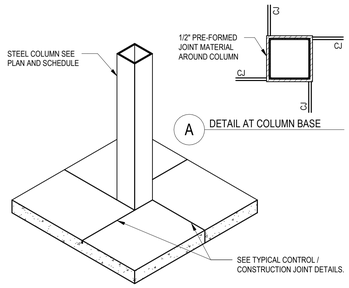
TYPICAL CONTROL JOINT

SEE GENERAL STRUCTURAL NOTES FOR JOINT SPACING

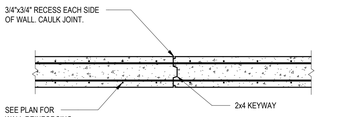
4 S301 TYPICAL CONTROL/CONSTRUCTION JOINT



5 S301 TYPICAL INTERIOR TUBE COLUMN AT SLAB ON GRADE DETAIL

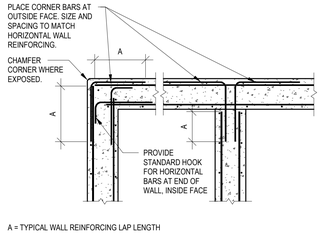


6 S301 TYPICAL SLAB AT STEEL TUBE COLUMN DETAIL



NOTES:
1. AT CONTROL JOINTS OMIT KEYWAY AND PROVIDE RECESS EACH SIDE OF WALL.
2. PLACE CONTROL JOINTS @20'-0" MAXIMUM. FOR WALLS LESS THAN 6'-0" TALL, PLACE CONTROL JOINTS AT 3 TIMES WALL HEIGHT (MAX).
3. STOP 1/2 OF HORIZONTAL REINFORCING PRECISELY AT CONTROL JOINT LOCATIONS.

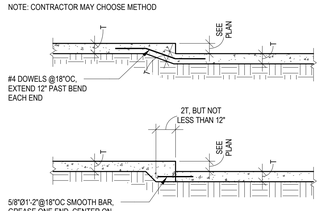
7 S301 TYPICAL VERTICAL CONTROL/CONSTRUCTION JOINT IN CONC WALL



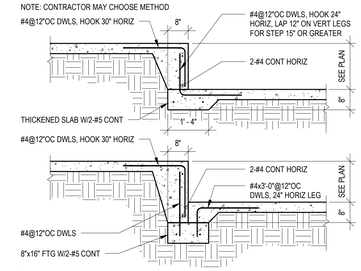
A = TYPICAL WALL REINFORCING LAP LENGTH

NOTE: SEE GENERAL STRUCTURAL NOTES FOR ADDITIONAL INFORMATION.

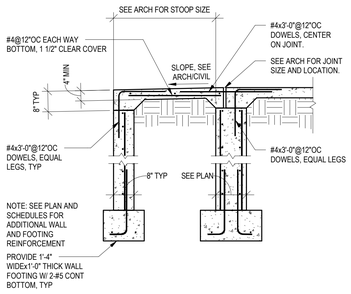
8 S301 TYPICAL CONCRETE WALL INTERSECTION REINFORCING - PLAN



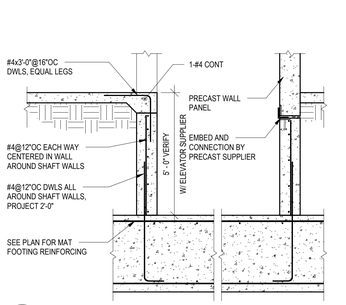
A S301 TYPICAL SLAB ON GRADE STEP UNDER 10"



B S301 TYPICAL SLAB ON GRADE STEP UP TO 2'-6"

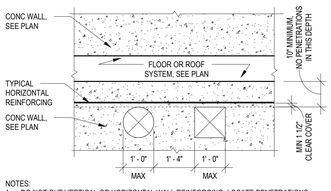


9 S301 TYPICAL SLAB ON GRADE STEP



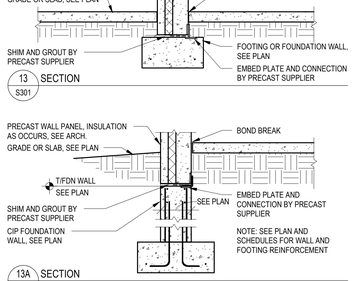
10 S301 SECTION

11 S301 SECTION



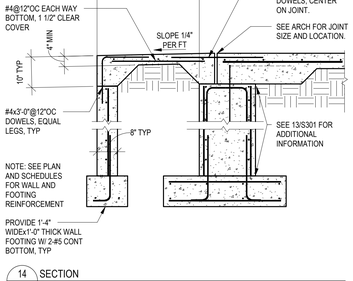
NOTES:
1. DO NOT CUT VERTICAL OR HORIZONTAL WALL REINFORCING. LOCATE PENETRATIONS BETWEEN VERTICAL REINFORCING. PROVIDE MIN 1 1/2" CLEAR COVER BETWEEN VERTICAL REINFORCING AND EDGE OF OPENING. ACCEPTABLE TO ADJUST VERTICAL REINFORCING SPACING UP TO 8" MAX TO ALLOW PENETRATIONS BETWEEN REINFORCING. (ADJUSTING PIER VERTICAL REINFORCING IS NOT ACCEPTABLE.)
2. MULTIPLE PENETRATIONS WITHIN 16" OF EACH OTHER ARE CONSIDERED A SINGLE OPENING.
3. SEE GENERAL STRUCTURAL NOTES FOR ADDITIONAL INFORMATION.

12 S301 OPENINGS UP TO 12" IN POURED CONCRETE WALLS

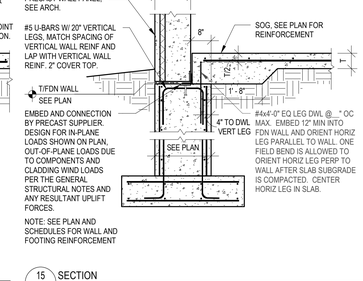


13 S301 SECTION

13A S301 SECTION



14 S301 SECTION



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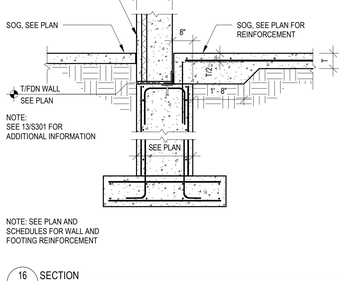

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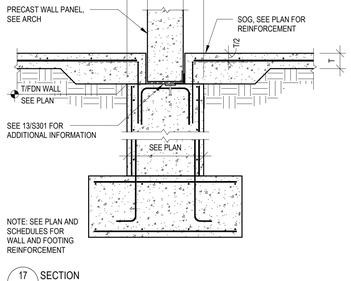

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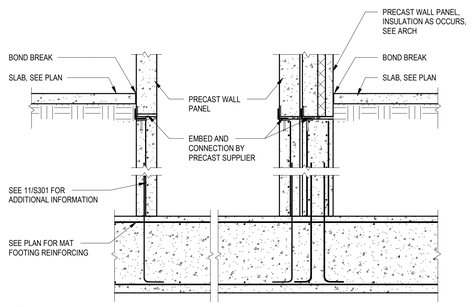

18 S301 SECTION

2008 HAY DOBBS, P.A. - CONFIDENTIAL

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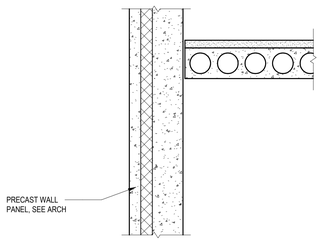
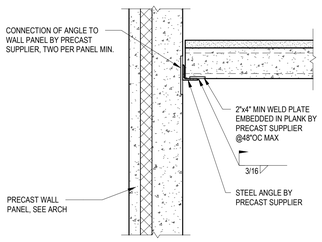


1 SECTION
S311



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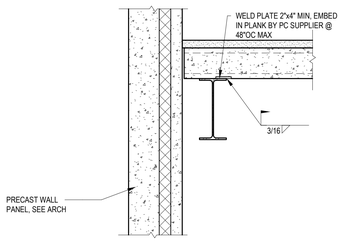

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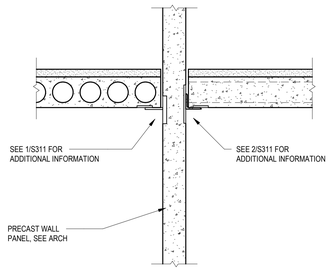

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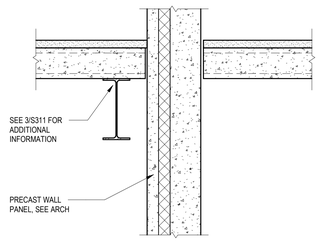

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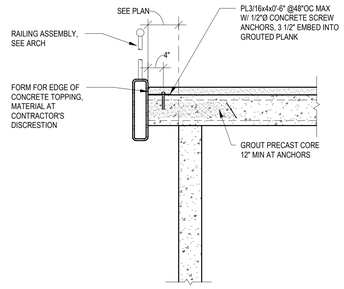

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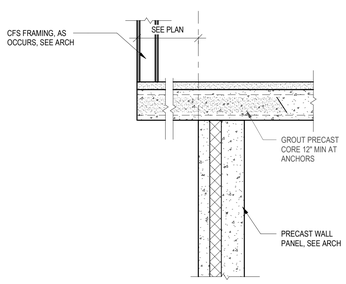

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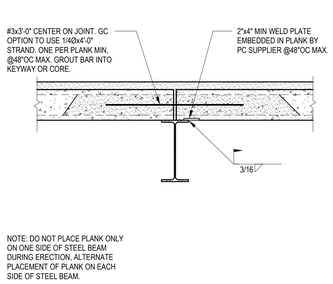

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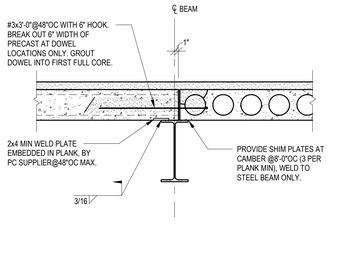

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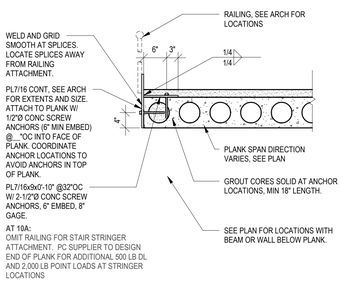

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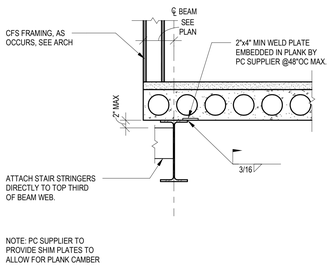

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S311

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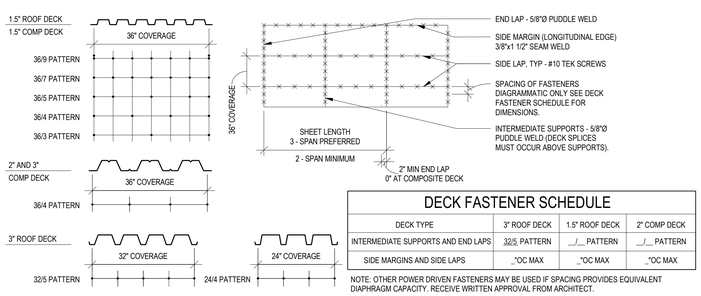
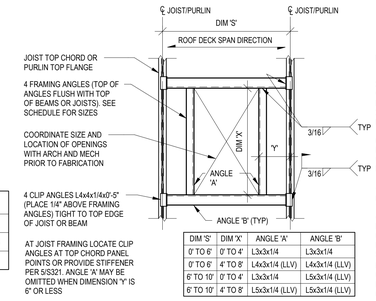


DECK FASTENER SCHEDULE

DECK TYPE	3" ROOF DECK	1.5" ROOF DECK	2" COMP DECK
INTERMEDIATE SUPPORTS AND END LAPS	32/5 PATTERN	__/__ PATTERN	__/__ PATTERN
SIDE MARGINS AND SIDE LAPS	__"OC MAX	__"OC MAX	__"OC MAX

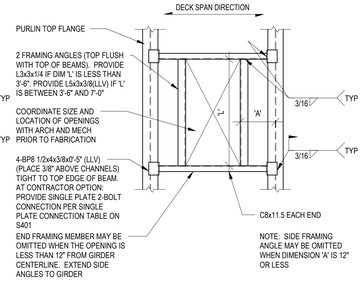
NOTE: OTHER POWER DRIVEN FASTENERS MAY BE USED IF SPACING PROVIDES EQUIVALENT DIAPHRAGM CAPACITY. RECEIVE WRITTEN APPROVAL FROM ARCHITECT.

1 S321 STEEL DECK ATTACHMENT



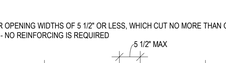
DIM 'S'	DIM 'X'	ANGLE 'A'	ANGLE 'B'
0' TO 6'	0' TO 4'	L3x3x1/4	L3x3x1/4
0' TO 6'	4' TO 8'	L4x3x1/4 (LLV)	L4x3x1/4 (LLV)
6' TO 10'	0' TO 4'	L3x3x1/4	L5x3x1/4 (LLV)
6' TO 10'	4' TO 8'	L5x3x1/4 (LLV)	L5x3x1/4 (LLV)

2 S321 OPENING IN NEW ROOF DECK

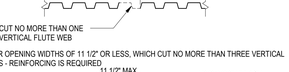


3 S321 OPENING IN NEW COMPOSITE DECK ON STEEL BEAMS

CASE 1: FOR OPENING WIDTHS OF 5 1/2" OR LESS, WHICH CUT NO MORE THAN ONE VERTICAL FLUTE WEB - NO REINFORCING IS REQUIRED



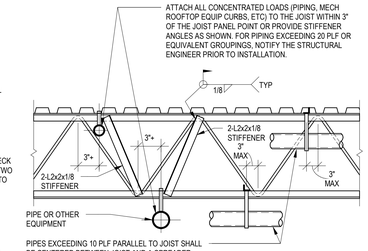
CASE 2: FOR OPENING WIDTHS OF 11 1/2" OR LESS, WHICH CUT NO MORE THAN THREE VERTICAL FLUTE WEBS - REINFORCING IS REQUIRED



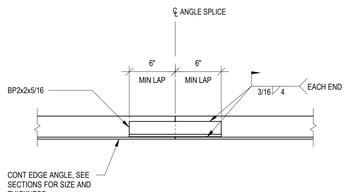
CASE 3: FOR LARGER OPENINGS - PROVIDE ANGLE FRAME PER 2/S321.

NOTES:
1. THIS DETAIL ONLY APPLIES TO OPENINGS IN 1 1/2" WIDE RIB ROOF DECK, 20 GA. MIN.
2. FOR GROUPS OF OPENINGS, IF A CLEAR DISTANCE OF TWO TIMES THE LARGEST OPENING DIMENSION CANNOT BE PROVIDED BETWEEN OPENINGS, TREAT GROUP OF OPENINGS AS A SINGLE OPENING AND PROVIDE AN ANGLE FRAME PER 2/S321.
3. FOR CASE 2, IF OPENING IS WITHIN 6" FROM A JOIST OR ANOTHER SUPPORT, ANGLE ONLY REQUIRED FOR ONE SIDE OF OPENING.

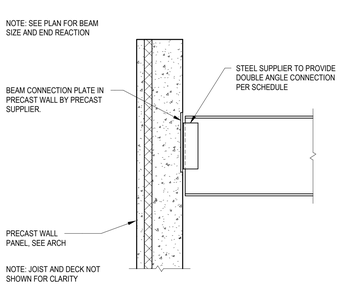
4 S321 OPENING IN 1 1/2" WIDE RIB ROOF DECK



5 S321 CONCENTRATED LOADS ON NEW JOIST



6 S321 DETAIL



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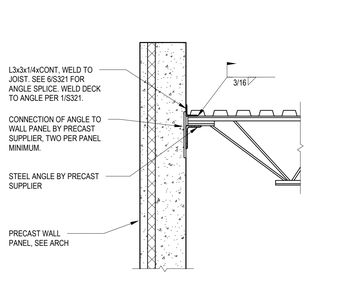

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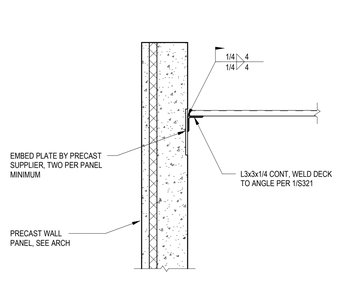

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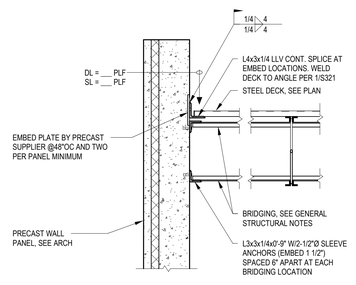

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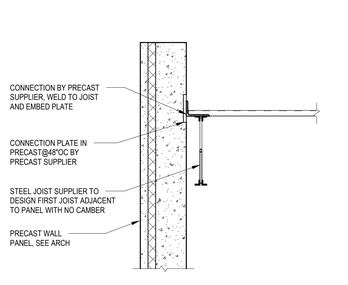

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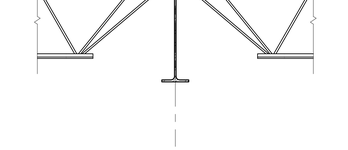

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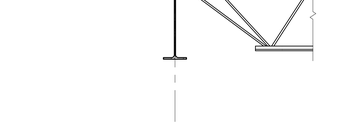

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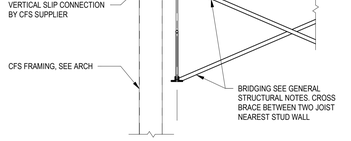

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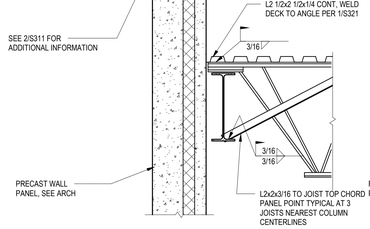

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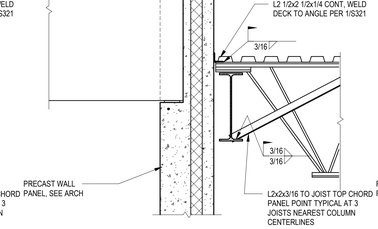

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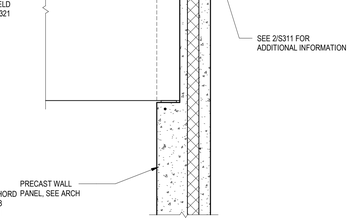

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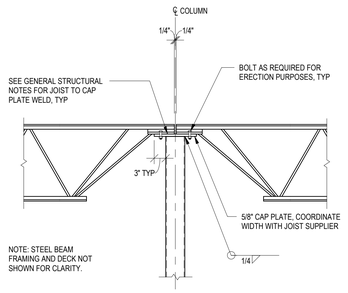
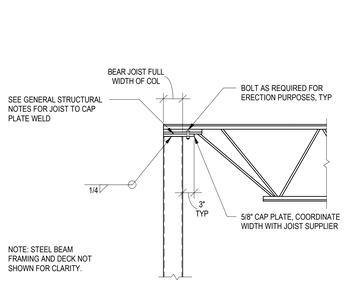
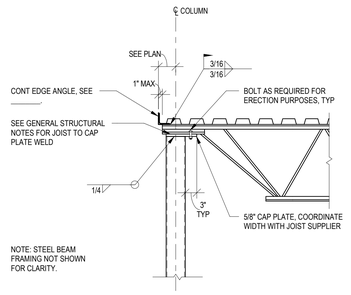


18 S321 JOIST AT TUBE COLUMN, BEARING EACH SIDE



19 S321 JOIST AT TUBE COLUMN, BEARING ONE SIDE



20 S321 JOIST AT TUBE COLUMN AT DECK EDGE

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BKBM Project No. 24426.00

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Project Number: 23008.003
Date: 05/07/2025

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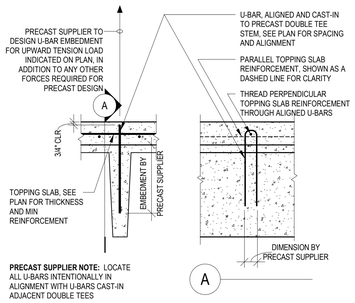

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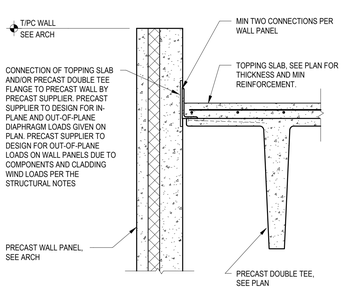

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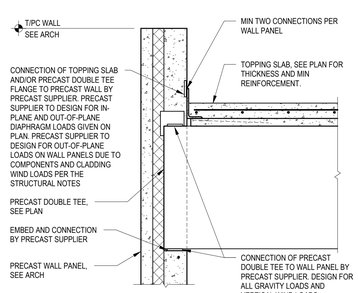

3 S331 SECTION

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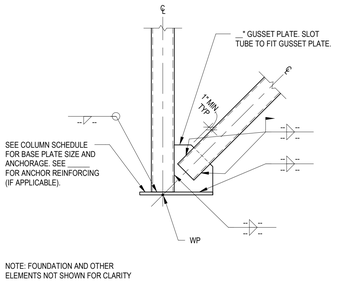
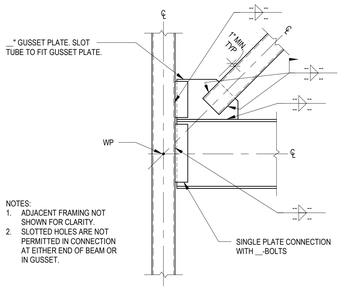
208 NW FORBES, P.A. - 6 CONFORMED



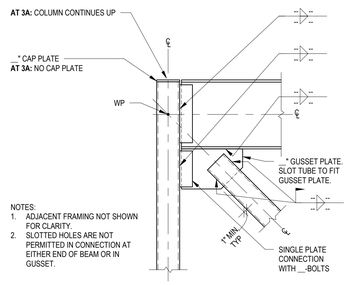
NOTE: FOUNDATION AND OTHER ELEMENTS NOT SHOWN FOR CLARITY

1 S341 DETAIL



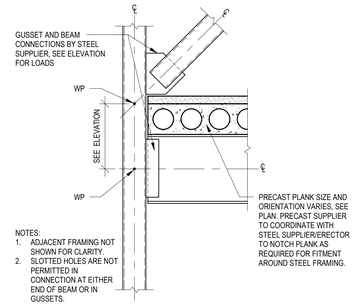
NOTES:
1. ADJACENT FRAMING NOT SHOWN FOR CLARITY.
2. SLOTTED HOLES ARE NOT PERMITTED IN CONNECTION AT EITHER END OF BEAM OR IN GUSSET.

2 S341 DETAIL



NOTES:
1. ADJACENT FRAMING NOT SHOWN FOR CLARITY.
2. SLOTTED HOLES ARE NOT PERMITTED IN CONNECTION AT EITHER END OF BEAM OR IN GUSSET.

3 S341 3A S341 DETAIL



NOTES:
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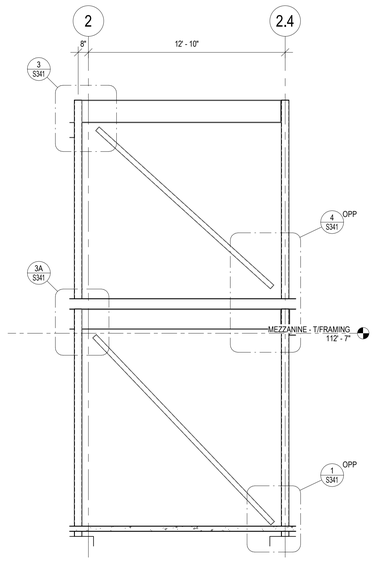
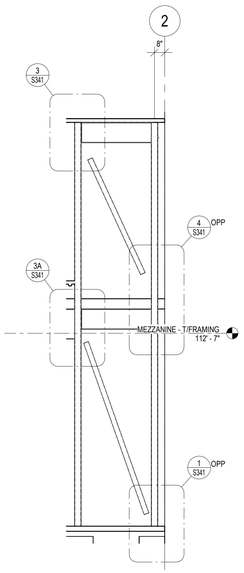
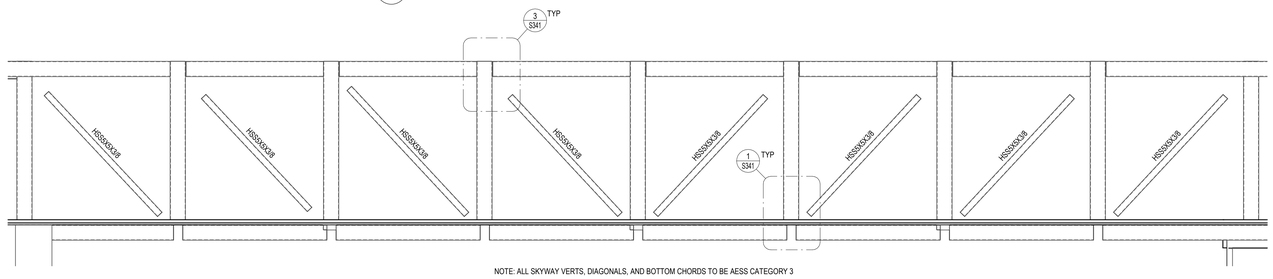
4 S341 DETAIL



5 S341 BRACED FRAME AT GRID D



6 S341 BRACED FRAME AT SKYWAY, NORTH OF GRID E



NOTE: ALL SKYWAY VERTS, DIAGONALS, AND BOTTOM CHORDS TO BE AESS CATEGORY 3

7 S341 ELEVATION OF SKYWAY BRACING

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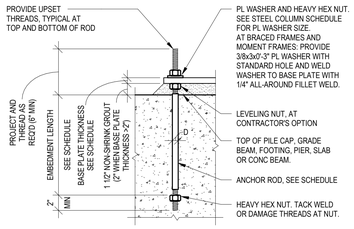
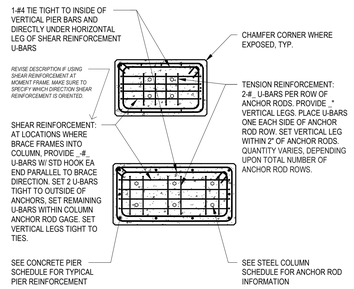


1 S401 TYPICAL ANCHOR ROD



2 S401 ADDITIONAL PIER REINFORCING AT LATERAL FRAME

AESS CATEGORY MATRIX

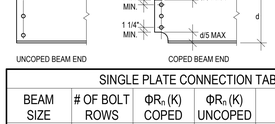
CATEGORY / CHARACTERISTICS	AESS C CUSTOM ELEMENTS	AESS 4 SHOWCASE ELEMENTS	AESS 3 FEATURE ELEMENTS IN CLOSE VIEW (<20 FT)	AESS 2 FEATURE ELEMENTS NOT IN CLOSE VIEW (>20 FT)	AESS 1 BASIC ELEMENTS	SSS STANDARD STRUCTURAL STEEL
1.1 SURFACE PREPARATION TO SSPC-SP 6		X	X	X	X	
1.2 SHARP EDGES GROUND SMOOTH		X	X	X	X	
1.3 CONTINUOUS WELD APPEARANCE		X	X	X	X	
1.4 STANDARD STRUCTURAL BOLTS		X	X	X	X	
1.5 WELD SPATTERS REMOVED		X	X	X	X	
2.1 VISUAL SAMPLES		OPTIONAL	OPTIONAL	OPTIONAL		
2.2 ONE-HALF STANDARD FABRICATION TOLERANCES		X	X	X		
2.3 FABRICATION MARKS NOT APPARENT		X	X	X		
2.4 WELDS UNIFORM AND SMOOTH		X	X	X		
3.1 MILL MARKS REMOVED		X	X			
3.2 BUTT AND PLUG WELDS GROUND SMOOTH AND FILLED		X	X			
3.3 HSS WELD SEAM ORIENTED FOR REDUCED VISIBILITY		X	X			
3.4 CROSS SECTIONAL ABUTTING SURFACE ALIGNED		X	X			
3.5 JOINT GAP TOLERANCES MINIMIZED		X	X			
3.6 ALL WELDED CONNECTIONS		OPTIONAL	OPTIONAL			
4.1 HSS SEAM NOT APPARENT		X				
4.2 WELDS CONTOURED AND BLENDED		X				
4.3 SURFACES FILLED AND SANDED		X				
4.4 WELD SHOW-THROUGH MINIMIZED		X				
C.1 ROLLED MEMBERS MINIMIZE DISTORTION						
C.2						
C.3						
C.4						
C.5						

NOTES:
1.1 PRIOR TO BLAST CLEANING, GREASE AND OIL ARE REMOVED BY SOLVENT CLEANING TO MEET SSPC-SP 1.
1.2 ROUGH SURFACES ARE DEBURRED AND GROUND SMOOTH. SHARP EDGES RESULTING FROM FLAME CUTTING, GRINDING, AND ESPECIALLY SHEARING ARE SOFTENED.
1.3 INTERMITTENT WELDS ARE MADE CONTINUOUS, EITHER WITH ADDITIONAL WELDING, CAULKING, OR BODY FILLER. FOR CORROSIVE ENVIRONMENTS, ALL JOINTS ARE SEAL WELDED. SEAMS OF HOLLOW STRUCTURAL SECTIONS ARE ACCEPTABLE AS PRODUCED.
1.4 ALL BOLT HEADS IN CONNECTIONS ARE ON THE SAME SIDE, AS SPECIFIED, AND CONSISTENT FROM ONE CONNECTION TO ANOTHER.
1.5 WELD SPATTER, SLIVERS, AND SURFACE DISCONTINUITIES ARE REMOVED. WELD PROJECTION UP TO 1/16" (2mm) IS ACCEPTABLE FOR BUTT AND PLUG WELD JOINTS.
2.1 VISUAL SAMPLES ARE EITHER A 3-D RENDERING, A PHYSICAL SAMPLE, A FIRST-OFF INSPECTION, A SCALED MOCK-UP, OR A FULL-SCALE MOCK-UP, AS SPECIFIED IN THE CONTRACT DOCUMENTS.
2.2 THESE TOLERANCES ARE ONE-HALF OF THOSE FOR STANDARD STRUCTURAL STEEL AS SPECIFIED IN AISC CODE OF STANDARD PRACTICE.
2.3 MEMBERS MARKINGS DURING THE FABRICATION AND ERECTION PROCESSES ARE NOT VISIBLE.
3.1 ALL MILL MARKS ARE NOT VISIBLE IN THE FINISHED PRODUCT.
3.2 CAULKING OR BODY FILLER IS ACCEPTABLE.
3.3 SEAMS ARE ORIENTED AWAY FROM VIEW OR AS INDICATED IN THE CONTRACT DOCUMENTS.
3.4 THE MATCHING OF ABUTTING CROSS SECTIONS IS REQUIRED.
3.5 THIS CHARACTERISTIC IS SIMILAR TO 2.2 ABOVE. A CLEAR DISTANCE BETWEEN ABUTTING MEMBERS OF 1/8" (3mm) IS REQUIRED.
3.6 HIDDEN BOLTS MAY BE CONSIDERED.
4.1 HSS SEAMS ARE TREATED SO THEY ARE NOT APPARENT.
4.2 IN ADDITION TO A CONTOURED AND BLENDED APPEARANCE, WELDED TRANSITIONS BETWEEN MEMBERS ALSO ARE CONTOURED AND BLENDED.
4.3 THE STEEL SURFACE IMPERFECTIONS ARE FILLED AND SANDED.
4.4 WELD SHOW-THROUGH ON THE BACK SIDE OF A WELDED ELEMENT CAN BE MINIMIZED BY HAND GRINDING THE BACK SIDE SURFACE. THE DEGREE OF WELD-THROUGH IS A FUNCTION OF WELD SIZE AND MATERIAL.
C. ADDITIONAL CHARACTERISTICS MAY BE ADDED FOR CUSTOM ELEMENTS.

BOLTED - DOUBLE ANGLE CONNECTION TABLE

BEAM SIZE	# OF BOLT ROWS	ΦR$_n$ (K) COPED	ΦR$_n$ (K) UNCOPED	REMARKS
W8x10-W8x31, W10x12-W10x22	2	19 (13 FOR W8x10, 17 FOR W8x13)	40 (30 FOR W8x10, 35 FOR W10x12)	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=7K W/OUT STIFFENER)
W8x35-W8x48, W10x26-W10x49	2	27	51 (46 FOR W10x26)	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=13K W/OUT STIFFENER)
W8x58-LARGER, W10x54-LARGER,	2	41	61	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=19K W/OUT STIFFENER)
W12x14-W12x26, W14x22	3	36 (32 FOR W12x14)	58 (53 FOR W12x14)	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=20K W/OUT STIFFENER)
W12x30-W12x40 W14x26-W14x43, W16x26-W16x40, W18x35-W18x40	3	43	66	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=25K W/OUT STIFFENER)
W12x45-LARGER, W14x48-LARGER, W16x45-LARGER, W18x46-LARGER	3	58	88	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=33K W/OUT STIFFENER)
ALL W21 AND W24	4	81	123	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=73K W/OUT STIFFENER)
ALL W27 AND W30	5	136	156	
ALL W33 AND W36	6	187	187	
BEAMS AS NOTED	7	193 (165 FOR W24)	217	UNCOPED CAPACITY ASSUMES tw=0.36
BEAMS AS NOTED	8	222	247	UNCOPED CAPACITY ASSUMES tw=0.36
BEAMS AS NOTED	9	256	278	UNCOPED CAPACITY ASSUMES tw=0.36
BEAMS AS NOTED	10	308	308	UNCOPED CAPACITY ASSUMES tw=0.36

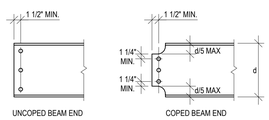
UNLESS NOTED OTHERWISE:
*ASSUMES AISC STANDARD CONNECTION CONFIGURATION.
1. ALL BOLTS 3/4"Ø A325-N.
2. ALL ANGLES MINIMUM 5/16" THICK ASTM A36. ALL BEAMS ASTM A992.
3. FOR COPED BEAM Leh=1 1/2" MINIMUM. Lev=1 1/4" MINIMUM (PARAMETERS PER AISC 15TH EDITION). MAXIMUM COPE LENGTH = 5". MAXIMUM COPE DEPTH 20% OF BEAM DEPTH.
4. HORIZONTAL SHORT SLOTTED HOLES PERMITTED IN BEAM WEB AND OUTSTANDING ANGLE LEGS.
5. COORDINATE ANGLE LENGTHS WITH DRAWINGS AND COORDINATE BOLT LOCATIONS FOR ERECTION PURPOSES.
6. BEAMS REQUIRING ADDITIONAL BOLTS WILL BE NOTED ON THE DRAWINGS THUS: "DA-X" (X=NUMBER OF ROWS OF BOLTS).
7. CAPACITIES SHOWN REPRESENT MINIMUM CONNECTION CAPACITY FOR THE RANGE OF SIZES GIVEN.



SINGLE PLATE CONNECTION TABLE

BEAM SIZE	# OF BOLT ROWS	ΦR$_n$ (K) COPED	ΦR$_n$ (K) UNCOPED	REMARKS
W8x10-W8x31, W10x12-W10x22	2	19 (13 FOR W8x10, 17 FOR W8x13)	25	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=7K W/OUT STIFFENER)
W8x35-W8x48, W10x26-W10x54	2	25	25	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=13K W/OUT STIFFENER)
W8x58-LARGER, W10x60-LARGER	2	25	25	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=21K W/OUT STIFFENER)
W12x14-W12x30 W14x22-W14x30	3	39 (32 FOR W12x14, 36 FOR W12x16)	43	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=19K W/OUT STIFFENER)
W12x35-LARGER, W14x34-LARGER	3	43	43	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=28K W/OUT STIFFENER)
W16x26-W16x40, W18x35-W18x40	4	58	62	WEB STIFFENER REQUIRED FOR DOUBLE COPED BEAMS IF COPE LENGTH >0'-3" (MAX CAPACITY=45K W/OUT STIFFENER)
W16x45-LARGER, W18x46-LARGER	4	62	62	
ALL W21 AND W24	5	80	80	USE ONLY WHERE NOTED FOR W24'S
ALL W27 AND W30	6	95	95	USE ONLY WHERE NOTED
ALL W33 AND W36	7	111	111	USE ONLY WHERE NOTED

UNLESS NOTED OTHERWISE:
*ASSUMES AISC STANDARD CONNECTION CONFIGURATION.
1. ALL BOLTS 3/4"Ø A325-N. PLATE WELDS 2-1/4" FULL LENGTH FILLET WELDS.
2. ALL PLATES 5/16" THICK ASTM A36. ALL BEAMS ASTM A992.
3. FOR COPED BEAMS Leh=1 1/2" MINIMUM. Lev=1 1/4" MINIMUM (PARAMETERS PER AISC 15TH EDITION). MAXIMUM COPE LENGTH = 5". MAXIMUM COPE DEPTHS = 20% OF BEAM DEPTH.
4. HORIZONTAL SHORT SLOTTED HOLES PERMITTED IN BEAM WEB.
5. COORDINATE PLATE LENGTH WITH DRAWINGS AND COORDINATE BOLT LOCATIONS FOR ERECTION PURPOSES.
6. BEAMS REQUIRING ADDITIONAL BOLTS WILL BE NOTED ON THE DRAWINGS THUS: "SP-X" (X=NUMBER OF ROWS OF BOLTS).
7. CAPACITIES SHOWN REPRESENT MINIMUM CONNECTION CAPACITY FOR THE RANGE OF SIZES GIVEN.
8. AT PURLIN TO HSS COLUMN CONNECTIONS, MINIMUM HSS TUBE WALL THICKNESS IS 1/4". PROVIDE DOUBLE ANGLE CONNECTION OR CONTACT EOR IF MINIMUM IS NOT MET.



COLUMN FOOTING SCHEDULE

MARK	FOOTING SIZE WIDTH	LENGTH	THICKNESS	REINFORCING
CF3-0	3' - 0"	3' - 0"	1' - 0"	3-#5 EACH WAY, BOTTOM
CF5-0	5' - 0"	5' - 0"	1' - 4"	6-#5 EACH WAY, BOTTOM

CONTINUOUS WALL FOOTING SCHEDULE

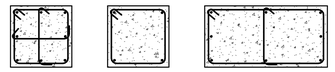
MARK	FOOTING SIZE WIDTH	THICKNESS	REINFORCING
WF2-0	2' - 0"	1' - 0"	2-#5 CONT, BOTTOM
WF3-0	3' - 0"	1' - 0"	3-#5 CONT, BOTTOM
WF8-0	8' - 0"	3' - 4"	8-#6 CONT, TOP AND BOTTOM

CONCRETE PIER SCHEDULE

MARK	SIZE	REINFORCING	REMARKS
CP1	32"Ø	18-#9 VERT, #4 TIES @12"OC	SEE __/S__ FOR REINFORCING LAYOUT AT TOP. AT BASE PROVIDE #9 DOWELS MATCHING SIZE AND LOCATION OF BAR ABOVE. HOOK DOWELS 5" CLEAR BOTTOM OF FOOTING. PROJECT HALF DOWELS 2'-0" ABOVE TOP OF FOOTING AND REMAINING HALF 5'-0" ABOVE (ALTERNATE). PROVIDE MECHANICAL COUPLER BETWEEN DOWEL AND PIER VERT.
CP2	20"x20"	8-#7 VERT, #3 TIES @14"OC	SEE DETAIL 'A' FOR TIE LAYOUT
CP3	24"x24"	8-#8 VERT, #3 TIES @14"OC	SEE DETAIL 'A' FOR TIE LAYOUT

UNLESS NOTED OTHERWISE:
1. PROVIDE HOOKED DOWELS INTO FOOTING TO MATCH VERTICAL REINFORCING. PROJECT INTO PIER PER CLASS B TENSION LAP SPLICE TABLE. SEE GENERAL STRUCTURAL NOTES FOR ADDITIONAL INFORMATION.
2. PROVIDE CROSSTIES AS SHOWN WITH 90° HOOK ONE END AND 135° HOOK OTHER END. SIZE TO MATCH TIES. ALTERNATE TIE CONFIGURATIONS MEETING ACI 318, SECTION 25.7.2.3 ARE ACCEPTABLE.
3. PROVIDE FIRST TIE MAXIMUM OF ONE-HALF TIE SPACING ABOVE TOP OF FOOTING.
4. EXTEND TIES TO WITHIN ONE-HALF TIE SPACING OF TOP OF PIER. PROVIDE MINIMUM OF 2-#4 OR 3-#3 TIES WITHIN 5" OF TOP OF PIER.
5. EXTEND VERTICAL REINFORCEMENT TO 2" CLEAR TOP OF PIER.

CONCRETE PIER BAR PLACEMENT DETAILS



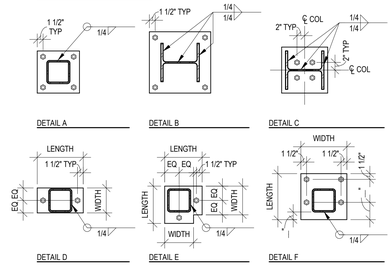
DETAIL A DETAIL B DETAIL C

STEEL COLUMN SCHEDULE

MARK	SIZE	BASE PLATE
SC1	HSS5x5x5/16	
SC2	HSS6x6x5/16	

UNLESS NOTED OTHERWISE:
1. PROVIDE 4-3/4"Ø UNHEADED ANCHOR RODS WITH HEX NUT AT EMBED END, SEE 1/S401. EXTEND 9" INTO CONCRETE TO TOP OF NUT.
2. PROVIDE 1 1/2" NON-SHRINK GROUT BELOW BASE PLATE.
3. PROVIDE 1/4x2x0'-2" PLATE WASHER AND NUT ON TOPSIDE OF BASE PLATE AT 3/4"Ø ANCHOR RODS. CIRCULAR OR SQUARE PLATE WASHERS ARE ACCEPTABLE. FOR LARGER ANCHOR RODS PROVIDE AISC STANDARD PLATE WASHER SIZE FOR OVERSIZE ANCHOR ROD HOLES PER AISC MANUAL TABLE 14-2. SEE DETAIL 3ABD003 FOR SPECIFIC PLATE WASHER SIZES AT BRACED FRAMES AND MOMENT FRAMES.
4. USE 1/2" COLUMN CAP PLATE AT TOP.

BASE PLATE DETAILS



CLASS 'A' TENSION LAP SPLICE TABLE

BAR SIZE	f'c (psi) 2500	3000	3500	4000	5000	6000	7000	8000
#3	1'-6"	1'-5"	1'-4"	1'-3"	1'-1"	1'-0"	1'-0"	1'-0"
#4	2'-0"	1'-10"	1'-9"	1'-7"	1'-5"	1'-4"	1'-3"	1'-2"
#5	2'-6"	2'-4"	2'-2"	2'-0"	1'-10"	1'-8"	1'-6"	1'-5"
#6	3'-0"	2'-9"	2'-7"	2'-5"	2'-2"	2'-0"	1'-10"	1'-9"
#7	4'-5"	4'-0"	3'-9"	3'-6"	3'-2"	2'-10"	2'-8"	2'-6"
#8	5'-0"	4'-7"	4'-3"	4'-0"	3'-7"	3'-3"	3'-0"	2'-10"
#9	5'-8"	5'-2"	4'-10"	4'-6"	4'-0"	3'-8"	3'-5"	3'-2"
#10	6'-4"	5'-9"	5'-4"	5'-0"	4'-6"	4'-1"	3'-9"	3'-6"
#11	7'-1"	6'-4"	5'-10"	5'-6"	4'-11"	4'-6"	4'-2"	3'-11"

CLASS 'B' TENSION LAP SPLICE TABLE

BAR SIZE	f'c (psi) 2500	3000	3500	4000	5000	6000	7000	8000
#3	1'-11"	1'-10"	1'-8"	1'-7"	1'-5"	1'-4"	1'-2"	1'-2"
#4	2'-7"	2'-5"	2'-3"	2'-1"	1'-11"	1'-9"	1'-7"	1'-6"
#5	3'-3"	3'-0"	2'-9"	2'-7"	2'-4"	2'-2"	2'-0"	1'-10"
#6	3'-11"	3'-7"	3'-4"	3'-1"	2'-10"	2'-7"	2'-4"	2'-3"
#7	5'-8"	5'-3"	4'-10"	4'-6"	4'-1"	3'-9"	3'-5"	3'-3"
#8	6'-6"	6'-0"	5'-6"	5'-2"	4'-8"	4'-3"	3'-11"	3'-8"
#9	7'-4"	6'-9"	6'-3"	5'-10"	5'-3"	4'-9"	4'-5"	4'-2"
#10	8'-3"	7'-6"	6'-11"	6'-6"	5'-9"	5'-3"	4'-11"	4'-7"
#11	9'-2"	8'-2"	7'-7"	7'-1"	6'-4"	5'-10"	5'-5"	5'-0"

NOTES:
1. THESE TABLES SHOW LENGTHS FOR PLAIN, BOTTOM ASTM A615 GRADE 60 BARS IN NORMAL WEIGHT CONCRETE, MEETING THE SPACING AND COVER LIMITATIONS GIVEN BELOW. MULTIPLY THESE LENGTHS BY ALL OF THE APPLICABLE FACTORS GIVEN FOR OTHER CONDITIONS. SPECIFIC EMBEDMENT, LAP, OR PROJECTION LENGTHS SHOWN ON DRAWINGS GOVERN OVER THESE TABLES.
2. SPACING AND COVER REQUIREMENTS:
   a. CLEAR SPACING BETWEEN BARS AT SPLICE ≥2db AND CLEAR COVER ≥db OR
   b. CLEAR SPACING BETWEEN BARS AT SPLICE ≥db AND CLEAR COVER ≥db AND STIRRUPS/TIES OVER FULL LENGTH OF SPLICE. STIRRUPS/TIES TO BE SPACED SUCH THAT:
      s x n≤16 FOR #3 TIES/STIRRUPS
      s x n≤32 FOR #4 TIES/STIRRUPS
      s x n≤50 FOR #5 TIES/STIRRUPS
   db = BAR DIAMETER IN INCHES, s = SPACING OF TIES/STIRRUPS, n = NUMBER OF BARS SPLICED AT A GIVEN LOCATION.
3. MULTIPLY GIVEN SPLICE LENGTHS BY ALL THE FOLLOWING APPLICABLE FACTORS:
   a. MULTIPLY BY 1.5 IF SPACING OR COVER REQUIREMENTS ARE NOT MET.
   b. MULTIPLY BY 1.3 FOR TOP BARS. TOP BARS ARE DEFINED AS HORIZONTAL BARS WITH MORE THAN 12" OF FRESH CONCRETE BELOW THE BAR.
   c. MULTIPLY BY 1.2 FOR #3 OR #4 EPOXY COATED BARS SPACED 4" MIN OC WITH 1 1/2" MIN CLEAR COVER.
   d. MULTIPLY BY 1.31 FOR OTHER EPOXY COATED TOP BARS.
   e. MULTIPLY BY 1.5 FOR OTHER EPOXY COATED BARS (EXCEPT TOP BARS).
   f. MULTIPLY BY 1.3 FOR LIGHTWEIGHT CONCRETE.
   g. MULTIPLY BY fy/60 FOR BARS WITH YIELD STRESS >60 KSI.
4. USE CLASS 'B' TENSION LAP SPLICES UNLESS SPECIFICALLY NOTED OTHERWISE.
5. COMPRESSION LAP LENGTH, ONLY WHERE NOTED, TO BE 30db. INCREASE TO 44db FOR Fy = 75 KSI, AND 57db FOR Fy = 90 KSI.

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Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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SCHEDULES AND DETAILS

SHEET NUMBER:
S401

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MECHANICAL ABBREVIATIONS

AD	AREA DRAIN	ISO	ISOLATION EXHAUST
A.F.F.	ABOVE FINISHED FLOOR	KW	KILOWATT
AFMS	AIR FLOW MEASURING STATION	LAT	LEAVING AIR TEMPERATURE
AHU	AIR HANDLING UNIT	LAV	LAVATORY
ANB	ACID NEUTRALIZING BASIN	LWT	LEAVING WATER TEMPERATURE
AP	ACCESS PANEL	MBH	BTU PER HOUR (THOUSANDS)
ARCH	ARCHITECT	MCF	THOUSAND CUBIC FEET
AS	AIR SEPARATOR	MH	MANHOLE
BD	BUTTERFLY DAMPER	NC	NOISE CRITERIA OR NORMALLY CLOSED
B/G	BELOW GRADE		
BTU	BRITISH THERMAL UNIT	NEG	NEGATIVE
BWV	BACKWATER VALVE	NIC	NOT IN CONTRACT
CCF	HUNDRED CUBIC FEET	NO	NORMALLY OPEN
CFH	CUBIC FEET PER HOUR	NTS	NOT TO SCALE
CFM	CUBIC FEET PER MINUTE	OA	OUTSIDE AIR
CL	CENTER LINE	OBD	OPPOSED BLADE DAMPER
CLG	CEILING	ORD	OVERFLOW ROOF DRAIN
CO	CLEAN OUT	PD	PRESSURE DROP OR DIFFERENCE
CONTR	CONTRACTOR	PE	PNEUMATIC-ELECTRIC
CONV	CONVECTOR	PLBG	PLUMBING
CUH	CABINET UNIT HEATER	PRV	PRESSURE REDUCING VALVE OR POWER ROOF VENTILATOR
CW	COLD WATER		
DB	DECIBEL	PSIA	POUNDS/SQ INCH ABSOLUTE
DF	DRINKING FOUNTAIN	PSIG	POUNDS/SQ INCH GAUGE
DIA	DIAMETER	PVC	POLY VINYL CHLORIDE
DIFF	DIFFUSER	RA	RETURN AIR
DISCH	DISCHARGE	RCP	REINFORCED CONCRETE PIPE
DMPR	DAMPER	RD	ROOF DRAIN
DN	DOWN	RECIRC	RECIRCULATING
DR	DRAIN	REG	REGISTER
DSN	DOWNSPOUT NOZZLE	RET	RETURN
DWG	DRAWING	RH	RELATIVE HUMIDITY
EAT	ENTERING AIR TEMPERATURE	RHT	REHEAT
EDR	EQUIVALENT DIRECT RADIATION	RHC	REHEAT COIL
EP	ELECTRIC-PNEUMATIC	RHW	RECIRCULATED HOT WATER
EWC	ELECTRIC WATER COOLER	RLF	RELIEF
EWT	ENTERING WATER TEMPERATURE	RM	ROOM
EXH	EXHAUST	RPM	REVOLUTIONS PER MINUTE
EXP	EXPANSION	RPZ	REDUCED ZONE BACKFLOW PREVENTER
F	FAHRENHEIT		
FC	FAN COIL	SA	SUPPLY AIR
FCO	FLOOR CLEAN OUT	SAN	SANITARY
FD	FLOOR DRAIN	SCFM	CFM, STANDARD CONDITIONS
FHC	FIRE HOSE CABINET	SD	SMOKE DAMPER
FHR	FIRE HOSE RACK	SP	STATIC PRESSURE
FLR	FLOOR	SPECS	SPECIFICATIONS
FLEX	FLEXIBLE	SUP	SUPPLY
FM	FIRE MAIN	SQ	SQUARE
FPM	FEET PER MINUTE	STM	STEAM
FPS	FEET PER SECOND	TD	TEMPERATURE DIFFERENCE
FT	FEET OR FOOT	TEMP	TEMPERATURE
F&T	FLOAT AND THERMOSTATIC	TONS	TONS OF REFRIGERATION
FTG	FOOTING	T-STAT	THERMOSTAT
FTR	FINNED TUBE RADIATION	TYP	TYPICAL
FV	FACE VELOCITY	UB	UP-BLAST
GA	GAUGE	UG	UNDERGROUND
GAL	GALLON	UH	UNIT HEATER
GEXH	GREASE EXHAUST	UR	URINAL
GPH	GALLONS PER HOUR	V	SANITARY VENT
GPM	GALLONS PER MINUTE	VAV	VARIABLE AIR VOLUME
GR	GRILLE	VD	VOLUME DAMPER
HB	HOSE BIBB	VEL	VELOCITY
HD	HEAD	VFD	VARIABLE FREQUENCY DRIVE
HOA	HANDS-OFF-AUTOMATIC	VOL	VOLUME
HTG	HEATING	VTR	VENT THROUGH ROOF
HTR	HEATER	W	SANITARY WASTE
HVAC	HEATING, VENTILATION, AND AIR CONDITIONING	W/	WITH
		W/O	WITHOUT
HYD	HYDRANT	WC	WATER CLOSET
HW	HOT WATER	WCO	WALL CLEANOUT
GCO	GRADE CLEANOUT	WH	WALL HYDRANT
INSUL	INSULATION	WTR	WATER
INV	INVERT		

MECHANICAL SYMBOLS LEGEND

GENERAL

SYMBOL	DESIGNATIONS
	LIGHT SOLID LINE WEIGHT INDICATES EXISTING ITEM TO REMAIN.
	DARK DASHED LINE WEIGHT INDICATES EXISTING ITEM TO BE DEMOLISHED.
	DARK SOLID LINE WEIGHT INDICATES NEW ITEM OR NEW LOCATION.

PLUMBING

SYMBOL	DESIGNATIONS
AV	ACID VENT
AW	ACID WASTE
CWV	CLEAR WATER VENT
CWW	CLEAR WATER WASTE
10#A	COMPRESSED AIR (PSI INDICATED)
DI	DEIONIZED WATER
CW	DOMESTIC COLD WATER
HW	DOMESTIC HOT WATER
140	DOMESTIC HOT WATER (TEMP. INDICATED)
RHW	DOMESTIC RECIRC. HOT WATER
140 RHW	DOM. RECIRC. HOT WATER (TEMP. INDICATED)
FW	FILTERED WATER
GW	GREASE WASTE
HARD	HARD COLD WATER
NPCW	NON-POTABLE COLD WATER
NPHW	NON-POTABLE HOT WATER
OSD	OVERFLOW STORM DRAIN
PAW	PUMPED ACID WASTE
PSD	PUMPED STORM
PW	PUMPED WASTE
RO	REVERSE OSMOSIS WATER
V	SANITARY VENT
W	SANITARY WASTE
SOFT	SOFTENED COLD WATER
SDT	SOIL DRAINAGE TILE
SHW	SOFTENED HOT WATER
SD	STORM DRAIN
TW	TEMPERED WATER
WW	WELL WATER

MECHANICAL PIPING

SYMBOL	DESIGNATIONS
ATM STM	ATMOSPHERIC STEAM SUPPLY
ATM SC	ATMOSPHERIC STEAM CONDENSATE
BF	BOILER FEED
CWS	CHILLED WATER SUPPLY
CWR	CHILLED WATER RETURN
CD	CONDENSATE DRAIN
CS	CONDENSER WATER SUPPLY
CR	CONDENSER WATER RETURN
FOS	FUEL OIL SUPPLY
FOR	FUEL OIL RETURN
FOF	FUEL OIL FILL
FOV	FUEL OIL VENT
GS	GLYCOL SUPPLY
GR	GLYCOL RETURN
HRS	HEAT RECOVERY SUPPLY
HRR	HEAT RECOVERY RETURN
HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
IG	INTERRUPTIBLE GAS
LPG	LIQUIFIED PETROLEUM GAS
2#G	NATURAL GAS (PSI INDICATED)
PC	PUMPED CONDENSATE
RADS	RADIATION WATER SUPPLY
RADR	RADIATION WATER RETURN
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RHG	REFRIGERANT HOT GAS BYPASS
RHS	REHEAT WATER SUPPLY
RHR	REHEAT WATER RETURN
RRS	REMOTE RADIATOR SUPPLY
RRR	REMOTE RADIATOR RETURN
SHWS	SECONDARY HEATING WATER SUPPLY
SHWR	SECONDARY HEATING WATER RETURN
SMS	SNOW MELT SUPPLY
SMR	SNOW MELT RETURN
10#STM	STEAM SUPPLY (PSI INDICATED)
10#SC	STEAM CONDENSATE (PSI INDICATED)

PIPE FITTINGS

SYMBOL	DESIGNATIONS
	CONNECTION, BOTTOM
	CONNECTION, TOP
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	ELBOW
	ELBOW DOWN
	ELBOW UP
	PIPE CAP
	PIPE FLANGE
	PIPE UNION
	TEE
	TEE, OUTLET UP
	TEE, OUTLET DOWN

PIPE SPECIALTIES

SYMBOL	DESIGNATIONS
	ALIGNMENT GUIDE
A	AUTOMATIC AIR VENT
	AUTOMATIC CONTROL VALVE, 2-WAY
	AUTOMATIC CONTROL VALVE, 3-WAY
	BACKWATER VALVE
	CATCH BASIN
	CLEANOUT
	COMBINATION BALANCE VALVE AND FLOW METER
	DIAPHRAGM
	DRAIN ABOVE
	DRAIN VALVE
	DUPLEX STRAINER
	EXPANSION JOINT
	FLEXIBLE CONNECTION
	FLOOR DRAIN
	FLOOR SINK
	FLOW DIRECTION
	FLOW DIRECTION W/PITCH
GPM	FLOW MEASURING STATION (FLOW INDICATED)
FS	FLOW SWITCH
	GAS COCK VALVE
	GAS PRESSURE REGULATOR VALVE
HB	HOSE BIBB
	MANHOLE
M	MANUAL AIR VENT
	PIPE ANCHOR
	PRESSURE GAUGE W/PIGTAIL & PETCOCK
	PRESSURE REDUCING VALVE (SETTING AS NOTED, PSI)
	PRESSURE RELIEF/SAFETY VALVES(SETTING AS NOTED, PSI)
PS	PRESSURE SWITCH
	PRESSURE/TEMPERATURE TEST PORT
	PUMP
	REDUCED PRESSURE ZONE BACK FLOW PREVENTER
	REFRIGERANT DRYER
	REFRIGERANT SIGHT GLASS
	ROOF DRAIN
	SHOCK ABSORBER
	STEAM TRAP (TYPE INDICATED)
	STRAINER
	STRAINER W/BLOWDOWN CAP AND VALVE
	THERMOMETER
	WALL CLEANOUT
WH	WALL HYDRANT

GENERAL DUTY VALVES

SYMBOL	DESIGNATIONS
OR	BALL VALVE
OR OR	BUTTERFLY VALVE
	CHECK VALVE
	FLOW LIMITING VALVE
	GATE VALVE
	GLOBE ANGLE VALVE
OR	GLOBE VALVE
OR	O. S. & Y. VALVE
	PLUG VALVE
	SHUTOFF VALVE
S	SOLENOID VALVE

DUCTWORK

SYMBOL	DESIGNATIONS
	SUPPLY AIR
	RETURN AIR
	EXHAUST AIR
	STANDARD BRANCH, NO SPLITTER - SUPPLY FLOW TO RIGHT - RETURN/EXHAUST FLOW TO LEFT
	BELLMOUTH WITH BALANCING DAMPER
	FLEXIBLE DUCT
	TURNING VANES
	FLEXIBLE CONNECTION
	MANUAL VOLUME DAMPER
	MOTORIZED DAMPER
TYPE XXX XXX ORIENTATION	FIRE, SMOKE, AND COMBINATION FIRE/SMOKE DAMPERS TYPE: FD = FIRE DAMPER SD = SMOKE DAMPER FSD = COMBINATION FIRE/SMOKE DAMPER ORIENTATION: ◇ HORIZONTAL ▽ VERTICAL
XXX XXX ACTUATOR (AS APPLICABLE) BLADE/CURTAIN	
	SUPPLY GRILLE OR REGISTER
	RETURN OR EXHAUST GRILLE OR REGISTER
	SUPPLY DUCT UP, POSITIVE PRESSURE
	RETURN DUCT UP, NEGATIVE PRESSURE
	EXHAUST DUCT UP, NEGATIVE PRESSURE
	SUPPLY DUCT DN, POSITIVE PRESSURE
	RETURN DUCT DN, NEGATIVE PRESSURE
	EXHAUST DUCT DN, NEGATIVE PRESSURE
	SUPPLY DIFFUSER/REGISTER BLANKOFF INDICATED
	RETURN GRILLE/REGISTER
	EXHAUST GRILLE/REGISTER
	LINEAR DIFFUSER
	CONCENTRIC DUCT TRANSITION
	ECCENTRIC DUCT TRANSITION
	RECTANGULAR-TO-ROUND DUCT TRANSITION
	VAV BOX
	VAV BOX W/REHEAT COIL
	REHEAT COIL
RISE DROP	DUCT OFFSETS
	DUCT CUTLINE

CONTROLS

SYMBOL	DESIGNATIONS
T	AQUA STAT
CO2	CARBON DIOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR
H	HUMIDISTAT OR R.H. SENSOR
R	REFRIGERANT SENSOR
P P	ROOM PRESSURE MONITOR
SD	SMOKE DETECTOR
TS	SPACE TEMPERATURE SENSOR
SP	STATIC PRESSURE SENSOR
T	TAMPERPROOF THERMOSTAT
T	THERMOSTAT
T	THERMOSTAT W/GUARD

MEDICAL GAS

SYMBOL	DESIGNATIONS
AAP	AREA ALARM PANEL
CAP	COMBINATION AREA/MASTER ALARM PANEL
MAP	MASTER ALARM PANEL
ZVB	ZONE VALVE BOX
CO2	CARBON DIOXIDE
IA	INSTRUMENT AIR
MA	MEDICAL AIR
MV	MEDICAL VACUUM
N	NITROGEN
N2O	NITROUS OXIDE
O	OXYGEN
WAGD	WASTE ANESTHETIC GAS DISPOSAL

PROCESS AND LABORATORY

SYMBOL	DESIGNATIONS
CDA	CLEAN DRY AIR
DI	DEIONIZED WATER
HV	HOUSE VACUUM
LA	LABORATORY AIR
LV	LABORATORY VACUUM
LN	LIQUID NITROGEN
N	NITROGEN
PV	PLANT VACUUM
RO	REVERSE OSMOSIS

FIRE PROTECTION

SYMBOL	DESIGNATIONS
TS	BUTTERFLY VALVE W/TAMPER SWITCH
	DETECTOR CHECK W/BYPASS METER
	DRY PIPE VALVE
FDV	FIRE DEPT VALVE W/CAP AND CHAIN
	FIRE HYDRANT WITH SHUTOFF VALVE
F	FIRE PROTECTION
DFP	FIRE PROTECTION (DRY SYSTEM)
	FIRE PROTECTION RISER
	FLUSH FIRE DEPT CONNECTION
	GRADE FIRE DEPT CONNECTION
TS	O.S. & Y. VALVE W/TAMPER SWITCH
	PENDANT SPRINKLER HEAD
	POST INDICATOR VALVE (PIV)
	PREACTION VALVE
FDVC	RECESSED FIRE DEPT CABINET
	SIDEWALL SPRINKLER HEAD
FDVC	SURFACE MOUNTED FIRE DEPT CABINET
	UPRIGHT SPRINKLER HEAD
	UPRIGHT SPRINKLER HEAD W/GUARD

ANNOTATION

12x12 / 12ø / 12/12	DUCT DIMENSIONS: RECTANGULAR (WxH), ROUND, FLAT-OVAL (W/H)
(4)A"12"@45	GRILLE, REGISTER, & DIFFUSER IDENTIFICATION: QUANTITY, TYPE, SIZE, CFM
TYPE FTR/RP 01, 6'-5", GPM 0.5	HYDRONIC FINNED TUBE RADIATION & RADIANT PANEL IDENTIFICATION: ACTIVE ELEMENT LENGTH
TYPE EBR 01, 6'-5"	ELECTRIC BASEBOARD RADIATION IDENTIFICATION: ACTIVE ELEMENT LENGTH
	DETAIL NUMBER / SHEET NUMBER
	SECTION NUMBER / SHEET NUMBER
	EQUIP DESIGNATION / EQUIP NUMBER
	POINT OF CONNECTION, NEW TO EXISTING
	POINT OF DISCONNECTION

MECHANICAL SHEET LIST

SHEET NUMBER	SHEET NAME
M000	MECHANICAL TITLE SHEET
M101	FIRST FLOOR PIPING PLAN
M102	SECOND FLOOR PIPING PLANS
M201	FIRST FLOOR DUCTWORK PLAN
M202	SECOND FLOOR DUCTWORK PLANS
M203	THIRD FLOOR DUCTWORK PLANS
M204	ROOF MECHANICAL PLAN
M700	MECHANICAL DETAILS
M701	MECHANICAL DETAILS
ME800	MECHANICAL ELECTRICAL SCHEDULES
ME801	MECHANICAL ELECTRICAL SCHEDULES
P100	BELOW GRADE PLUMBING PLAN
P101	FIRST FLOOR PLUMBING PLAN
P102	SECOND FLOOR PLUMBING PLAN
P103	ROOF PLUMBING PLAN
P200	ENLARGED PLUMBING PLANS
P300	PLUMBING RISER DIAGRAMS
P301	PLUMBING RISER DIAGRAMS
P400	PLUMBING DETAILS
P500	PLUMBING SCHEDULES
PE600	PLUMBING ELECTRICAL SCHEDULES
FP101	FIRST FLOOR FIRE PROTECTION PLAN
FP102	SECOND FLOOR FIRE PROTECTION PLAN

SHEET TOTAL: 23

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mechanical + electrical consulting engineering

Dunham Project Number: 0425231-000-00

Project Name: NOVA CLASSICAL ACADEMY
IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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SHEET TITLE:
MECHANICAL TITLE SHEET

SHEET NUMBER:

M000

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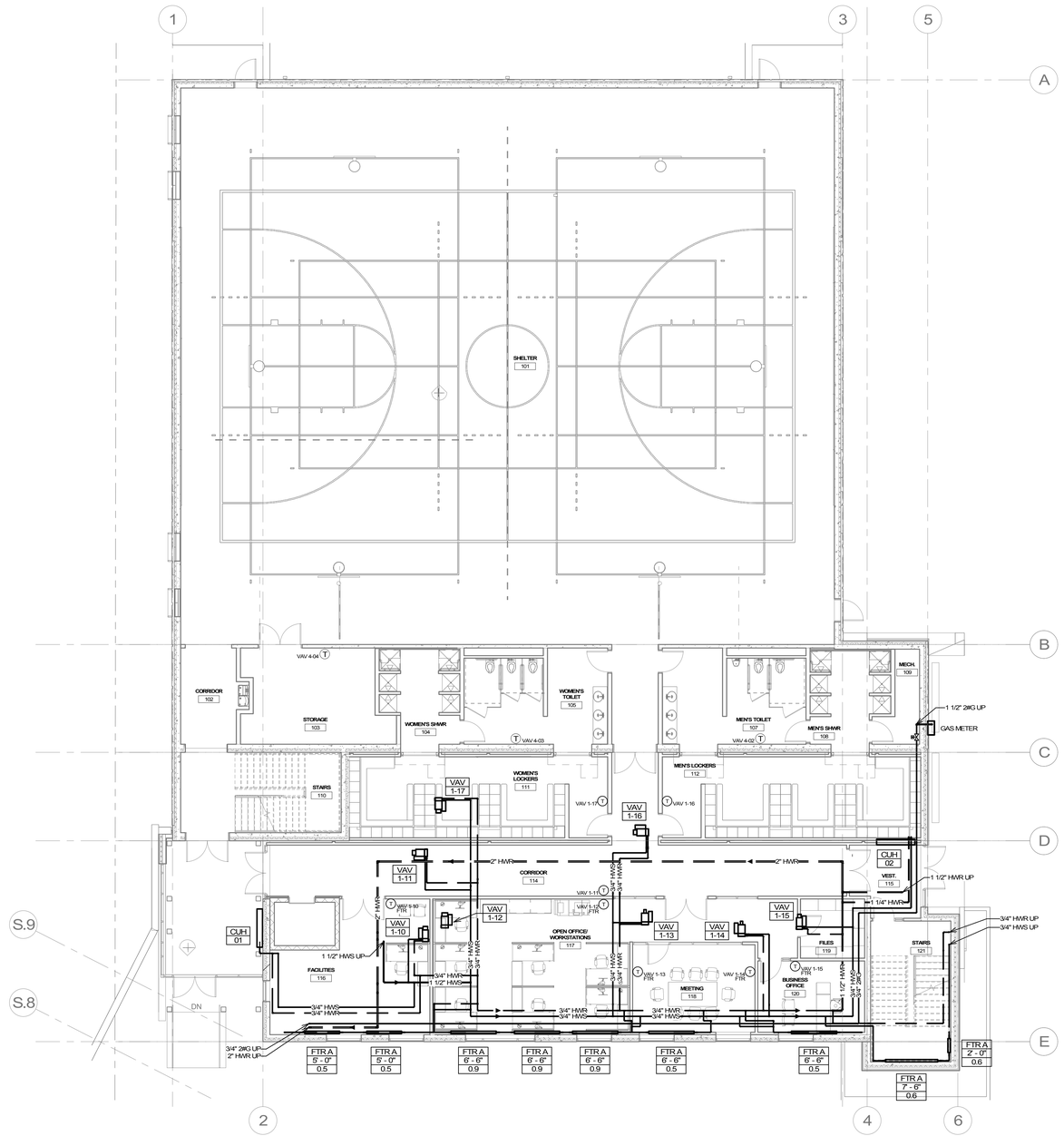

1 FIRST FLOOR PIPING PLAN
1/8" = 1'-0"

KEY NOTES:

1 NOT USED.

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SHEET TITLE:
FIRST FLOOR PIPING PLAN

SHEET NUMBER:

M101

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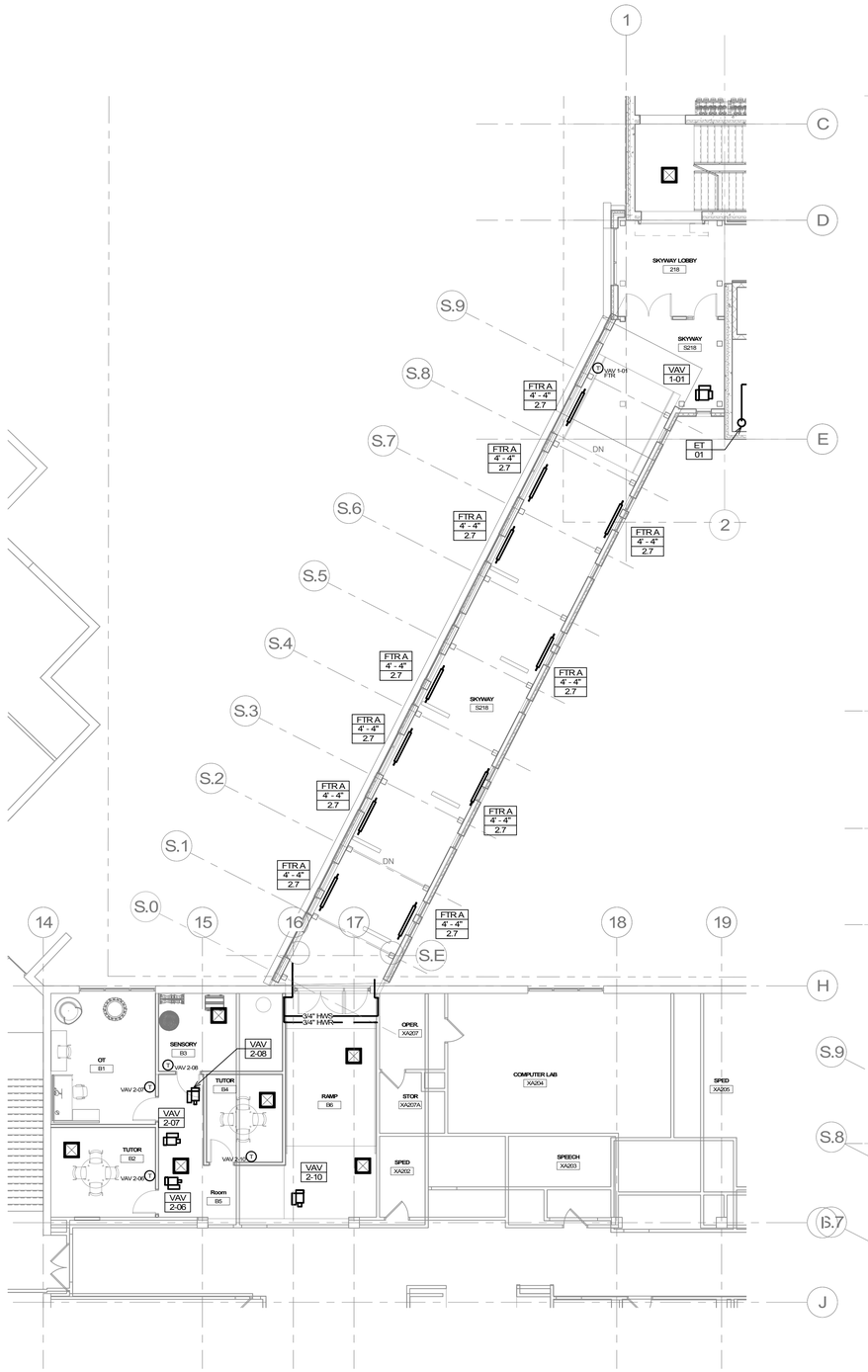
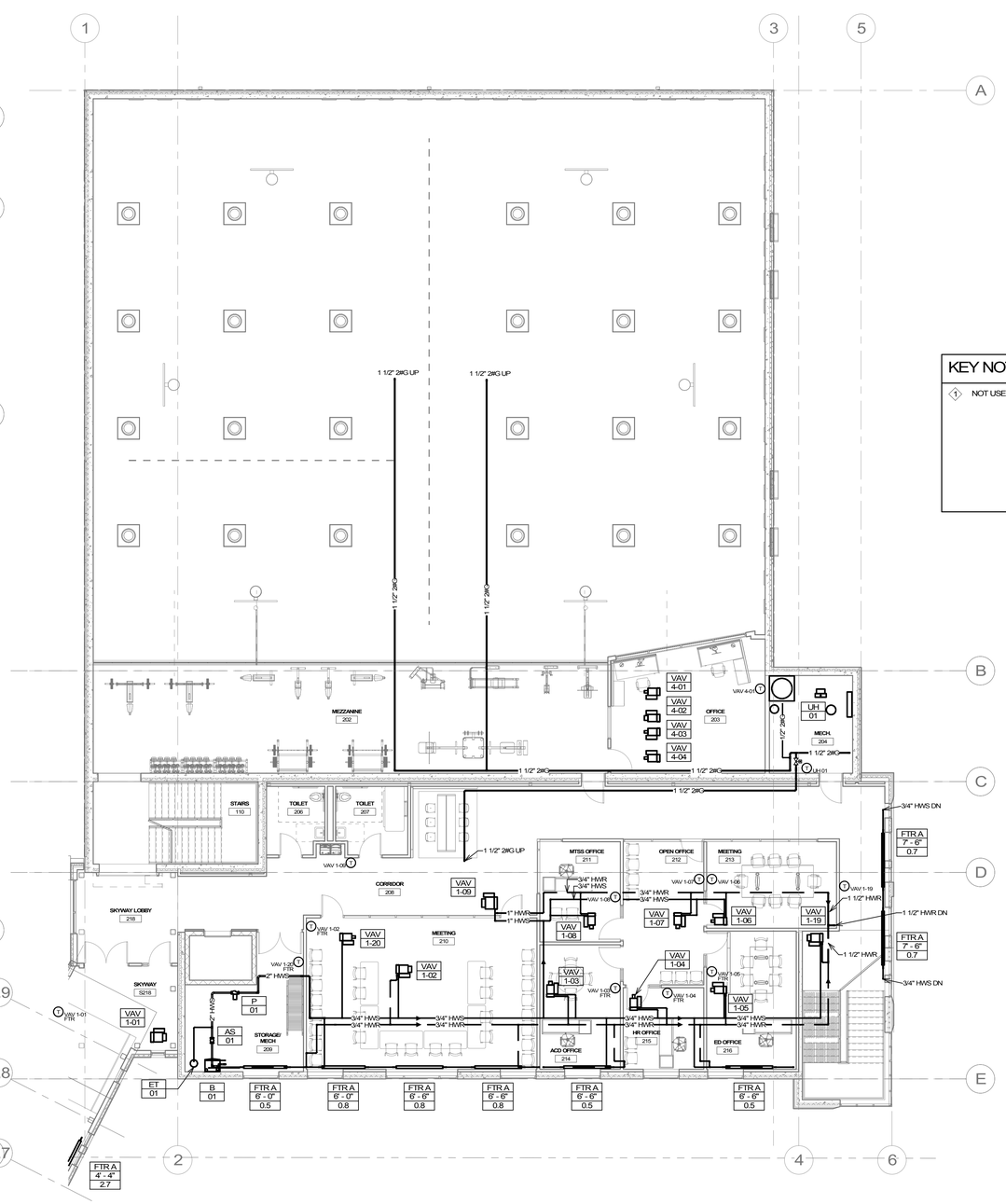


2 SECOND FLOOR PIPING PLAN - SKYWAY
1/8" = 1'-0"



1 SECOND FLOOR PIPING PLAN - SHELTER
1/8" = 1'-0"

KEY NOTES:

1. NOT USED.

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SHEET TITLE:
SECOND FLOOR PIPING PLANS

SHEET NUMBER:

M102

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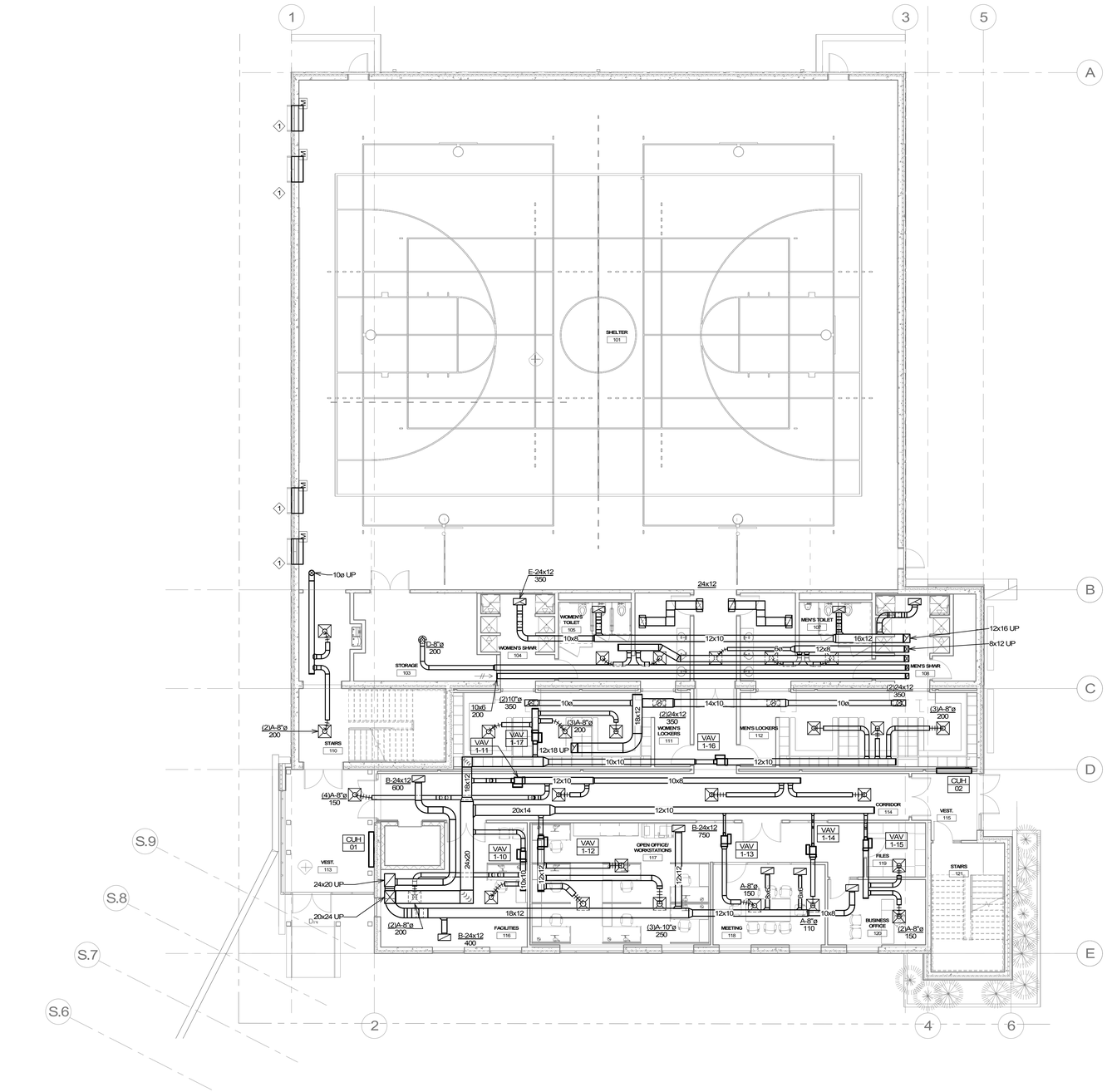
CONSTRUCTION



1 FIRST FLOOR DUCTWORK PLAN
1/8" = 1'-0"

KEY NOTES:

1. INSULATED DAMPER, EMERGENCY POWER, CYCLONE CWS WALL SHROUD, ICC-500 LOUVER BY ARCH

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SHEET TITLE:
FIRST FLOOR DUCTWORK PLAN

SHEET NUMBER:

M201

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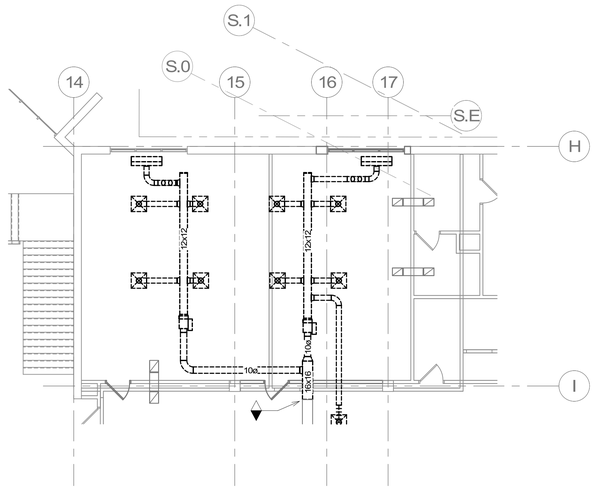
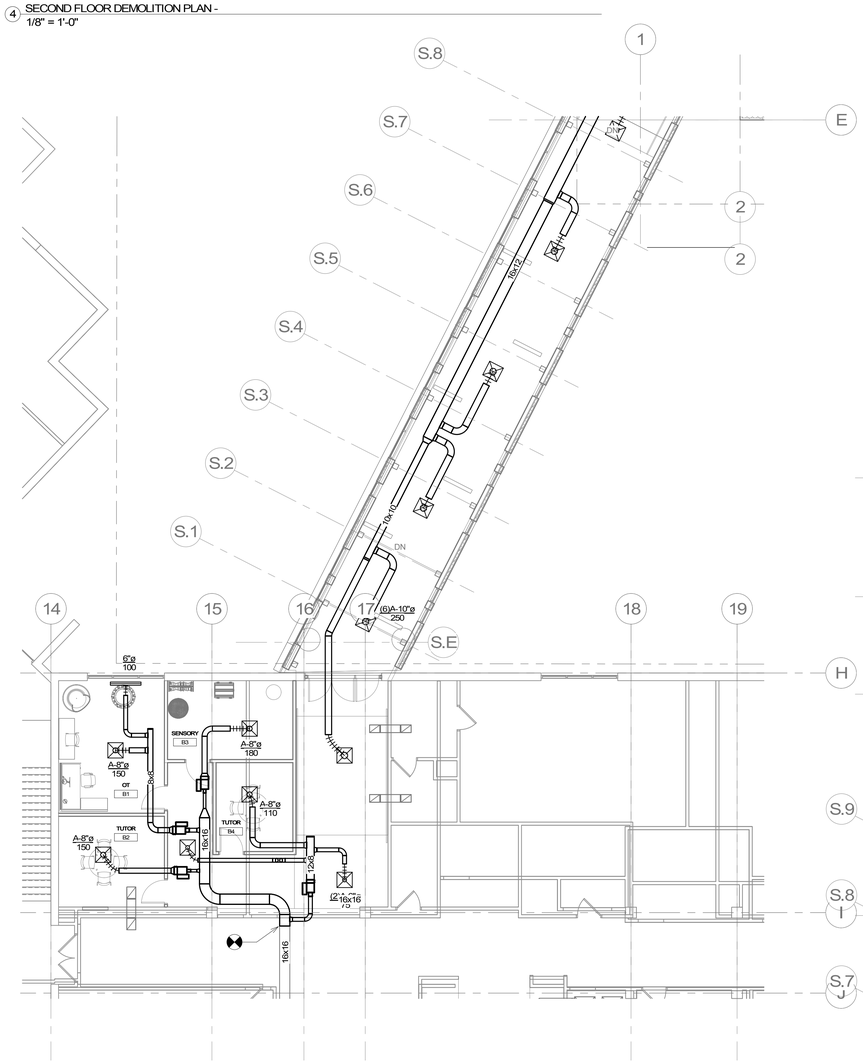
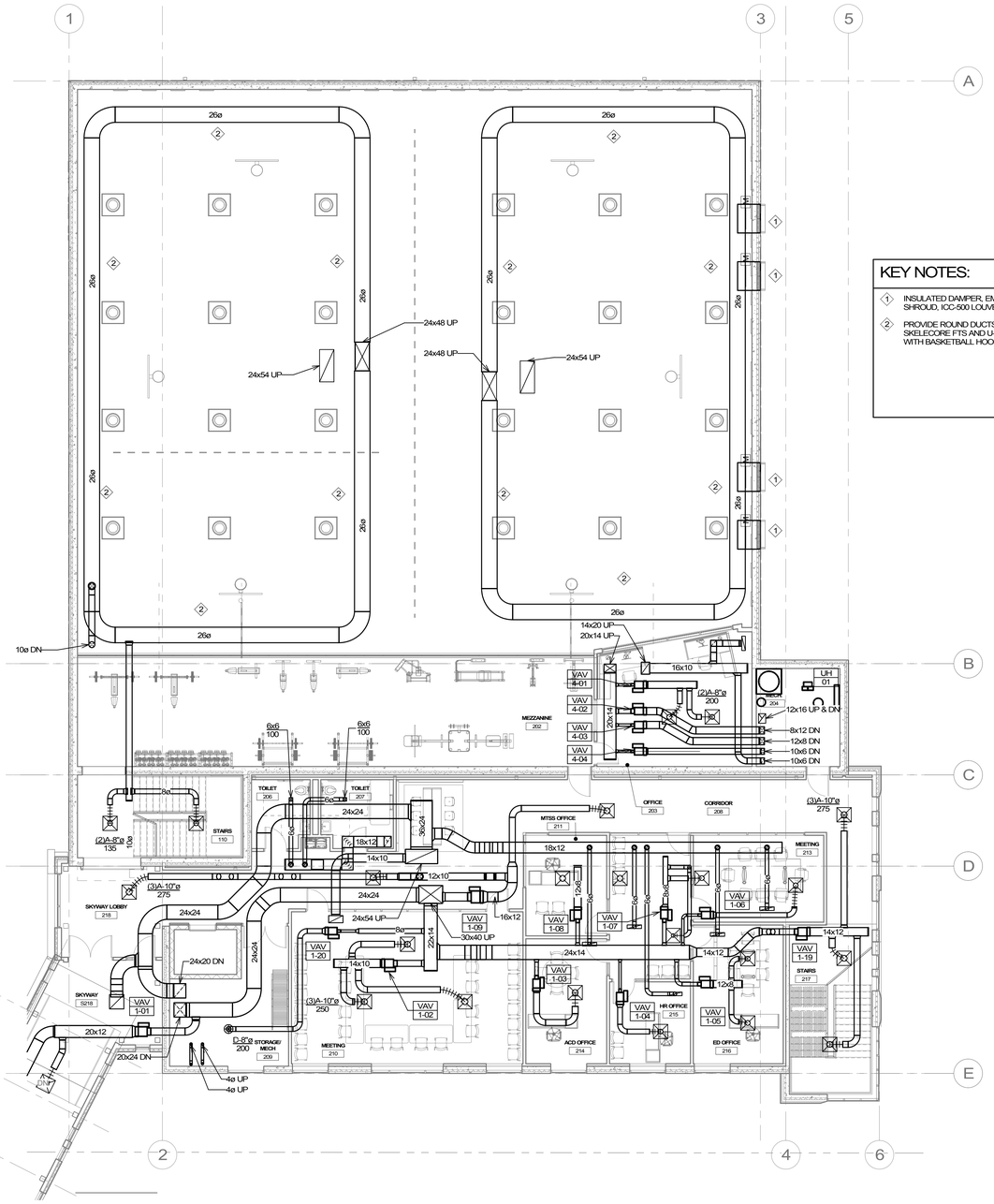


4 SECOND FLOOR DEMOLITION PLAN -
1/8" = 1'-0"



2 SECOND FLOOR DUCTWORK PLAN - SKYWAY
1/8" = 1'-0"



1 SECOND FLOOR DUCTWORK PLAN - SHELTER
1/8" = 1'-0"

KEY NOTES:

1. INSULATED DAMPER, EMERGENCY POWER, CYCLONE CWS WALL SHROUD, ICC-500 LOUVER BY ARCH
2. PROVIDE ROUND DUCTSOX TUFTEX FABRIC DUCT SYSTEM WITH SKELECORE FTS AND U-TRACK SUSPENSION. COORDINATE ROUTING WITH BASKETBALL HOOPS AND MOVABLE PARTITIONS.

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SHEET TITLE:
SECOND FLOOR DUCTWORK PLANS

SHEET NUMBER:

M202

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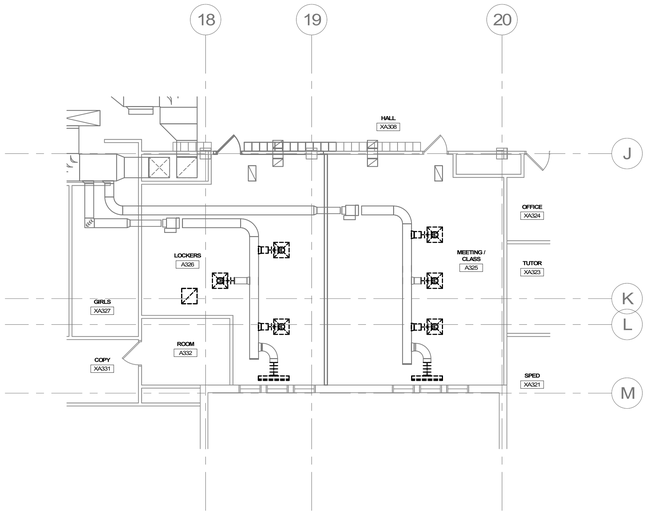
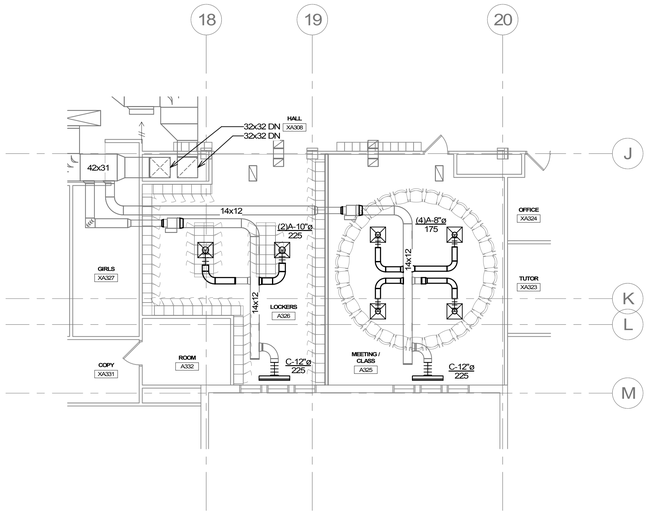


2 THIRD FLOOR DEMOLITION PLAN - HALL
1/8" = 1'-0"



1 THIRD FLOOR DUCTWORK PLAN - HALL
1/8" = 1'-0"

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SHEET TITLE:
THIRD FLOOR DUCTWORK PLANS

SHEET NUMBER:

M203

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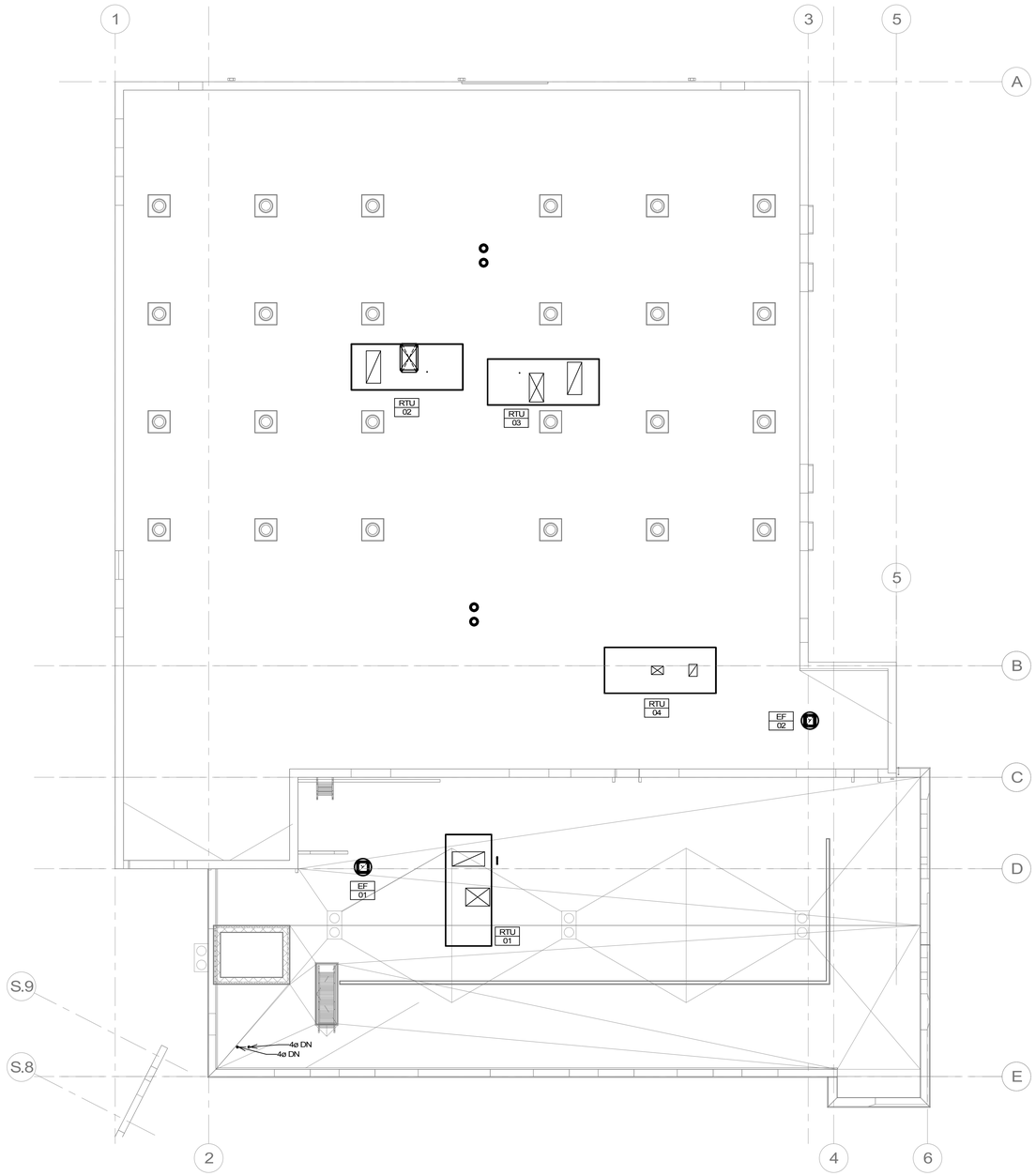

1 ROOF MECHANICAL PLAN
1/8" = 1'-0"

KEY NOTES:

1 INSULATED DAMPER, EMERGENCY POWER, CYCLONE CWS WALL SHROUD, ICC-500 LOUVER BY ARCH

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SHEET TITLE:
ROOF MECHANICAL PLAN

SHEET NUMBER:

M204

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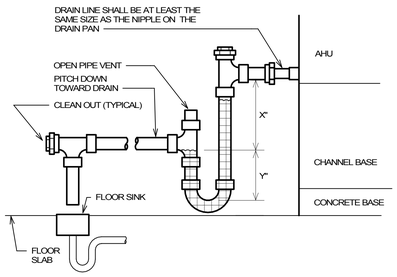


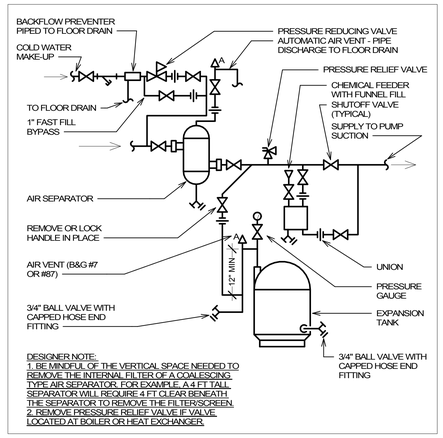
CONDENSATE TRAP SIZING FOR DRAW THROUGH AIR HANDLING UNIT.
X = NEGATIVE STATIC PRESSURE AT THE DRAIN PAN + 2"
Y = X, IF SPACE ALLOWS BUT NOT LESS THAN 1/2 X.

NEGATIVE PRESSURE AT THE DRAIN IS EQUAL TO THE MAXIMUM STATIC PRESSURE ON THE DRAIN PAN INCLUDING MAXIMUM FILTER PRESSURE DROP AND PRESSURE DROP OF FUTURE COMPONENTS OF UNIT OR SYSTEM IF APPLICABLE.

NOTES:

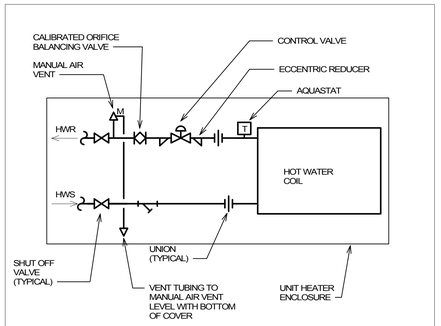
1. PITCH DRAIN PAN AT 1/4" PER FOOT MINIMUM SLOPE TO DRAIN.
2. PROVIDE SHOP DRAWING FOR DRAIN PAN AND CONDENSATE PIPING FOR REVIEW WITH AIR HANDLING UNIT SUBMITTAL.
3. DRAIN LINE SHALL BE AT LEAST THE SAME SIZE AS THE NIPPLE ON THE DRAIN PAN.

1 DRAW THROUGH AHU CONDENSATE TRAP DETAIL
NO SCALE



DESIGNER NOTE:
1. BE MINDFUL OF THE VERTICAL SPACE NEEDED TO REMOVE THE INTERNAL FILTER OF A COALESCING TYPE AIR SEPARATOR. FOR EXAMPLE, A 4 FT TALL SEPARATOR WILL REQUIRE 4 FT CLEAR BENEATH THE SEPARATOR TO REMOVE THE FILTER/SCREEN.
2. REMOVE PRESSURE RELIEF VALVE IF VALVE LOCATED AT BOILER OR HEAT EXCHANGER.

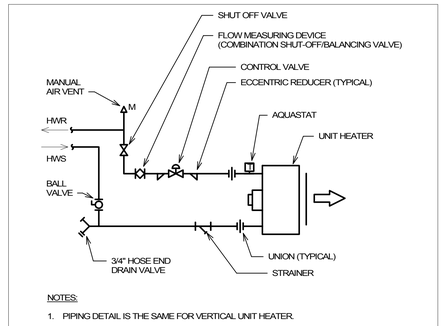
2 EXPANSION TANK AND AIR SEPARATOR PIPING DETAIL
NO SCALE



NOTES:

1. REFER TO SPECIFICATIONS FOR AQUASTAT AND CONTROL VALVE REQUIREMENTS.

5 HOT WATER CABINET UNIT HEATER PIPING DETAIL (2-WAY VALVE)
NO SCALE



NOTES:

1. PIPING DETAIL IS THE SAME FOR VERTICAL UNIT HEATER.

6 HOT WATER HORIZONTAL UNIT HEATER PIPING DETAIL (2-WAY VALVE)
NO SCALE

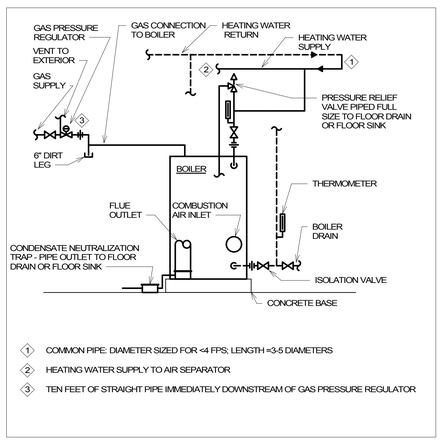
3 GAS PIPE ROOF SUPPORT DETAIL
NO SCALE

NOTES:

1. ALL VALVES AND FITTINGS TO BE CONCEALED UNDER RADIATION COVER OR ABOVE CEILING WHERE NOTED.

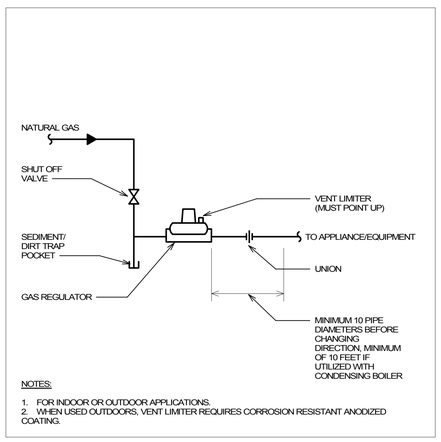
7 HOT WATER RADIATION PIPING DETAIL
NO SCALE

8 INLINE CIRCULATING PUMP DETAIL1
NO SCALE



1. COMMON PIPE: DIAMETER SIZED FOR <4 FPS; LENGTH =3-5 DIAMETERS
2. HEATING WATER SUPPLY TO AIR SEPARATOR
3. TEN FEET OF STRAIGHT PIPE IMMEDIATELY DOWNSTREAM OF GAS PRESSURE REGULATOR

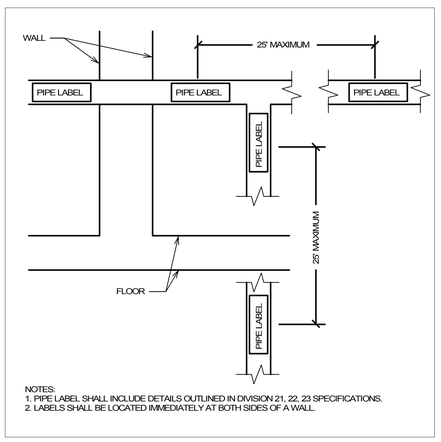
4 GAS-FIRED CONDENSING BOILER PIPING DETAIL
NO SCALE



NOTES:

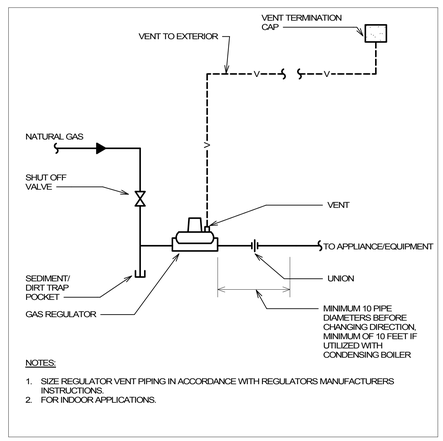
1. FOR INDOOR OR OUTDOOR APPLICATIONS.
2. WHEN USED OUTDOORS, VENT LIMITER REQUIRES CORROSION RESISTANT ANODIZED COATING.

9 OPEN TO AIR VENT GAS REGULATOR DETAIL
NO SCALE



NOTES:
1. PIPE LABEL SHALL INCLUDE DETAILS OUTLINED IN DIVISION 21, 22, 23 SPECIFICATIONS.
2. LABELS SHALL BE LOCATED IMMEDIATELY AT BOTH SIDES OF A WALL.

10 PIPE LABEL DETAIL1
NO SCALE



NOTES:

1. SIZE REGULATOR VENT PIPING IN ACCORDANCE WITH REGULATORS MANUFACTURERS INSTRUCTIONS.
2. FOR INDOOR APPLICATIONS.

11 PIPED VENT GAS REGULATOR DETAIL
NO SCALE

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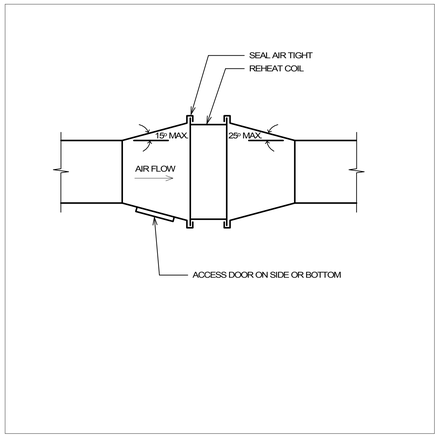
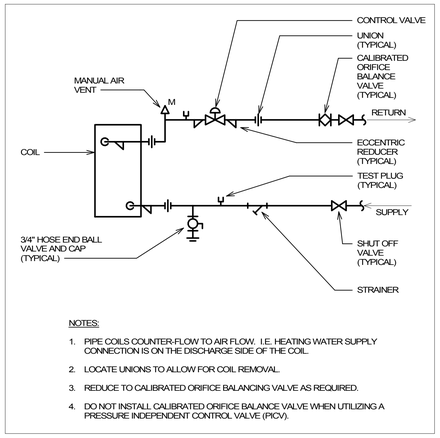
SHEET TITLE:
MECHANICAL DETAILS

SHEET NUMBER:

M700



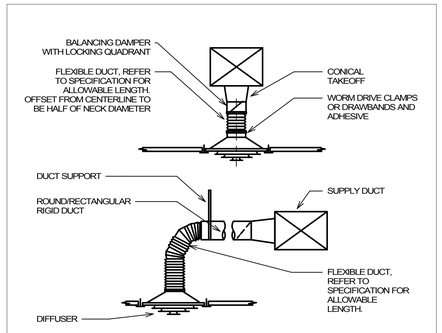
1 REHEAT COIL DUCT CONNECTION
NO SCALE



NOTES:

1. PIPE COILS COUNTER-FLOW TO AIR FLOW. I.E. HEATING WATER SUPPLY CONNECTION IS ON THE DISCHARGE SIDE OF THE COIL.
2. LOCATE UNIONS TO ALLOW FOR COIL REMOVAL.
3. REDUCE TO CALIBRATED ORIFICE BALANCING VALVE AS REQUIRED.
4. DO NOT INSTALL CALIBRATED ORIFICE BALANCE VALVE WHEN UTILIZING A PRESSURE INDEPENDENT CONTROL VALVE (PICV).

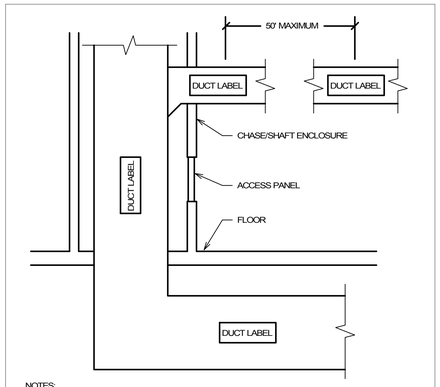
2 REHEAT COIL PIPING DETAIL (2-WAY VALVE)
NO SCALE



NOTES:

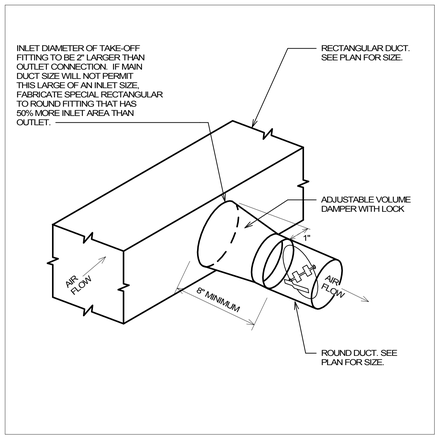
1. TOP DETAIL IS TO BE FOLLOWED WHEN CENTERLINE OF DIFFUSER IS UNDER THE DUCT ENOUGH TO PERMIT A BOTTOM TAKEOFF WITH A FLEXIBLE DUCT OFFSET OF LESS THAN HALF THE NECK DIAMETER. BOTTOM DETAIL TO BE USED IN ALL OTHER CASES.

3 CEILING DIFFUSER RUNOUT DETAIL
NO SCALE

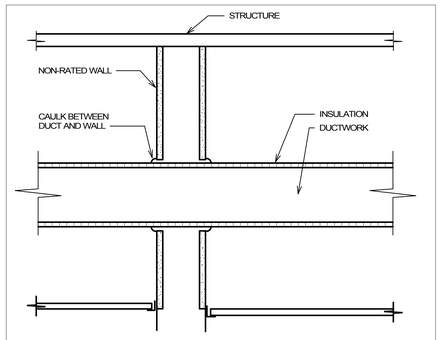


NOTES:
1. DUCT LABEL SHALL INCLUDE DETAILS OUTLINED IN DIVISION 23 SPECIFICATIONS.
2. DUCT LABELS TO BE PROVIDED EVERY 50 FEET AND AT TRANSITIONS INTO ENCLOSED SPACES NOT ACCESSIBLE

4 DUCT LABEL DETAIL
NO SCALE



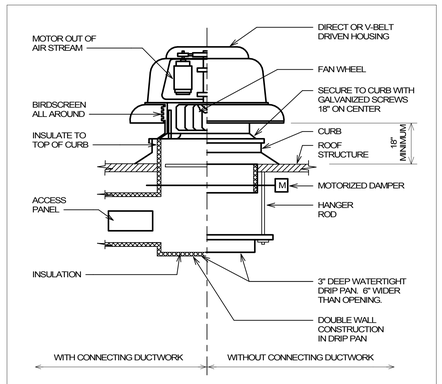
5 DUCT TAKE-OFF TO DIFFUSER DETAIL
NO SCALE



NOTES:

1. FINISH CAULKING WITH 1/4" MINIMUM BEAD OF CAULK APPLIED TO THE PERIMETER OF THE DUCT AT ITS EGRESS FROM THE WALL.

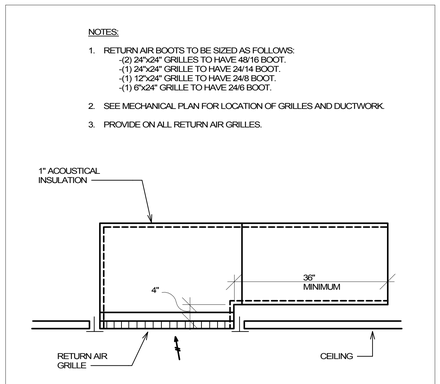
6 DUCT THROUGH NON-RATED WALL PENETRATION DETAIL
NO SCALE



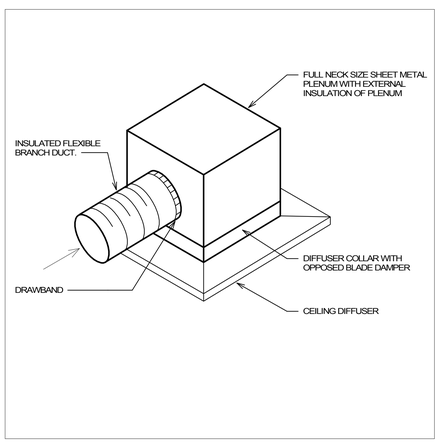
7 POWER ROOF VENTILATOR DETAIL
NO SCALE

NOTES:

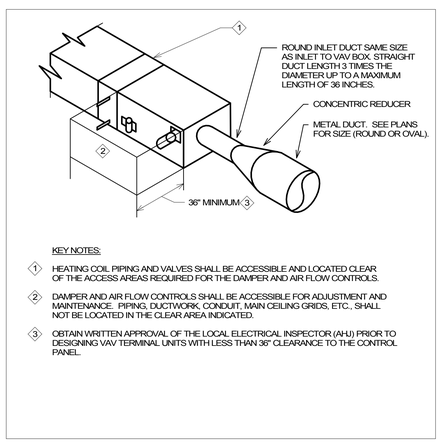
1. RETURN AIR BOOTS TO BE SIZED AS FOLLOWS:
   -(2) 24"x24" GRILLES TO HAVE 48/16 BOOT.
   -(1) 24"x24" GRILLE TO HAVE 24/14 BOOT.
   -(1) 12"x24" GRILLE TO HAVE 24/8 BOOT.
   -(1) 6"x24" GRILLE TO HAVE 24/6 BOOT.
2. SEE MECHANICAL PLAN FOR LOCATION OF GRILLES AND DUCTWORK.
3. PROVIDE ON ALL RETURN AIR GRILLES.



8 RETURN AIR GRILLE DETAIL
NO SCALE



9 SUPPLY DIFFUSER CONNECTION DETAIL (SQUARE NECK)
NO SCALE



KEY NOTES:

1. HEATING COIL PIPING AND VALVES SHALL BE ACCESSIBLE AND LOCATED CLEAR OF THE ACCESS AREAS REQUIRED FOR THE DAMPER AND AIR FLOW CONTROLS.
2. DAMPER,AND AIR FLOW CONTROLS SHALL BE ACCESSIBLE FOR ADJUSTMENT AND MAINTENANCE. PIPING, DUCTWORK, CONDUIT, MAIN CEILING GRIDS, ETC., SHALL NOT BE LOCATED IN THE CLEAR AREA INDICATED.
3. OBTAIN WRITTEN APPROVAL OF THE LOCAL ELECTRICAL INSPECTOR (AHJ) PRIOR TO DESIGNING VAV TERMINAL UNITS WITH LESS THAN 36" CLEARANCE TO THE CONTROL PANEL.

10 TERMINAL UNIT INSTALLATION DETAIL
NO SCALE

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Dunham Project Number: 0425231-000-00

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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.

Bryan J. Schmidt, P.E.
PRINT NAME

SIGNATURE

26566
LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
MECHANICAL DETAILS

SHEET NUMBER:

M701

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ROOFTOP UNIT - PACKAGED UNIT SCHEDULE

MECHANICAL

EQUIPMENT TAG	APPLICATION	SUPPLY FAN			RETURN FAN			MIN OA (CFM)	COOLING COIL					CONDENSING UNIT				HEATING COIL				REFRIGERANT TYPE	PRE-FILTER MERV RATING	PRE- FILTER SIZE (IN)	FINAL FILTER MERV RATING	FINAL FILTER SIZE (IN)	EER COOLING	IEER COOLING	WEIGHT (LBS)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
										EAT		LAT																				
		CFM	ESP (IN W.C.)	MOTOR CONTROL	CFM	ESP (IN W.C.)	MOTOR CONTROL		TYPE	DB (F)	WB (F)	DB (F)	WB (F)	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	AMBIENT TEMP (F)	NUMBER OF COMPRESSORS	NUMBER OF STAGES	NUMBER OF FANS	HOT GAS REHEAT (YES/NO)	TYPE	EAT DB (F)	LAT DB (F)	INPUT MBH	OUTPUT MBH								
RTU 01	OFFICE	8500	2	VFD	8500	1	ECM	2125	DX	87.2	64.7	54.2	45	261	213	95	2	INVERTER SCROLL	2	NO	NATURAL GAS	50	76.3	300	243	R-32	8	(9) 18x24x2	14	(9) 18x24x4	11.0	19.7	4258	DAIKIN	DPSC20B	
RTU 02	OFFICE	8500	2	VFD	8500	1	ECM	2125	DX	87.2	64.7	54.2	45	261	213	95	2	INVERTER SCROLL	2	NO	NATURAL GAS	50	76.3	300	243	R-32	8	(9) 18x24x2	14	(9) 18x24x4	11.0	19.7	4258	DAIKIN	DPSC20B	
RTU 03	OFFICE	8500	2	VFD	8500	1	ECM	2125	DX	87.2	64.7	54.2	45	261	213	95	2	INVERTER SCROLL	2	NO	NATURAL GAS	50	76.3	300	243	R-32	8	(9) 18x24x2	14	(9) 18x24x4	11.0	19.7	4258	DAIKIN	DPSC20B	
RTU 04	OFFICE	8500	2	VFD	8500	1	ECM	2125	DX	87.2	64.7	54.2	45	261	213	95	2	INVERTER SCROLL	2	NO	NATURAL GAS	50	76.3	300	243	R-32	8	(9) 18x24x2	14	(9) 18x24x4	11.0	19.7	4258	DAIKIN	DPSC20B	

MECHANICAL NOTES:
1. PROVIDE WITH FACTORY DISCONNECT AND FIELD POWERED GFI RECEPTACLE.
2. PROVIDE RETURN SMOKE DETECTOR.

ELECTRICAL

EQUIPMENT TAG	HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR				PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
					TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				
RTU 01	63.25 FLA	480 V	3	<10000	CP	MFR.	BY UNIT	DIV.23	100A	-	NEMA-3R	DIV.26	AT UNIT	HP1S	7,9,11	1-1/4"C, 3#4 + 1#8G	
RTU 02	49.15A	480 V	3	<10000	CP	MFR.	BY UNIT	DIV.23	100A	-	NEMA-3R	DIV.26	AT UNIT	HP1S	13,15,17	1"C, 3#6 + 1#8G	
RTU 03	49.15A	480 V	3	<10000	CP	MFR.	BY UNIT	DIV.23	100A	-	NEMA-3R	DIV.26	AT UNIT	HP1S	19,21,23	1"C, 3#6 + 1#8G	
RTU 04	16A	480 V	3	<10000	CP	MFR.	BY UNIT	DIV.23	100A	-	NEMA-3R	DIV.26	AT UNIT	HP1S	25,27,29	3/4"C, 3#10 + 1#10G	

GENERAL ELECTRICAL NOTES:
A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.
B. CALCULATED A.I.C. VALUES LESS THAN 5,000A ARE NOT LISTED.

ELECTRICAL NOTES:
1. SINGLE POINT ELECTRICAL CONNECTION BY DIV 26.
2. INTEGRAL GFCI CONVENIENCE RECEPTACLE.

CONTROLLER TYPES:
VFD - VARIABLE FREQUENCY MOTOR CONTROLLER
MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL
MAGS - MAGNETIC STARTER
MRSMS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

GRILLES, REGISTERS, AND DIFFUSERS SCHEDULE

MECHANICAL

EQUIPMENT TAG	APPLICATION	MOUNTING TYPE	DESCRIPTION	MATERIAL	ACCESSORIES	FINISH	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
A	SUPPLY	CEILING	SQUARE CONE	STEEL	-	WHITE	TITUS	TMS	-
B	RETURN	CEILING	EGG CRATE	ALUMINUM	-	WHITE	TITUS	50	-
C	SUPPLY	CEILING	2-SLOT LINEAR	STEEL	INSULATED PLENUM	WHITE	TITUS	MPI-39	-
D	SUPPLY	CEILING	ROUND	STEEL	-	WHITE	TITUS	TMR	-
E	EXHAUST	CEILING	EGG CRATE	ALUMINUM	-	WHITE	TITUS	50	-

MECHANICAL NOTES:

VARIABLE AIR VOLUME BOX SCHEDULE - HEATING WATER

MECHANICAL

EQUIPMENT TAG	UNIT SERVED	INLET SIZE (IN)	MAXIMUM CFM	MINIMUM CFM	MAXIMUM APD (IN W.C.)	HEATING COIL				EWT (F)	LWT (F)	HEATING COIL				MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
						HEATING CFM	EAT (F)	LAT (F)	CAPACITY (MBH)			GPM	GLYCOL TYPE	MAXIMUM WPD (FT)	MINIMUM COIL ROWS			
VAV 1-01	SKYWAY	12	1525	300	0.35	765	55	95	33.1	120	100	3.3	NONE	4.5	2	TITUS	DESV	-
VAV 1-02	MEETING B202	10	750	140	0.35	375	55	95	16.3	120	100	1.6	NONE	4.5	2	TITUS	DESV	-
VAV 1-03	ACD OFFICE B203B	6	210	40	0.35	105	55	95	4.6	120	100	0.5	NONE	4.5	2	TITUS	DESV	-
VAV 1-04	HR OFFICE B203C	4	130	30	0.35	65	55	95	2.8	120	100	0.4	NONE	4.5	2	TITUS	DESV	-
VAV 1-05	ED OFFICE B203D	6	250	50	0.35	125	55	95	5.4	120	100	0.5	NONE	4.5	2	TITUS	DESV	-
VAV 1-06	MTSS OFFICE B203E	4	120	25	0.35	60	55	95	2.6	120	100	0.4	NONE	4.5	2	TITUS	DESV	-
VAV 1-07	OPEN OFFICE B203	6	250	50	0.35	125	55	95	5.4	120	100	0.5	NONE	4.5	2	TITUS	DESV	-
VAV 1-08	MEETING B203A	6	250	50	0.35	125	55	95	5.4	120	100	0.5	NONE	4.5	2	TITUS	DESV	-
VAV 1-09	HALL B209	14	1650	330	0.35	825	55	95	35.8	120	100	3.6	NONE	4.5	2	TITUS	DESV	-
VAV 1-10	FACILITIES B100	8	400	80	0.35	200	55	95	8.7	120	100	0.9	NONE	4.5	2	TITUS	DESV	-
VAV 1-11	FIRST FLOOR CORR	8	600	120	0.35	300	55	95	13.0	120	100	1.3	NONE	4.5	2	TITUS	DESV	-
VAV 1-12	OPEN OFFICE B101	10	750	140	0.35	375	55	95	16.3	120	100	1.6	NONE	4.5	2	TITUS	DESV	-
VAV 1-13	BUSINESS OFFICE B101A	4	150	30	0.35	75	55	95	3.3	120	100	0.4	NONE	4.5	2	TITUS	DESV	-
VAV 1-14	FILES B101B	4	110	25	0.35	55	55	95	2.4	120	100	0.4	NONE	4.5	2	TITUS	DESV	-
VAV 1-15	MEETING B101C	6	300	60	0.35	150	55	95	6.5	120	100	0.7	NONE	4.5	2	TITUS	DESV	-
VAV 1-16	LOCKERS B102	8	600	120	0.35	300	55	95	13.0	120	100	1.3	NONE	4.5	2	TITUS	DESV	-
VAV 1-17	LOCKER B104	8	600	120	0.35	300	55	95	13.0	120	100	1.3	NONE	4.5	2	TITUS	DESV	-
VAV 1-19	MTSS OFFICE B203E	10	825	25	0.35	415	55	95	17.9	120	100	1.8	NONE	4.5	2	TITUS	DESV	-
VAV 1-20	MEETING B202	4	200	140	0.35	100	55	95	4.3	120	100	0.4	NONE	4.5	2	TITUS	DESV	-
VAV 4-01	OFFICE 203	8	400	330	0.35	200	55	95	8.7	120	100	0.9	NONE	4.5	2	TITUS	DESV	-
VAV 4-02	MEN'S TOILET 107	8	450	330	0.35	225	55	95	9.8	120	100	1.0	NONE	4.5	2	TITUS	DESV	-
VAV 4-03	WOMEN'S TOILET 105	8	400	330	0.35	200	55	95	8.7	120	100	0.9	NONE	4.5	2	TITUS	DESV	-
VAV 4-04	STORAGE 103	4	200	330	0.35	100	55	95	4.3	120	100	0.4	NONE	4.5	2	TITUS	DESV	-

MECHANICAL NOTES:

FAN SCHEDULE

MECHANICAL

EQUIPMENT TAG	APPLICATION	TYPE	CFM	ESP (IN W.C.)	BHP	FAN RPM	DRIVE TYPE	SONES	ECM (YES/NO)	VFD (YES/NO)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
EF 01	OFFICE TOILETS	DOWNBLAST	550	0.8	0.2	1014	DIRECT	7.2	YES	NO	GREENHECK	G-140-VG	
EF 02	GYM TOILETS	DOWNBLAST	1120	0.6	0.6	1515	DIRECT	13.2	YES	NO	GREENHECK	G-140-VG	

GENERAL MECHANICAL NOTES:
A. REFER TO ELECTRICAL SECTION BELOW FOR CALCULATED SHORT-CIRCUIT CURRENT AT EQUIPMENT.

MECHANICAL NOTES:

ELECTRICAL

EQUIPMENT TAG	HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR					PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
					TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				
EF 01		120 V	1	<5000	CP	MFR.	INTEGRAL	DIV.23	MRS.	-	NEMA-3R	DIV.26	AT UNIT	LP1S-U	19		
EF 02		120 V	1	<5000	CP	MFR.	INTEGRAL	DIV.23	MRS.	-	NEMA-3R	DIV.26	AT UNIT	LP1S-A	34		

GENERAL ELECTRICAL NOTES:
A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.
B. MECHANICAL EQUIPMENT AND CORRESPONDING ELECTRICAL DISCONNECTS/CONTROLLERS SHALL HAVE A STANDARD SHORT-CIRCUIT CURRENT RATING HIGHER THAN THE CALCULATED VALUE SHOWN IN THIS SCHEDULE, DETAILED BY THE "CALCULATED AFC" COLUMN.

ELECTRICAL NOTES:

CONTROLLER TYPES:
VFD - VARIABLE FREQUENCY MOTOR CONTROLLER
MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL.
MAGS - MAGNETIC STARTER
MRSMS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

UNIT HEATER SCHEDULE - HEATING WATER

MECHANICAL

EQUIPMENT TAG	APPLICATION	TYPE	FAN		COIL								MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
			CFM	MOTOR HP	EAT (F)	COIL ROWS	EWT (F)	LWT (F)	GPM	GLYCOL TYPE	GLYCOL %	WPD (FT)	CAPACITY (MBH)			
CUH 01		RECESSED	810	(2) 1/4	60	2	120	100	9.0	-		2.2	33	RITTLING	RCW-380-08	
CUH 02		RECESSED	810	(2) 1/4	60	2	120	100	9.0	-		2.2	33	RITTLING	RCW-380-08	
UH 01		HORIZONTAL	450	1/30	60	1	120	100	1.7	-		0.8	6.7	RITTLING	RH-24	

GENERAL MECHANICAL NOTES:
A. REFER TO ELECTRICAL SECTION BELOW FOR CALCULATED SHORT-CIRCUIT CURRENT AT EQUIPMENT.

MECHANICAL NOTES:

ELECTRICAL

EQUIPMENT TAG	HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR					PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
					TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				
CUH 01		120 V	1	<5000	CP	MFR.	INTEGRAL	DIV.23	MRS.	-	NEMA-1	DIV.26	AT UNIT				
CUH 02		120 V	1	<5000	CP	MFR.	INTEGRAL	DIV.23	MRS.	-	NEMA-1	DIV.26	AT UNIT				
UH 01		120 V	1	<5000	CP	MFR.	INTEGRAL	DIV.23	MRS.	-	NEMA-1	DIV.26	AT UNIT				

GENERAL ELECTRICAL NOTES:
A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.
B. MECHANICAL EQUIPMENT AND CORRESPONDING ELECTRICAL DISCONNECTS/CONTROLLERS SHALL HAVE A STANDARD SHORT-CIRCUIT CURRENT RATING HIGHER THAN THE CALCULATED VALUE SHOWN IN THIS SCHEDULE, DETAILED BY THE "CALCULATED AFC" COLUMN.

ELECTRICAL NOTES:

CONTROLLER TYPES:
MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL.
MAGS - MAGNETIC STARTER
MRSMS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

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mechanical + electrical consulting engineering

Dunham Project Number: 0425231-000-00

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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.

Madeline M. Folin, P.E.
PRINT NAME

SIGNATURE

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LICENSE NO.

05/07/2025
DATE

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Bryan J. Schmidt, P.E.
PRINT NAME

SIGNATURE

26566
LICENSE NO.

05/07/2025
DATE

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SHEET TITLE:
MECHANICAL ELECTRICAL SCHEDULES

SHEET NUMBER:

ME800

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BOILER SCHEDULE - HEATING WATER

MECHANICAL

EQUIPMENT TAG	APPLICATION	TYPE	BOILER RATED PRESSURE (PSIG)	OUTPUT (MBH)	FLUE CONNECTION SIZE (IN)	WATER					BURNER				MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
						EWT (F)	LWT (F)	GPM	GLYCOL TYPE	WPD (FT)	GAS INPUT (CFH)	GAS TYPE	GAS PRESSURE TO REGULATOR (PSIG)	TURNDOWN			
B 01	HEATING WATER	CONDENSING		264	3	100	120	30	NONE		285	NAT GAS		10:1	LOCHINVAR	WHB285N	

GENERAL MECHANICAL NOTES:

A. REFER TO ELECTRICAL SECTION BELOW FOR CALCULATED SHORT-CIRCUIT CURRENT AT EQUIPMENT.

MECHANICAL NOTES:

ELECTRICAL

EQUIPMENT TAG	HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR					PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
					TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				

GENERAL ELECTRICAL NOTES:

A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.

B. MECHANICAL EQUIPMENT AND CORRESPONDING ELECTRICAL DISCONNECTS/CONTROLLERS SHALL HAVE A STANDARD SHORT-CIRCUIT CURRENT RATING HIGHER THAN THE CALCULATED VALUE SHOWN IN THIS SCHEDULE, DETAILED BY THE "CALCULATED AFC" COLUMN.

ELECTRICAL NOTES:

CONTROLLER TYPES:

MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL
MAGS - MAGNETIC STARTER
MRS/MS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

HYDRONIC PUMP SCHEDULE

MECHANICAL

EQUIPMENT TAG	APPLICATION	TYPE	GPM	DISCHARGE HEAD (FT)	GLYCOL TYPE	NPSHR (FT)	RPM	BHP	SUCTION SIZE (IN)	DISCHARGE SIZE (IN)	ECM (YES/NO)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
P 01	HEATING WATER	INLINE	30	45	NONE	-	2614	0.832	1-1/2	1-1/2	YES	BELL & GOSSETT	ECOCIRC XL 110-180	-

GENERAL MECHANICAL NOTES:

A. REFER TO ELECTRICAL SECTION BELOW FOR CALCULATED SHORT-CIRCUIT CURRENT AT EQUIPMENT.

MECHANICAL NOTES:

ELECTRICAL

EQUIPMENT TAG	HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR					PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
					TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				

GENERAL ELECTRICAL NOTES:

A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.

B. MECHANICAL EQUIPMENT AND CORRESPONDING ELECTRICAL DISCONNECTS/CONTROLLERS SHALL HAVE A STANDARD SHORT-CIRCUIT CURRENT RATING HIGHER THAN THE CALCULATED VALUE SHOWN IN THIS SCHEDULE, DETAILED BY THE "CALCULATED AFC" COLUMN.

ELECTRICAL NOTES:

CONTROLLER TYPES:

VFD - VARIABLE FREQUENCY MOTOR CONTROLLER
MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL
MAGS - MAGNETIC STARTER
MRS/MS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

FINNED TUBE RADIATION SCHEDULE - HEATING WATER

MECHANICAL

EQUIPMENT TAG	TYPE	NUMBER OF ROWS	FIN SIZE (INxIN)	FINS/FT	FIN MATERIAL	PIPE MATERIAL	PIPE SIZE (IN)	ENCLOSURE GAUGE	ENCLOSURE HEIGHT (IN)	EAT DB (F)	EWT (F)	LWT (F)	GLYCOL TYPE	GLYCOL %	WPD/100 FT (FT)	CAPACITY PER LINEAR FT (BTUH)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
FTR A	WALL	1	2-3/4X4	32	ALUMINUM	COPPER	3/4	14	8	65	120	110	NONE	-		270	RITTLING	FS3	-

MECHANICAL NOTES:

EXPANSION TANK SCHEDULE

MECHANICAL

EQUIPMENT TAG	APPLICATION	TYPE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	PRECHARGE PRESSURE (PSIG)	ASME CERTIFIED (YES/NO)	SIZE		MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
							DIAMETER (IN)	LENGTH (IN)			
ET 01	HEATING WATER	DIAPHRAGM	4.4	2.5	12	NO	11	14	BELL & GOSSETT	HFT-30	-

MECHANICAL NOTES:

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mechanical + electrical consulting engineering
Dunham Project Number: 0425231-000-00

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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Madeline M. Folin, P.E.
PRINT NAME

SIGNATURE

57233
LICENSE NO.

05/07/2025
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SHEET TITLE:
MECHANICAL ELECTRICAL SCHEDULES

SHEET NUMBER:

ME801

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GENERAL NOTES:

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B. COORDINATE ALL PIPE ROUTING WITH ALL OTHER TRADES TO ENSURE ADEQUATE CLEARANCES FOR OTHER PIPING, DUCTWORK, ELECTRICAL CONDUIT, STRUCTURAL SUPPORTS, ETC. ANY UNAVOIDABLE CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER OF RECORD. PROVIDE ALL OFFSETS AND TRANSITIONS AS REQUIRED FOR A CLEAN INSTALLATION. ADDITIONAL COMPENSATION WILL NOT BE REWARDED DUE TO LACK OF COORDINATION WITH OTHER SUBCONTRACTORS.

C. SUPPORT ALL PIPING DIRECTLY FROM STRUCTURE. DO NOT SUPPORT ANY PIPING FROM DUCTWORK, CONDUIT, PIPING, ETC.

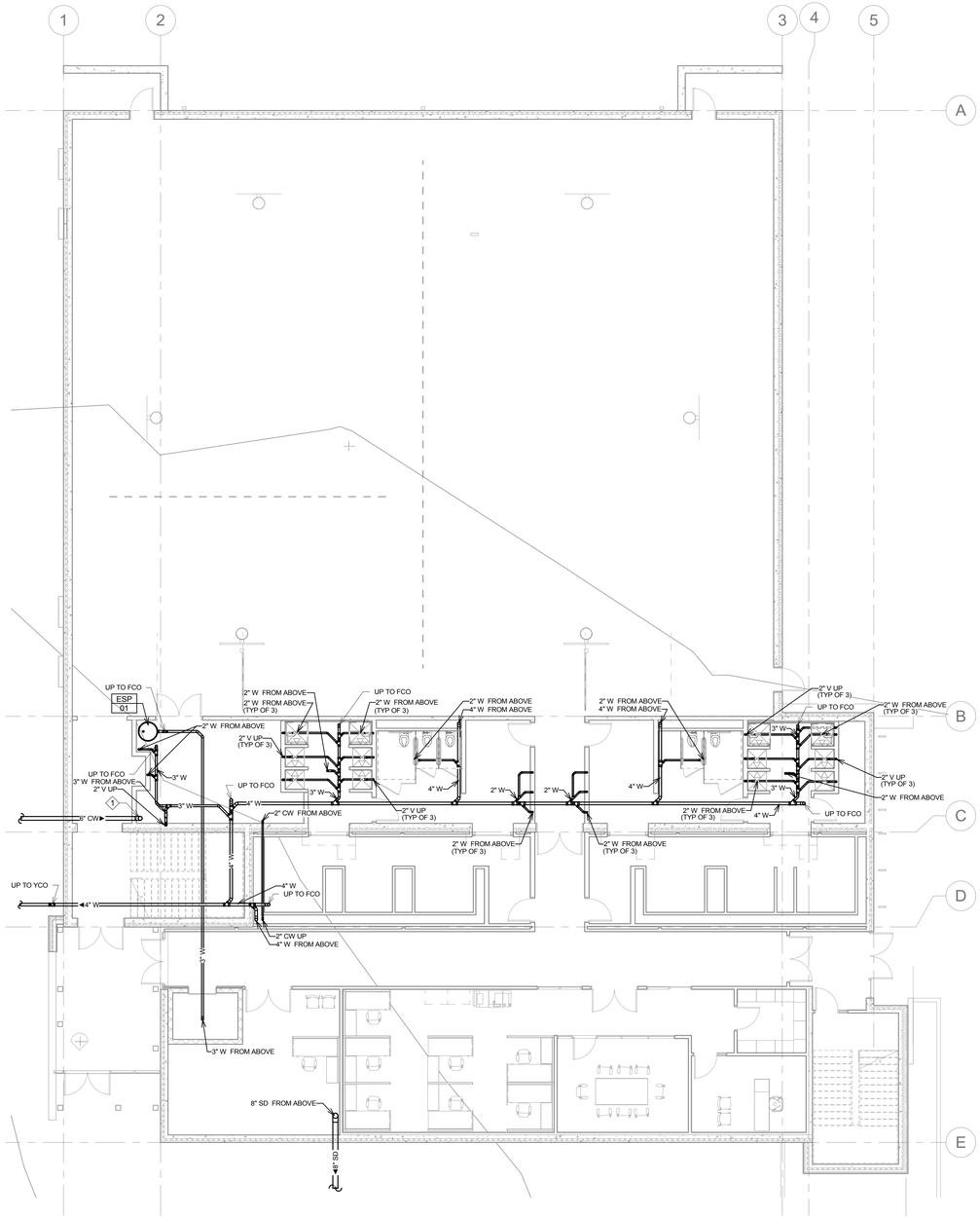
D. COORDINATE WITH PROJECT SPECIFICATION MANUAL AND DRAWING DETAILS FOR ADDITIONAL PIPING ISOLATION VALVES, TEMPERATURE/PRESSURE GAUGES, BALANCING VALVES, DRAINS, VENTS, AND OTHER REQUIRED PIPING ACCESSORIES AND COMPONENTS THAT MAY NOT BE DIRECTLY INDICATED ON THIS DRAWING.

E. THE PLUMBING CONTRACTOR WILL BE RESPONSIBLE TO ADEQUATELY SEAL AND PROTECT ALL PIPING ON SITE FROM CONSTRUCTION DEBRIS AND CONTAMINATION THROUGHOUT THE ENTIRE PROCESS.

F. WALLS AND PLUMBING FIXTURES FROM FLOOR ABOVE SHOWN FOR REFERENCE ONLY.

KEY NOTES:

1. 6" COMBINATION FIRE PROTECTION AND DOMESTIC WATER SERVICE PIPE UP TO FLOOR ABOVE. SEE DETAIL FOR FURTHER INFORMATION.



1 BELOW GRADE PLUMBING PLAN
1/8" = 1'-0"

BLOOM HAY DOBBS

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PRINT NAME

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SHEET TITLE:
BELOW GRADE PLUMBING PLAN

SHEET NUMBER:

P100

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GENERAL NOTES:

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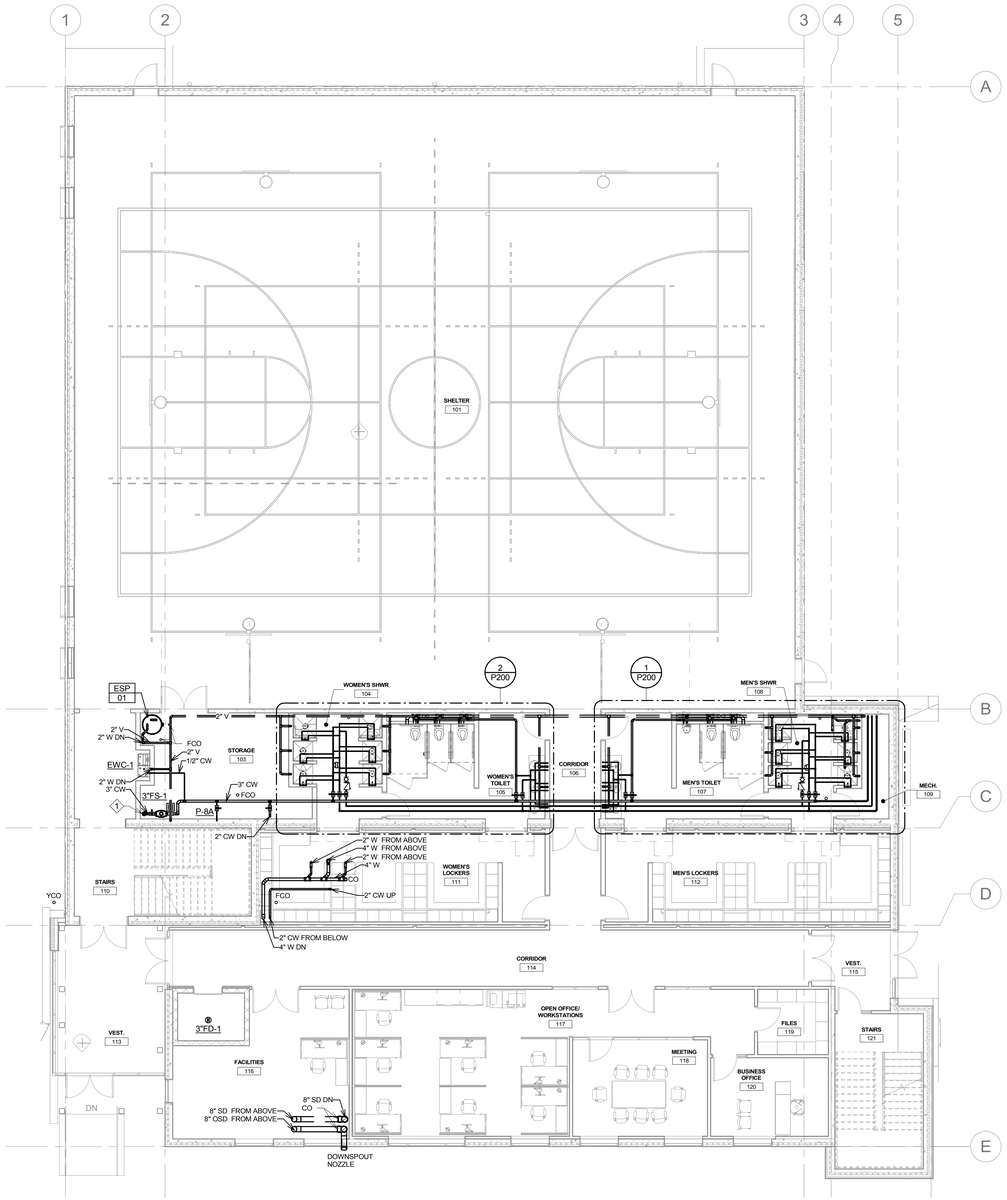
E. THE PLUMBING CONTRACTOR WILL BE RESPONSIBLE TO ADEQUATELY SEAL AND PROTECT ALL PIPING ON SITE FROM CONSTRUCTION DEBRIS AND CONTAMINATION THROUGHOUT THE ENTIRE PROCESS.

KEY NOTES:

1. 6" COMBINATION FIRE PROTECTION AND DOMESTIC WATER SERVICE PIPE UP FROM BELOW FLOOR. SEE DETAIL FOR FURTHER INFORMATION.



1 FIRST FLOOR PLUMBING PLAN
1/8" = 1'-0"

2008 INVISIBLE, P.A. - CONSTRUCTION

BLOOM HAY DOBBS

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mechanical + electrical consulting engineering
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Project Number: 23008.003
Date: 05/07/2025

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Bryan J. Schmidt, P.E.
PRINT NAME

SIGNATURE

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LICENSE NO.

05/07/2025
DATE

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SHEET TITLE:
FIRST FLOOR PLUMBING PLAN

SHEET NUMBER:

P101

GENERAL NOTES:

A. THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ANY GENERAL CONSTRUCTION WORK AS DIRECTLY IMPACTED BY THE PIPING INSTALLATION. EXAMPLES OF WORK DIRECTLY TIED TO THE MECHANICAL CONTRACTOR'S WORK WOULD INCLUDE, BUT NOT LIMITED TO, ANY ROOF PENETRATIONS, FIRE SEALING OF ALL RATED WALL PENETRATIONS, ETC.

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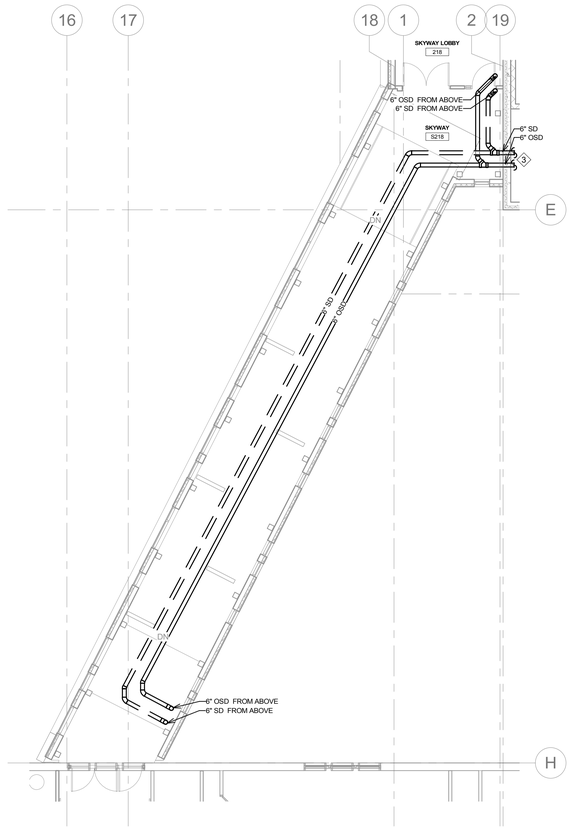
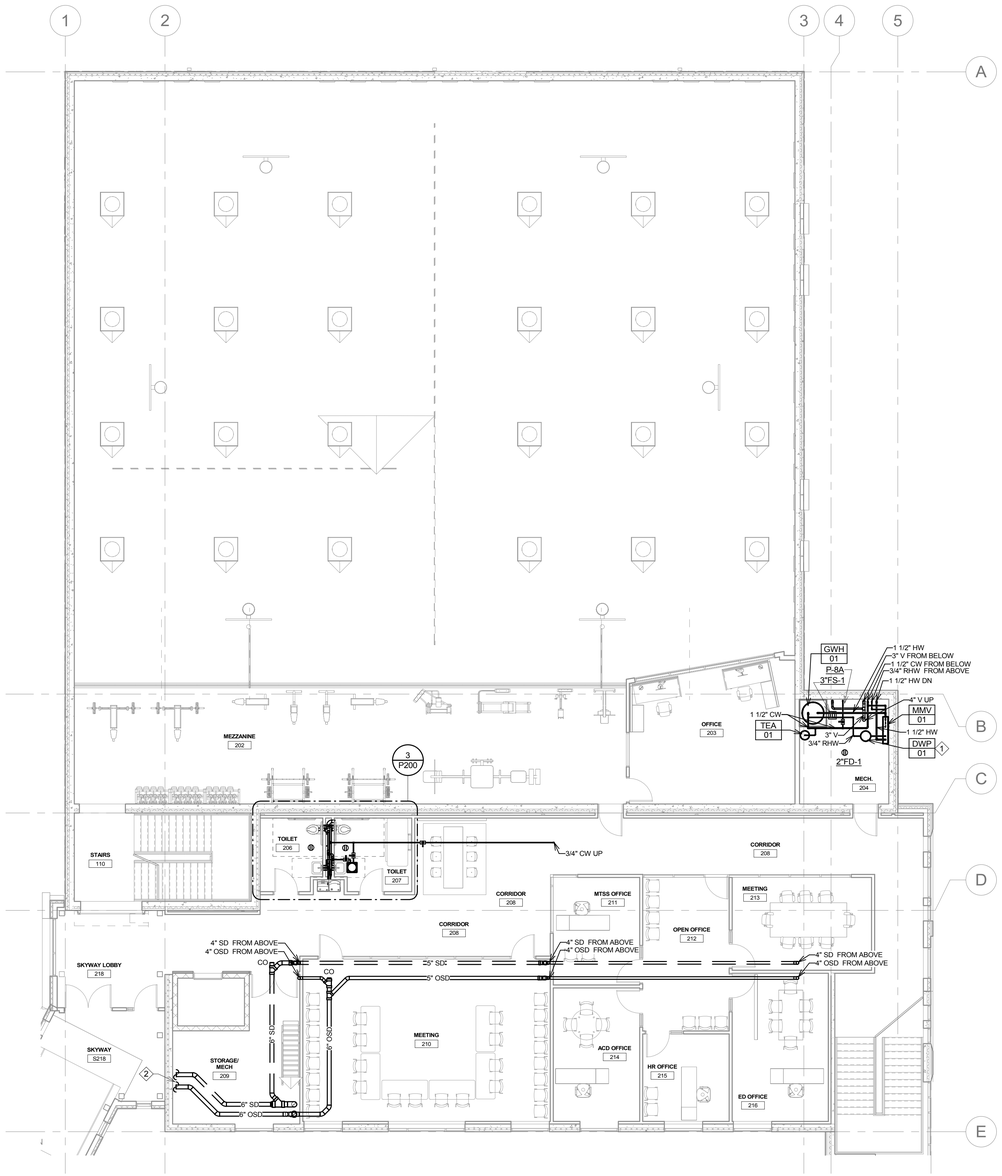
E. THE PLUMBING CONTRACTOR WILL BE RESPONSIBLE TO ADEQUATELY SEAL AND PROTECT ALL PIPING ON SITE FROM CONSTRUCTION DEBRIS AND CONTAMINATION THROUGHOUT THE ENTIRE PROCESS.

KEY NOTES:

1. DWP-01 TO BE MOUNTED ON UNISTRUT STAND SERVING MMV-01.
2. REFER TO 2/P102 FOR PIPING CONTINUATION.
3. REFER TO 1/P102 FOR PIPING CONTINUATION.



2 SECOND FLOOR PLUMBING PLAN - SKYWAY S218
1/8" = 1'-0"



1 SECOND FLOOR PLUMBING PLAN
1/8" = 1'-0"

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SHEET TITLE:
SECOND FLOOR PLUMBING PLAN

SHEET NUMBER:

P102

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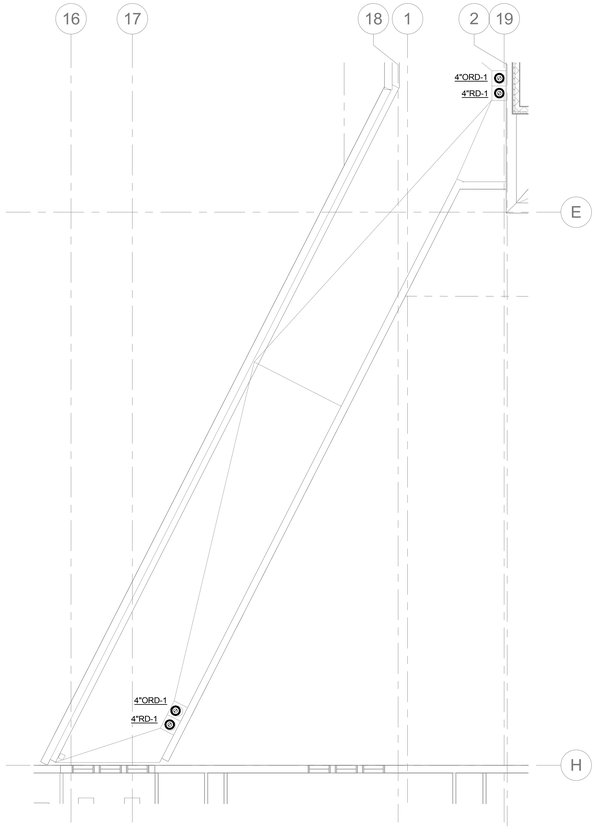
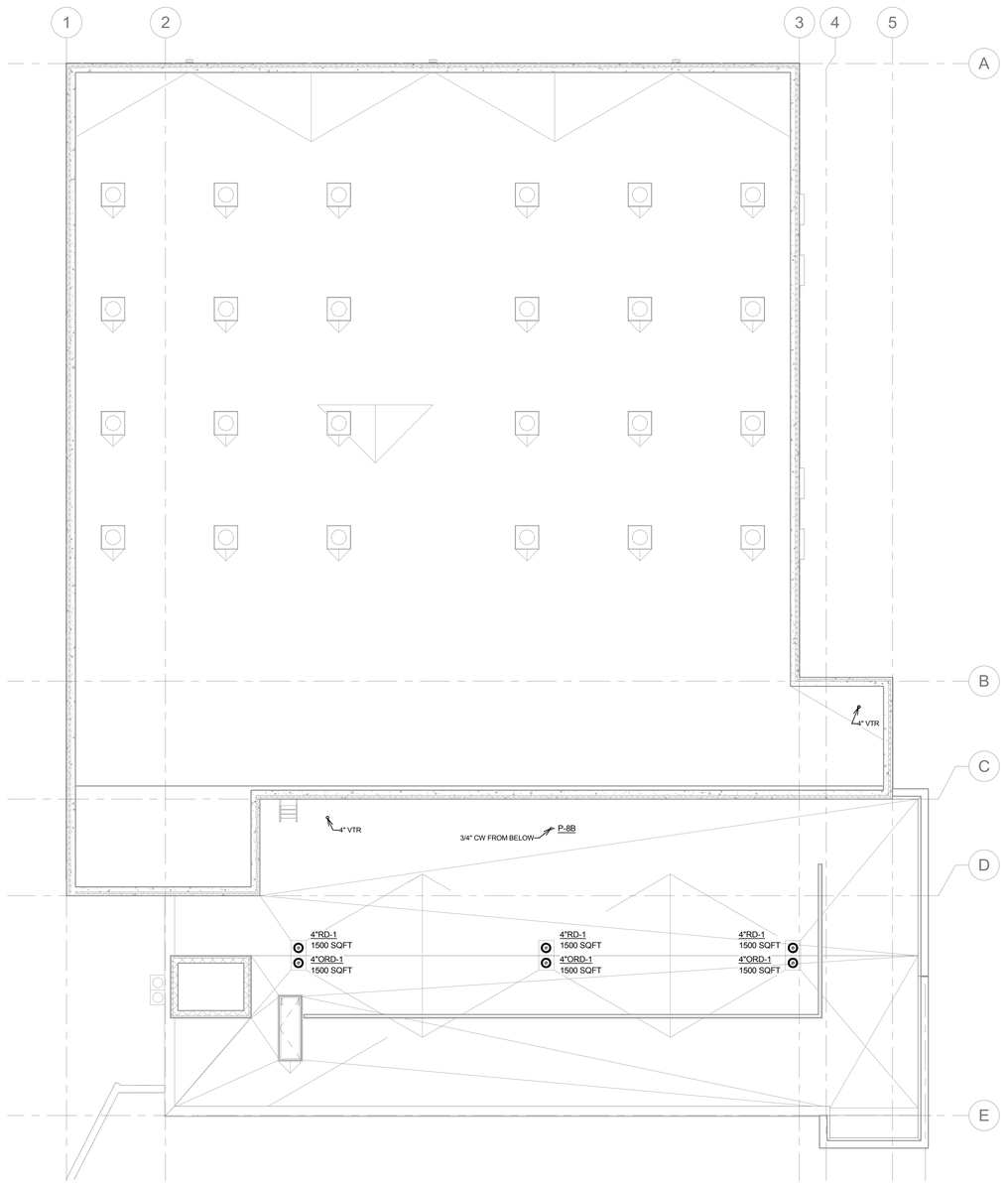


2 ROOF PLUMBING PLAN - SKYWAY
1/8" = 1'-0"



1 ROOF PLUMBING PLAN
1/8" = 1'-0"

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SHEET TITLE:
ROOF PLUMBING PLAN

SHEET NUMBER:

P103

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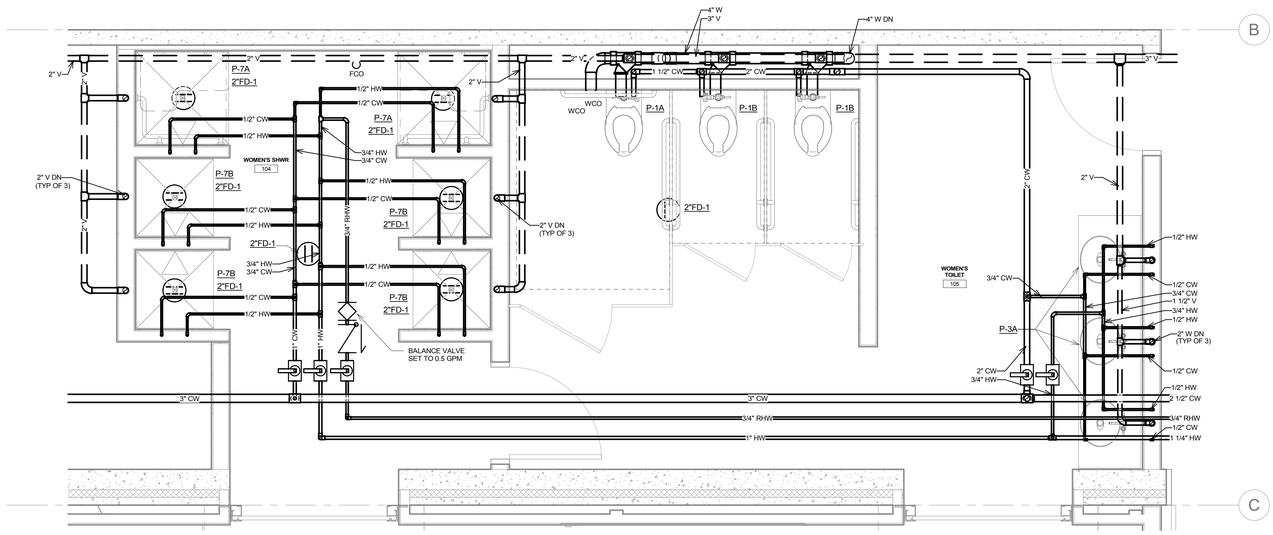
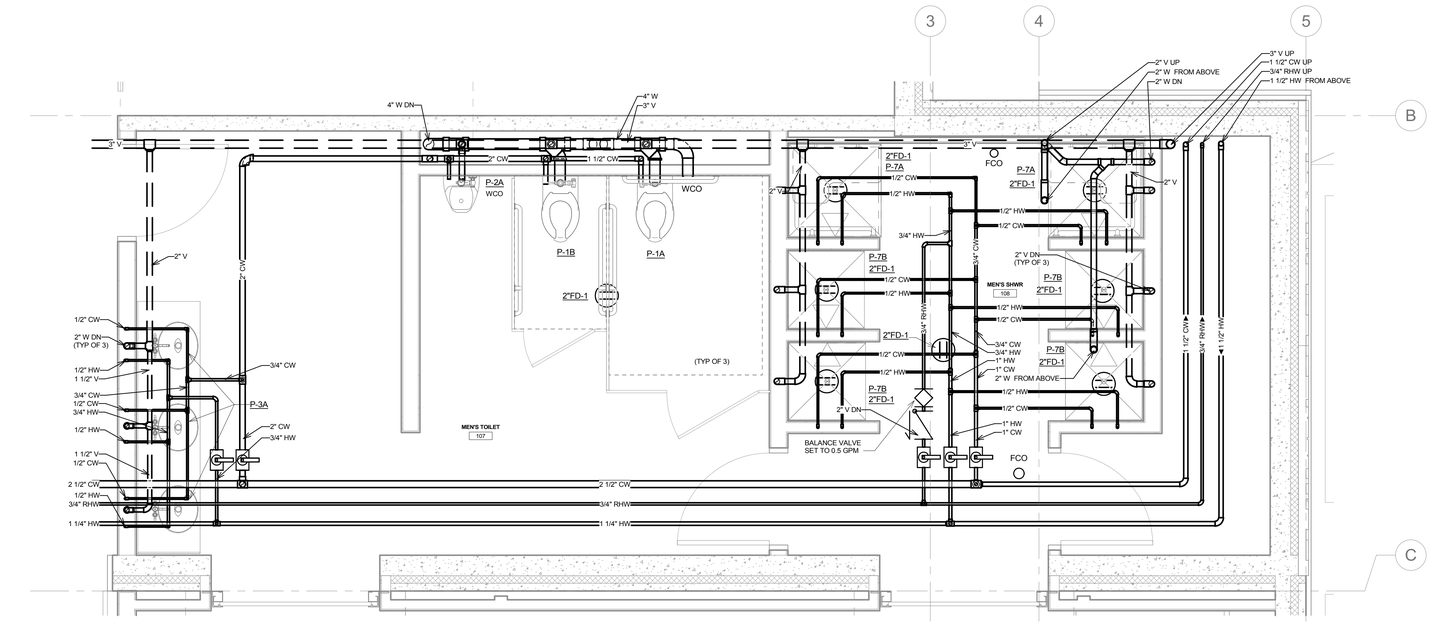
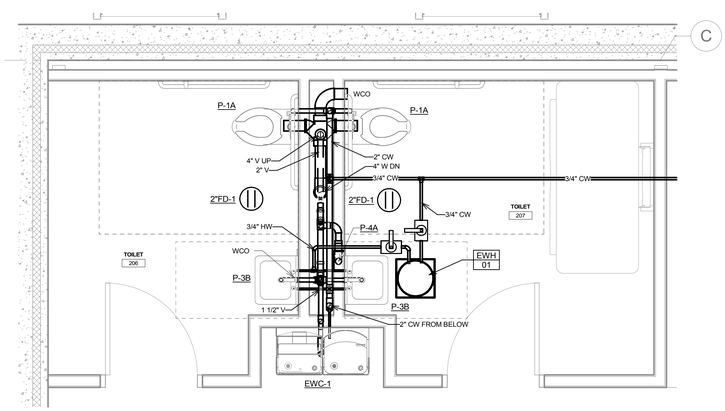
d/b/a BLOOM HAY DOBBS



2 ENLARGED PLUMBING PLAN - WOMAN'S TOILET (B105) AND WOMAN'S SHWR (B105A)
1/2" = 1'-0"



1 ENLARGED PLUMBING PLAN - MEN'S TOILET (B103) AND MEN'S SHWR (B103A)
1/2" = 1'-0"



3 ENLARGED PLUMBING PLAN - TOILET (B204) & TOILET (B205)
1/2" = 1'-0"

BLOOM HAY DOBBS

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PRINT NAME

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05/07/2025
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SHEET TITLE:
ENLARGED PLUMBING PLANS

SHEET NUMBER:

P200

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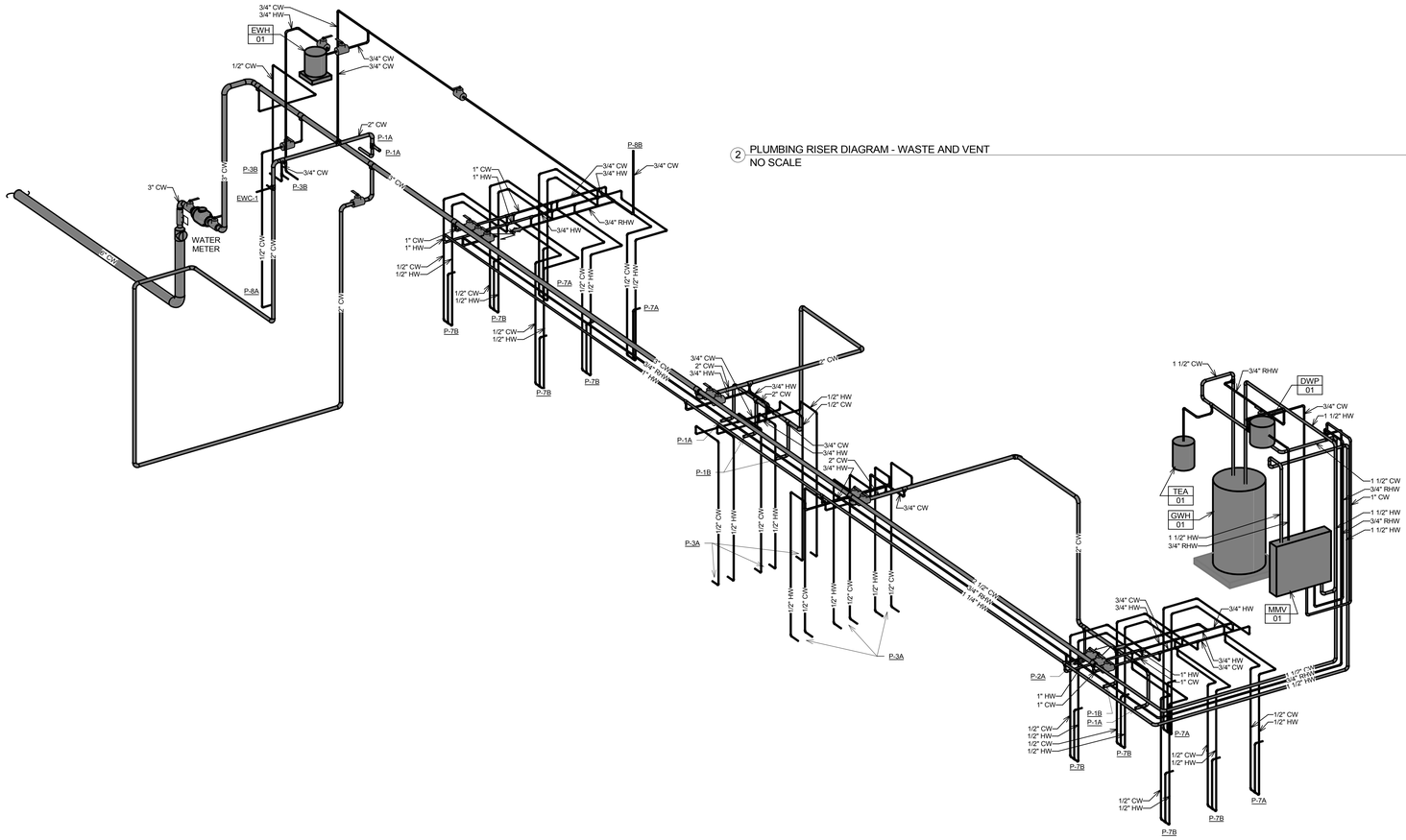
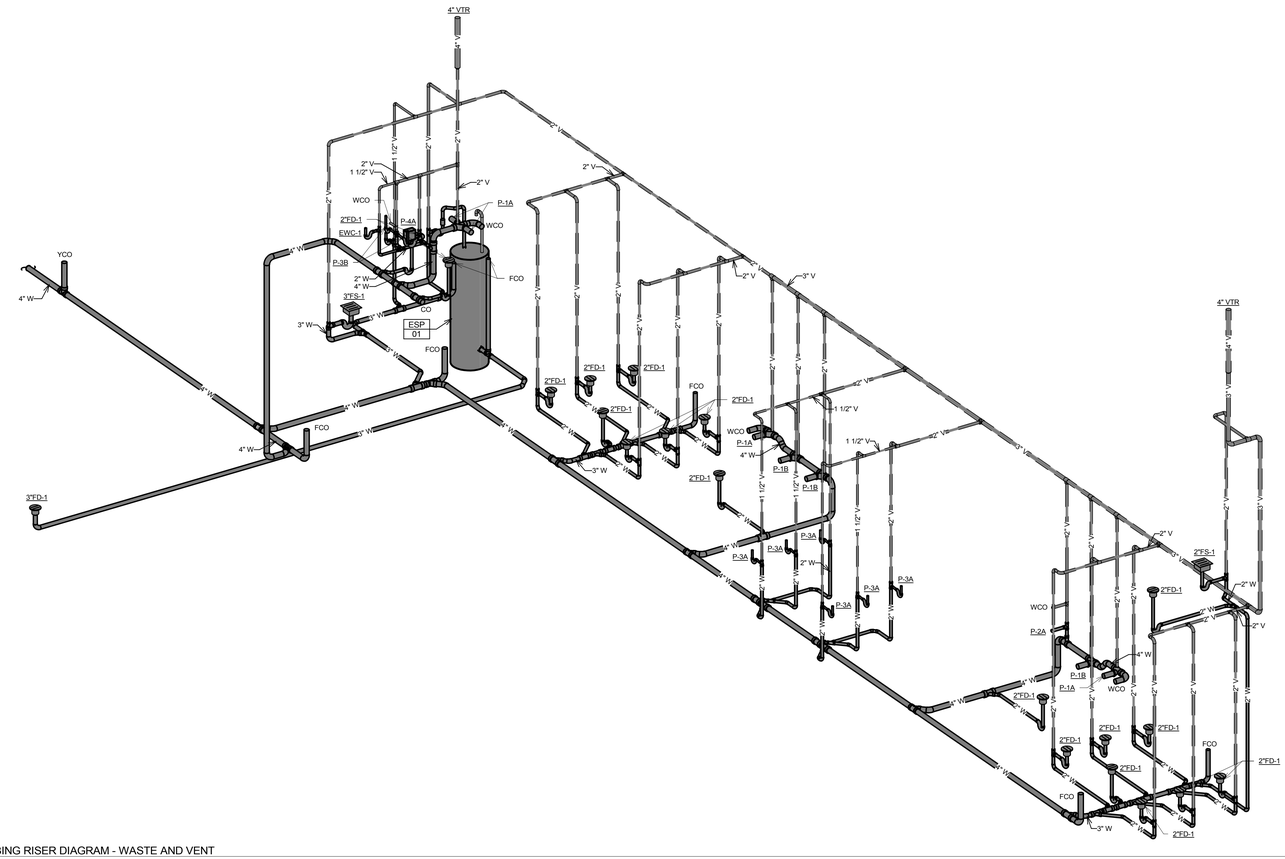


1 PLUMBING RISER DIAGRAM - POTABLE WATER
NO SCALE



2 PLUMBING RISER DIAGRAM - WASTE AND VENT
NO SCALE

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SHEET TITLE:
PLUMBING RISER DIAGRAMS

SHEET NUMBER:

P300

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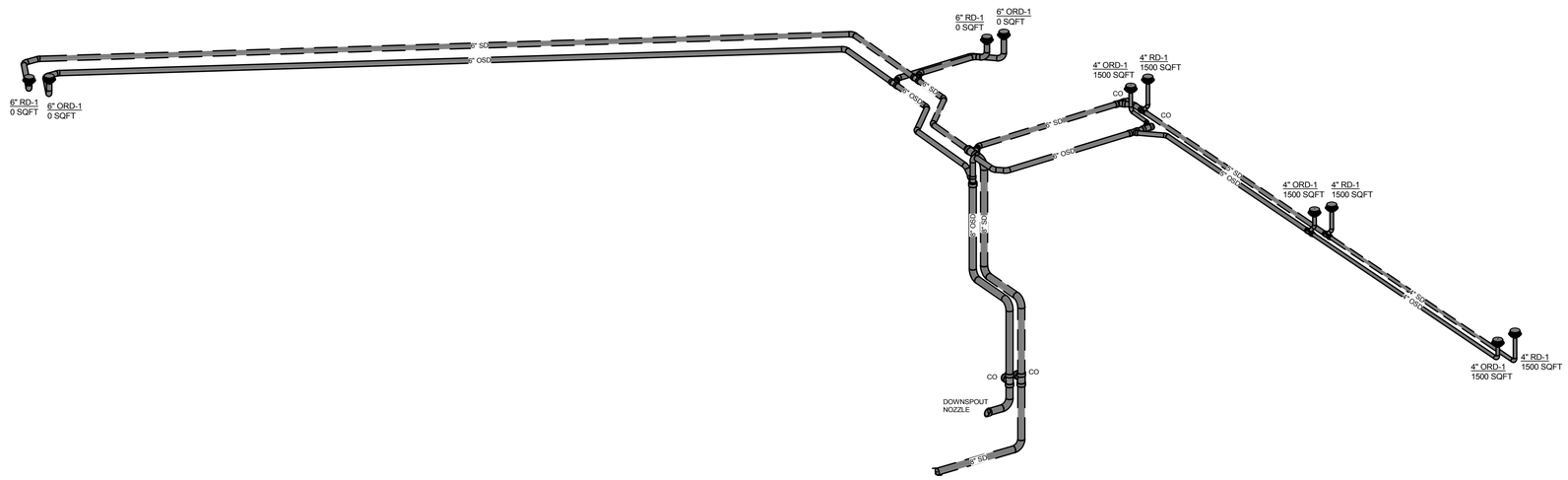

1 PLUMBING RISER DIAGRAM - STORM DRAINAGE
NO SCALE

BLOOM
HAY DOBBS

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Suite 200
St. Paul, MN 55114
Tel. 612.338.4590

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05/07/2025
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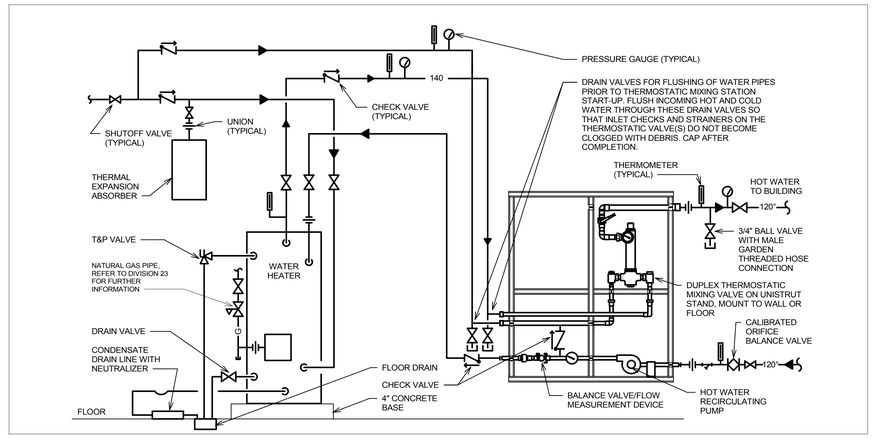
SHEET TITLE:
PLUMBING RISER DIAGRAMS

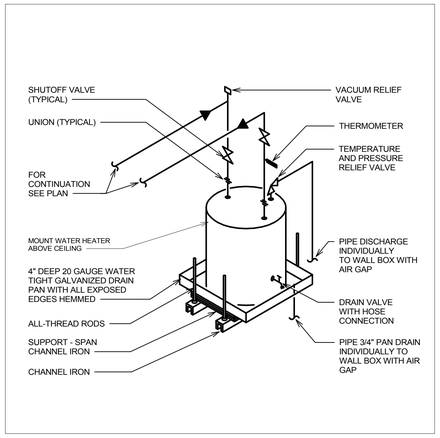
SHEET NUMBER:

P301

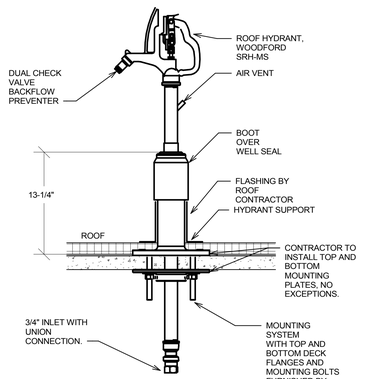
3008 NOT FOR BID, P.A. - CONSTRUCTION



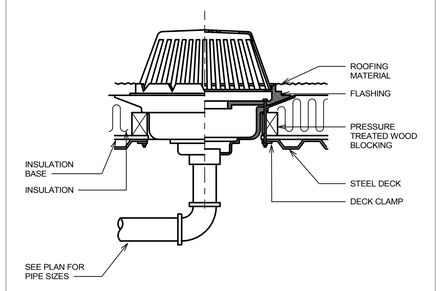
9 GAS WATER HEATER WITH MASTER MIXING VALVE STATION DETAIL
NO SCALE



8 ELECTRIC WATER HEATER PIPING DETAIL
NO SCALE



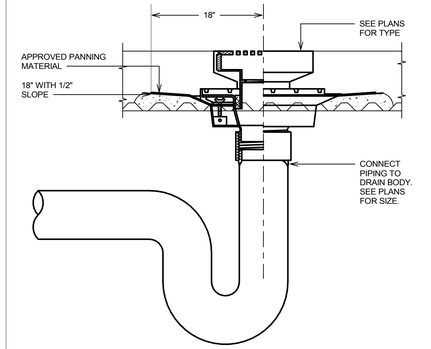
7 ROOF HYDRANT DETAIL
NO SCALE



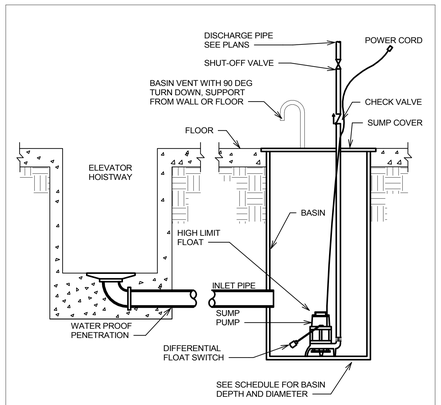
NOTES:

1. SET DRAINS AT INSULATION HEIGHT. VERIFY HEIGHT AND TYPE OF INSULATION.

6 ROOF DRAIN DETAIL
NO SCALE

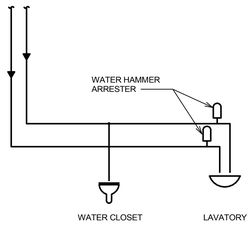


5 FLOOR DRAIN DETAIL
NO SCALE



4 ELEVATOR HOISTWAY SUMP PUMP DETAIL
NO SCALE

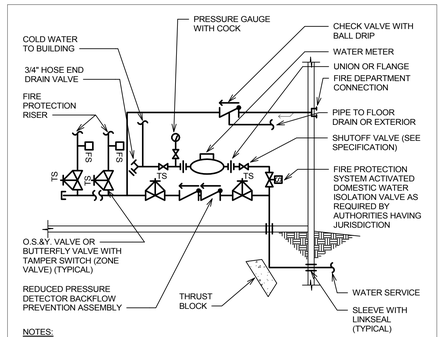
SIZING CHART						
PLUMBING AND DRAINAGE INSTITUTE (P.D.I.) ARRESTER SYMBOL	A	B	C	D	E	F
FIXTURE UNIT RATING	1-11	12-32	33-60	61-113	114-154	155-330



NOTES:

1. INSTALL WATER HAMMER ARRESTERS IN THE FOLLOWING LOCATIONS: PLUMBING FIXTURE GROUPS CONTAINING MOP SINKS, FLUSH VALVES, EQUIPMENT WITH SOLENOID OR AUTOMATIC FILL VALVES (DISHWASHERS, REFRIGERATORS, CLOTHES WASHERS, HUMIDIFIER, ETC). SEE SPECIFICATION 221119 DOMESTIC WATER PLUMBING SPECIALTIES.

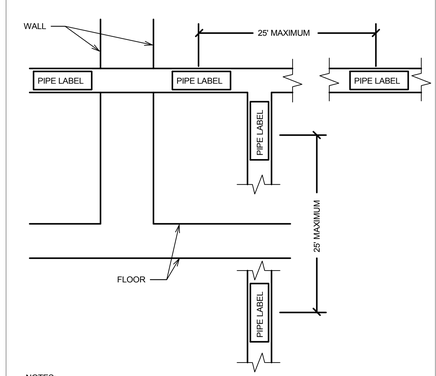
3 WATER HAMMER ARRESTOR DETAIL
NO SCALE



NOTES:

1. PROVIDE THE QUANTITY OF FIRE PROTECTION ZONES AS INDICATED ON THE PLAN DRAWINGS.

2 COMBINATION FIRE AND DOMESTIC WATER SERVICE PIPING DETAIL
NO SCALE



NOTES:
1. PIPE LABEL SHALL INCLUDE DETAILS OUTLINED IN DIVISION 21, 22, 23 SPECIFICATIONS.
2. LABELS SHALL BE LOCATED IMMEDIATELY AT BOTH SIDES OF A WALL.

1 PIPE LABEL DETAIL
NO SCALE

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Dunham Project Number: 0425231-000-00

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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.

Bryan J. Schmidt, P.E.
PRINT NAME

SIGNATURE

26566
LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
PLUMBING DETAILS

SHEET NUMBER:

P400

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PLUMBING FIXTURE SCHEDULE

MECHANICAL

FIXTURE TAG	FIXTURE DESCRIPTION	MOUNTING	ADA	FIXTURE	TRIM	STOP	TRAP	CARRIER	WASTE (IN)	TRAP (IN)	VENT (IN)	CW (IN)	HW (IN)	RO (IN)	MECHANICAL NOTES
P-1A	WATER CLOSET	WALL	YES	AMERICAN STANDARD AFWALL MILLENNIUM 3351.101, ELONGATED BOWL, WALL MOUNTED WITH TOP SPUD, WHITE, EVERCLEAN SURFACE.	TOTO FLUSHOMETER MODEL ECOPOWER TET6LA, SENSOR OPERATED, HYDROELECTRIC FLUSH, BATTERY POWERED, 1.28 GPF LOW CONSUMPTION,1" ANGLE STOP, TOP SPUD, POLISHED CHROME.	INTEGRAL ANGLE STOP ON FLUSH VALVE.	INTEGRAL	FLOOR SET VERTICALLY ADJUSTABLE WITH AUXILIARY SUPPORT ASSEMBLY (4 FEET SUPPORTS).	4	NA	2	1 1/2	NA	NA	PROVIDE OPEN FRONT WHITE SEAT EQUAL TO OLSONITE 95SSCT. FLUSH VALVE HANDLE TO BE ON THE APPROACH SIDE OF WATER CLOSET.
P-1B	WATER CLOSET	WALL	NO	AMERICAN STANDARD AFWALL MILLENNIUM 3351.101, ELONGATED BOWL, WALL MOUNTED WITH TOP SPUD, WHITE, EVERCLEAN SURFACE.	TOTO FLUSHOMETER MODEL ECOPOWER TET6LA, SENSOR OPERATED, HYDROELECTRIC FLUSH, BATTERY POWERED, 1.28 GPF LOW CONSUMPTION,1" ANGLE STOP, TOP SPUD, POLISHED CHROME.	INTEGRAL ANGLE STOP ON FLUSH VALVE.	INTEGRAL	FLOOR SET VERTICALLY ADJUSTABLE WITH AUXILIARY SUPPORT ASSEMBLY (4 FEET SUPPORTS).	4	NA	2	1 1/2	NA	NA	PROVIDE OPEN FRONT WHITE SEAT EQUAL TO OLSONITE 95SSCT. FLUSH VALVE HANDLE TO BE ON THE APPROACH SIDE OF WATER CLOSET.
P-2A	URINAL	WALL	YES	AMERICAN STANDARD WASHBROOK 6590.001, ELONGATED 14" RIM, WALL MOUNTED WITH TOP SPUD, WASHOUT FLUSH, STRAINER, WHITE.	TOTO FLUSHVALVE MODEL ECOPOWER TEU1LA, SENSOR OPWERATED, HYDROELECTRIC FLUSH, BATTERY POWERED, 0.5 GPF, 3/4" ANGLE STOP, TOP SPUD, POLISHED CHROME.	INTEGRAL ANGLE STOP ON FLUSH VALVE.	NA	FLOOR MOUNTED, HANGER PLATE, ADJUSTABLE SUPPORTING RODS, STRUCTURAL UPRIGHTS AND WELDED FEET.	2	NA	1-1/2	3/4	NA	NA	-
P-3A	LAVATORY	UNDER COUNTER MOUNT	YES	AMERICAN STANDARD OVALYN 0495.221, OVAL UNDERMOUNT SINK, 17-1/8x14-1/8" BOWL, LESS OVERFLOW, VITREOUS CHINA, WHITE.	SLOAN MODEL EBF-187, 0.5 GPM, LAMINAR FLOW, DECK MOUNTED, SENSOR OPERATED, BATTERY POWERED, POLISHED CHROME	McGUIRE QUARTER TURN BRASS BALL VALVE POLISHED CHROME PLATED CAST BRASS ANGLE VALVE KITS, LOOSE KEY, FLEXIBLE RISERS, ESCUTCHEON.	McGUIRE 1-1/4"x1-1/4" CAST BRASS CHROME PLATED 'P' TRAP, TREATED INSIDE & OUTSIDE WITH SANIGUARD; EXTEND TO WALL WITH ESCUTCHEON.	NA	1-1/2	1-1/4	1-1/2	1/2	1/2	NA	PROVIDE WITH ASSE 1070 THERMOSTATIC MIXING VALVE. PROVIDE MOLDED COVERING FOR WATER AND WASTE PIPING EQUAL TO TRUEBRO "LAV GUARD 2". PROVIDE McGUIRE CAST BRASS CHROME PLATED TAILPIECE & OPEN GRID STRAINER, ALL METAL PARTS TREATED INSIDE & OUTSIDE WITH SANIGUARD.
P-3B	LAVATORY	WALL	YES	AMERICAN STANDARD DECORUM 9024.001EC, WALL HUNG FOR CONCEALED ARMS SUPPORT, SINGLE HOLE, LESS OVERFLOW, VITREOUS CHINA, WHITE.	SLOAN MODEL EBF-187, 0.5 GPM, LAMINAR FLOW, DECK MOUNTED, SENSOR OPERATED, BATTERY POWERED, POLISHED CHROME	McGUIRE QUARTER TURN BRASS BALL VALVE POLISHED CHROME PLATED CAST BRASS ANGLE VALVE KITS, LOOSE KEY, FLEXIBLE RISERS, ESCUTCHEON.	McGUIRE 1-1/4"x1-1/4" CAST BRASS CHROME PLATED 'P' TRAP, TREATED INSIDE & OUTSIDE WITH SANIGUARD; EXTEND TO WALL WITH ESCUTCHEON.	FLOOR MOUNTED, CONCEALED ARMS, LEVELING AND SECURING SCREWS, STRUCTURAL UPRIGHTS AND WELDED FEET.	1-1/2	1-1/4	1-1/2	1/2	1/2	NA	PROVIDE WITH ASSE 1070 THERMOSTATIC MIXING VALVE. PROVIDE MOLDED COVERING FOR WATER AND WASTE PIPING EQUAL TO TRUEBRO "LAV GUARD 2". PROVIDE McGUIRE CAST BRASS CHROME PLATED TAILPIECE & OPEN GRID STRAINER, ALL METAL PARTS TREATED INSIDE & OUTSIDE WITH SANIGUARD.
P-4A	STANDPIPE WALL BOX	WALL	NA	GUY GRAY MBS1200DB2, RECESSED, WHITE POWDER COATED STEEL WASTE OUTLET BOX, WATER TIGHT, SLOPED TO 2" CENTER.	NA	NA	2" 'P' TRAP	NA	2	2	1-1/2	NA	NA	NA	MOUNT WALL BOX BELOW LAVATORY SINK.
P-7A	SHOWER	WALL	YES	NA	DELTA R10000-UNWS PRESSURE BALANCE VALVE WITH T13H333-05, 1.5 GPM SHOWER HEAD, HAND HELD SHOWER HEAD AND WALL HEAD WITH DIVERTER, 70" WHITE VINYL HOSE, 36" SLIDE BAR, INTEGRAL STOPS, DIVERTER FOR HEAD TO HAND CONTROL.	INTEGRAL	NA	NA	2" FD	NA	NA	1/2	1/2	NA	
P-7B	SHOWER	WALL	NO	NA	DELTA R10000-UNWS PRESSURE BALANCE VALVE WITH T13H132, 1.5 GPM SHOWER HEAD, INTEGRAL STOPS.	INTEGRAL	NA	NA	2" FD	NA	NA	1/2	1/2	NA	
P-8A	HOSE BIBB	WALL	NA	WOODFORD MODEL 21	NA	BALL VALVE	NA	NA	NA	NA	NA	3/4	NA	NA	-
P-8B	ROOF HYDRANT	ROOF	NA	WOODFORD MODEL RHY2-1-MS	NA	BALL VALVE	NA	NA	NA	NA	NA	3/4	NA	NA	-

THERMAL EXPANSION ABSORBER SCHEDULE

MECHANICAL

EQUIPMENT TAG	APPLICATION	TYPE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	PRECHARGE PRESSURE (PSIG)	ASME CERTIFIED (YES/NO)	SIZE		MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
							DIAMETER (IN)	LENGTH (IN)			
TEA 01											

MECHANICAL NOTES:

ELECTRIC WATER COOLER SCHEDULE

MECHANICAL

EQUIPMENT TAG	FIXTURE DESCRIPTION	MOUNTING	ADA	FIXTURE	STOP	TRAP	WASTE (IN)	TRAP (IN)	VENT (IN)	CW (IN)	MECHANICAL NOTES
EWC-1	BI-LEVEL ELECTRIC WATER COOLER WITH BOTTLE FILLER.	WALL	YES	ELKAY MODEL LZSTL8WSSK, BI-LEVEL COOLER, FILTERED BOTTLE FILLING STATION, STAINLESS STEEL.	BALL VALVE	1-1/4"x1-1/4" CAST BRASS, CHROME PLATED, 'P' TRAP, EXTEND TO WALL W/ ESCUTCHEON	1-1/4	1-1/4	1-1/2	1/2	1

MECHANICAL NOTES:

1. REFER TO ELECTRICAL PLANS FOR RECEPTACLE LOCATION.

ROOF AND OVERFLOW DRAIN SCHEDULE

MECHANICAL

EQUIPMENT TAG	SIZE (IN)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
ORD-1	SEE PLAN	JOSAM	21500-AE	1
RD-1	SEE PLAN	JOSAM	21500-AE	--

MECHANICAL NOTES:

1. PROVIDE WITH 2" INTERNAL DAM.

FLOOR DRAIN SCHEDULE

MECHANICAL

EQUIPMENT TAG	SIZE (IN)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
FD-1	SEE PLAN	JOSAM	30000-5A	--

FLOOR SINK SCHEDULE

MECHANICAL

EQUIPMENT TAG	SIZE (IN)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
FS-1	SEE PLAN	JOSAM	49360-LF-NB-3	--

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Bryan J. Schmidt, P.E.
PRINT NAME

SIGNATURE

26566
LICENSE NO.

05/07/2025
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
PLUMBING SCHEDULES

SHEET NUMBER:

P500

DOB NOT SCALE, P.A. - CONSTRUCTION

THERMOSTATIC MIXING STATION SCHEDULE

MECHANICAL

EQUIPMENT TAG	APPLICATION	NUMBER OF MIXING VALVES	MINIMUM FLOW (GPM)	MAXIMUM FLOW (GPM)	PRESSURE DROP AT MAXIMUM FLOW (PSIG)	INLET TEMPERATURE (F)	OUTLET TEMPERATURE (F)	INLET SIZE (IN)	OUTLET SIZE (IN)	RETURN FROM BUILDING SIZE (IN)	RETURN TO HEATER SIZE (IN)	PUMP											
												GPM	DISCHARGE HEAD (FT)	RPM	BHP	SUCTION SIZE (IN)	DISCHARGE SIZE (IN)	VFD (YES/NO)	MANUFACTURER	MODEL NUMBER	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
MMV 01																							

GENERAL MECHANICAL NOTES:

A. REFER TO ELECTRICAL SECTION BELOW FOR CALCULATED SHORT-CIRCUIT CURRENT AT EQUIPMENT.

MECHANICAL NOTES:

ELECTRICAL

EQUIPMENT TAG	HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR					PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
					TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				

GENERAL ELECTRICAL NOTES:

A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.
B. MECHANICAL EQUIPMENT AND CORRESPONDING ELECTRICAL DISCONNECTS/CONTROLLERS SHALL HAVE A STANDARD SHORT-CIRCUIT CURRENT RATING HIGHER THAN THE CALCULATED VALUE SHOWN IN THIS SCHEDULE, DETAILED BY THE "CALCULATED AFC" COLUMN.

ELECTRICAL NOTES:

CONTROLLER TYPES:

VFD - VARIABLE FREQUENCY MOTOR CONTROLLER
MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL

MAGS - MAGNETIC STARTER
MRS/MS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

DOMESTIC WATER PUMP SCHEDULE

MECHANICAL

EQUIPMENT TAG	APPLICATION	TYPE	GPM	DISCHARGE HEAD (FT)	NPSHR (FT)	RPM	BHP	SUCTION SIZE (IN)	DISCHARGE SIZE (IN)	VFD (YES/NO)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
DWP 01													

GENERAL MECHANICAL NOTES:

A. REFER TO ELECTRICAL SECTION BELOW FOR CALCULATED SHORT-CIRCUIT CURRENT AT EQUIPMENT.

MECHANICAL NOTES:

ELECTRICAL

EQUIPMENT TAG	HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR					PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
					TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				
DWP 01		120 V	1	<5000	CP	MFR.	INTEGRAL	DIV.23	MRS.	-	NEMA-1	DIV.26	AT UNIT				

GENERAL ELECTRICAL NOTES:

A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.
B. MECHANICAL EQUIPMENT AND CORRESPONDING ELECTRICAL DISCONNECTS/CONTROLLERS SHALL HAVE A STANDARD SHORT-CIRCUIT CURRENT RATING HIGHER THAN THE CALCULATED VALUE SHOWN IN THIS SCHEDULE, DETAILED BY THE "CALCULATED AFC" COLUMN.

ELECTRICAL NOTES:

CONTROLLER TYPES:

VFD - VARIABLE FREQUENCY MOTOR CONTROLLER
MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL

MAGS - MAGNETIC STARTER
MRS/MS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

WATER HEATER SCHEDULE - ELECTRIC

MECHANICAL

EQUIPMENT TAG	APPLICATION	WATER			HEATING CAPACITY (W)	WATER HEATER SET POINT (F)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
		STORAGE CAPACITY (GAL)	RECOVERY RATE (GPH)	TEMPERATURE RISE (F)					
EWH 01	DOMESTIC HOT WATER	6	8	90	1650	120	AO SMITH	EJC-6	

GENERAL MECHANICAL NOTES:

A. REFER TO ELECTRICAL SECTION BELOW FOR CALCULATED SHORT-CIRCUIT CURRENT AT EQUIPMENT.

MECHANICAL NOTES:

ELECTRICAL

EQUIPMENT TAG	HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR					PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
					TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				

GENERAL ELECTRICAL NOTES:

A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.
B. MECHANICAL EQUIPMENT AND CORRESPONDING ELECTRICAL DISCONNECTS/CONTROLLERS SHALL HAVE A STANDARD SHORT-CIRCUIT CURRENT RATING HIGHER THAN THE CALCULATED VALUE SHOWN IN THIS SCHEDULE, DETAILED BY THE "CALCULATED AFC" COLUMN.

ELECTRICAL NOTES:

CONTROLLER TYPES:

MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL

MAGS - MAGNETIC STARTER
MRS/MS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

WATER HEATER SCHEDULE - GAS

MECHANICAL

EQUIPMENT TAG	APPLICATION	WATER			GAS				EFFICIENCY (%)	WATER HEATER SET POINT (F)	MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
		STORAGE CAPACITY (GAL)	RECOVERY RATE (GPH)	TEMPERATURE RISE (F)	INPUT (MBH)	TYPE	MINIMUM INLET PRESSURE (IN. W.C.)	MAXIMUM INLET PRESSURE (IN. W.C.)					
GWH 01													

GENERAL MECHANICAL NOTES:

A. REFER TO ELECTRICAL SECTION BELOW FOR CALCULATED SHORT-CIRCUIT CURRENT AT EQUIPMENT.

MECHANICAL NOTES:

ELECTRICAL

EQUIPMENT TAG	HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR					PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
					TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				
GWH 01		120 V	1	<5000	CP	MFR.	INTEGRAL	DIV.23	MRS.	-	NEMA-1	DIV.26					

GENERAL ELECTRICAL NOTES:

A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.
B. MECHANICAL EQUIPMENT AND CORRESPONDING ELECTRICAL DISCONNECTS/CONTROLLERS SHALL HAVE A STANDARD SHORT-CIRCUIT CURRENT RATING HIGHER THAN THE CALCULATED VALUE SHOWN IN THIS SCHEDULE, DETAILED BY THE "CALCULATED AFC" COLUMN.

ELECTRICAL NOTES:

CONTROLLER TYPES:

MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL

MAGS - MAGNETIC STARTER
MRS/MS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

ELEVATOR SUMP PUMP SCHEDULE

MECHANICAL

EQUIPMENT TAG	APPLICATION	TYPE	DISCHARGE HEAD (FT)	GPM	NUMBER OF PUMPS	BHP	MOTOR RPM (EACH)	BASIN		MANUFACTURER	MODEL NUMBER	MECHANICAL NOTES
								DIAMETER (IN)	DEPTH (IN)			
ESP 01	ELEVATOR SUMP PUMP	SIMPLEX SUBMERSIBLE	25	50	1	1	1750	30	96	WEIL	1601-550	1,2,3,4,5,6,7

GENERAL MECHANICAL NOTES:

A. REFER TO ELECTRICAL SECTION BELOW FOR CALCULATED SHORT-CIRCUIT CURRENT AT EQUIPMENT.

MECHANICAL NOTES:

1. PROVIDE WEIL MODEL 8234 TETHERED LEVEL CONROL FOR SIMPLEX PUMPING (OFF, LEAD, HIGH WATER FLOAT).
2. PROVIDE WEIL MODEL 8153 SIMPLEX CONTROL PANEL, HIGH WATER ALARM SYSTEM. LOCKABLE THROUGH DOOR DISCONNECT.
3. PROVIDE WEIL MODEL 8805 ROUND WET WELL COVER FOR SUBMERSIBLE FLOOR MOUNT PUMPS.
4. PROVIDE ANTI-FLOTATION RING AS PART OF THE BASIN WITH CONCRETE BALLAST AS RECOMMENDED BY BASIN MANUFACTURER.
5. PROVIDE 20 FOOT STAINLESS STEEL LIFTING CABLE AND PUMP OPENING COVER WITH DISCHARGE FLANGE.
6. PROVIDE CAST IRON CAULKING HUB INLET, GASKET, NUTS, BOLTS AND WASHERS. REFER TO PLAN FOR PIPE SIZE.
7. PROVIDE 2" DISCHARGE PIPE.
8. PROVIDE 3" DISCHARGE PIPE.
9. PROVIDE 4" DISCHARGE PIPE.
10. PROVIDE UL EXPLOSION PROOF MOTOR.

ELECTRICAL

HP/LOAD	VOLTAGE	PHASE	CALCULATED AFC	CONTROLLER				DISCONNECT AT MOTOR					PANEL	CIRCUIT NUMBER	CONDUIT/FEEDER SIZE	ELECTRICAL NOTES
				TYPE	FURNISHED BY/ INSTALLED BY	LOCATION	CTRL WIRE BY	AMPS/TYPE	FUSE SIZE (AMPS)	NEMA TYPE	FURNISHED BY/ INSTALLED BY	LOCATION				

GENERAL ELECTRICAL NOTES:

A. WHEN THE CONTROLLER TYPE IS A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE FREQUENCY DRIVE CONTROLLER SCHEDULE OR THE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION.
B. MECHANICAL EQUIPMENT AND CORRESPONDING ELECTRICAL DISCONNECTS/CONTROLLERS SHALL HAVE A STANDARD SHORT-CIRCUIT CURRENT RATING HIGHER THAN THE CALCULATED VALUE SHOWN IN THIS SCHEDULE, DETAILED BY THE "CALCULATED AFC" COLUMN.

ELECTRICAL NOTES:

CONTROLLER TYPES:

MMS - MANUAL MOTOR STARTER (WITH OVERLOADS)
CP - CONTROL PANEL

MAGS - MAGNETIC STARTER
MRS/MS - MOTOR RATED SWITCH (WITHOUT OVERLOADS)

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Dunham Project Number: 0425231-000-00

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.

Madeline M. Folin, P.E.
PRINT NAME

SIGNATURE

57233
LICENSE NO.

05/07/2025
DATE

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

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Bryan J. Schmidt, P.E.
PRINT NAME

SIGNATURE

26566
LICENSE NO.

05/07/2025
DATE

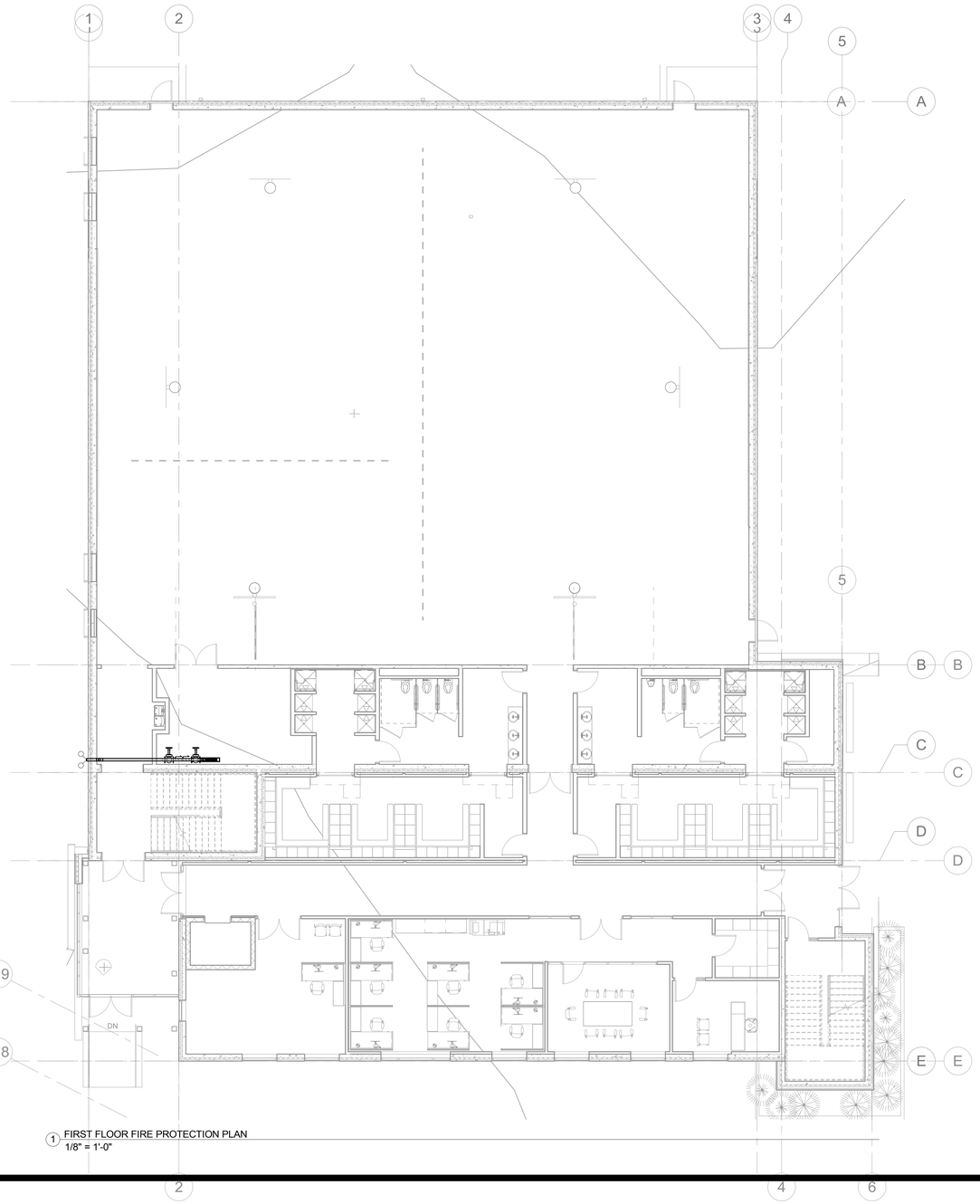
DD DOCUMENT Not For Construction

SHEET TITLE:
PLUMBING ELECTRICAL SCHEDULES

SHEET NUMBER:

PE600

2008 VAN DOREN, P.A. - CONSTRUCTION



1 FIRST FLOOR FIRE PROTECTION PLAN
1/8" = 1'-0"

GENERAL NOTES:

A. THE FIRE PROTECTION CONTRACTOR SHALL BE RESPONSIBLE FOR ANY GENERAL CONSTRUCTION WORK AS DIRECTLY IMPACTED BY THE SPRINKLER SYSTEM INSTALLATION. EXAMPLES OF WORK DIRECTLY TIED INTO THE FIRE PROTECTION CONTRACTORS WORK INCLUDES, BUT NOT LIMITED TO FIRE SEALING OF ALL RATED WALL PENETRATIONS, CEILING ACCESS PANELS, ETC.

B. COORDINATE ALL SPRINKLER PIPE ROUTING WITH ALL OTHER TRADES TO ENSURE ADEQUATE CLEARANCES FOR DUCTWORK, ELECTRICAL CONDUIT, STRUCTURAL SUPPORTS, PIPING, EQUIPMENT, ETC. ANY UNAVOIDABLE CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER OF RECORD. PROVIDE ALL OFFSETS AND TRANSITIONS AS REQUIRED FOR A CLEAN INSTALLATION. ADDITIONAL COMPENSATION WILL NOT BE REWARDED DUE TO LACK OF COORDINATION WITH OTHER SUBCONTRACTORS. FIRE PROTECTION CONTRACTOR TO MOVE AND RELOCATE PIPING THAT INTERFERES WITH OTHER TRADES.

C. SUPPORT ALL PIPING DIRECTLY FROM STRUCTURE. DO NOT SUPPORT ANY PIPING FROM DUCTWORK, CONDUIT, PIPING, ETC.

D. ALL SPRINKLER PIPING ROUTED THROUGH FIRE RATED WALLS SHALL BE ADEQUATELY FIRE SEALED AS REQUIRED TO MAINTAIN THE LISTED WALL RATING.

E. ALL SPRINKLER HEADS SHALL BE INSTALLED AT THE CENTER OF ALL LAY-IN CEILING TILES. SPRINKLER HEADS IN GYPSUM CEILING SHALL BE ARRANGED IN AN ARCHITECTURALLY SYMMETRIC MANNER. COORDINATE WITH ARCHITECTURAL CEILING PLANS.

F. COORDINATE WITH ARCHITECTURAL CEILING PLANS TO PROVIDE FULL COVERAGE THROUGHOUT. VERIFY SOFFITS, COLUMNS, AND OTHER POTENTIAL OBSTRUCTIONS WHEN LAYING OUT SPRINKLER HEAD COVERAGE.

G. COORDINATE WITH PROJECT SPECIFICATION MANUAL AND DRAWING DETAILS FOR ADDITIONAL AUXILIARY DRAIN, MANUAL VENTS, INSPECTOR'S TEST STATIONS, AND OTHER REQUIRED PIPING COMPONENTS THAT MAY NOT BE INDICATED DIRECTLY ON THIS DRAWING.

KEY NOTES:

1 NOTE NOT USED.

BLOOM HAY DOBBS

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Bryan J. Schmidt, P.E.
PRINT NAME

SIGNATURE

26566
LICENSE NO.

05/07/2025
DATE

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SHEET TITLE:
FIRST FLOOR FIRE PROTECTION PLAN

SHEET NUMBER:

FP101

2008 BLOOM DOBBS, P.A. - ALL RIGHTS RESERVED.

GENERAL NOTES:

A. THE FIRE PROTECTION CONTRACTOR SHALL BE RESPONSIBLE FOR ANY GENERAL CONSTRUCTION WORK AS DIRECTLY IMPACTED BY THE SPRINKLER SYSTEM INSTALLATION. EXAMPLES OF WORK DIRECTLY TIED INTO THE FIRE PROTECTION CONTRACTORS WORK INCLUDES, BUT NOT LIMITED TO FIRE SEALING OF ALL RATED WALL PENETRATIONS, CEILING ACCESS PANELS, ETC.

B. COORDINATE ALL SPRINKLER PIPE ROUTING WITH ALL OTHER TRADES TO ENSURE ADEQUATE CLEARANCES FOR DUCTWORK, ELECTRICAL CONDUIT, STRUCTURAL SUPPORTS, PIPING, EQUIPMENT, ETC. ANY UNAVOIDABLE CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER OF RECORD. PROVIDE ALL OFFSETS AND TRANSITIONS AS REQUIRED FOR A CLEAN INSTALLATION. ADDITIONAL COMPENSATION WILL NOT BE REWARDED DUE TO LACK OF COORDINATION WITH OTHER SUBCONTRACTORS. FIRE PROTECTION CONTRACTOR TO MOVE AND RELOCATE PIPING THAT INTERFERES WITH OTHER TRADES.

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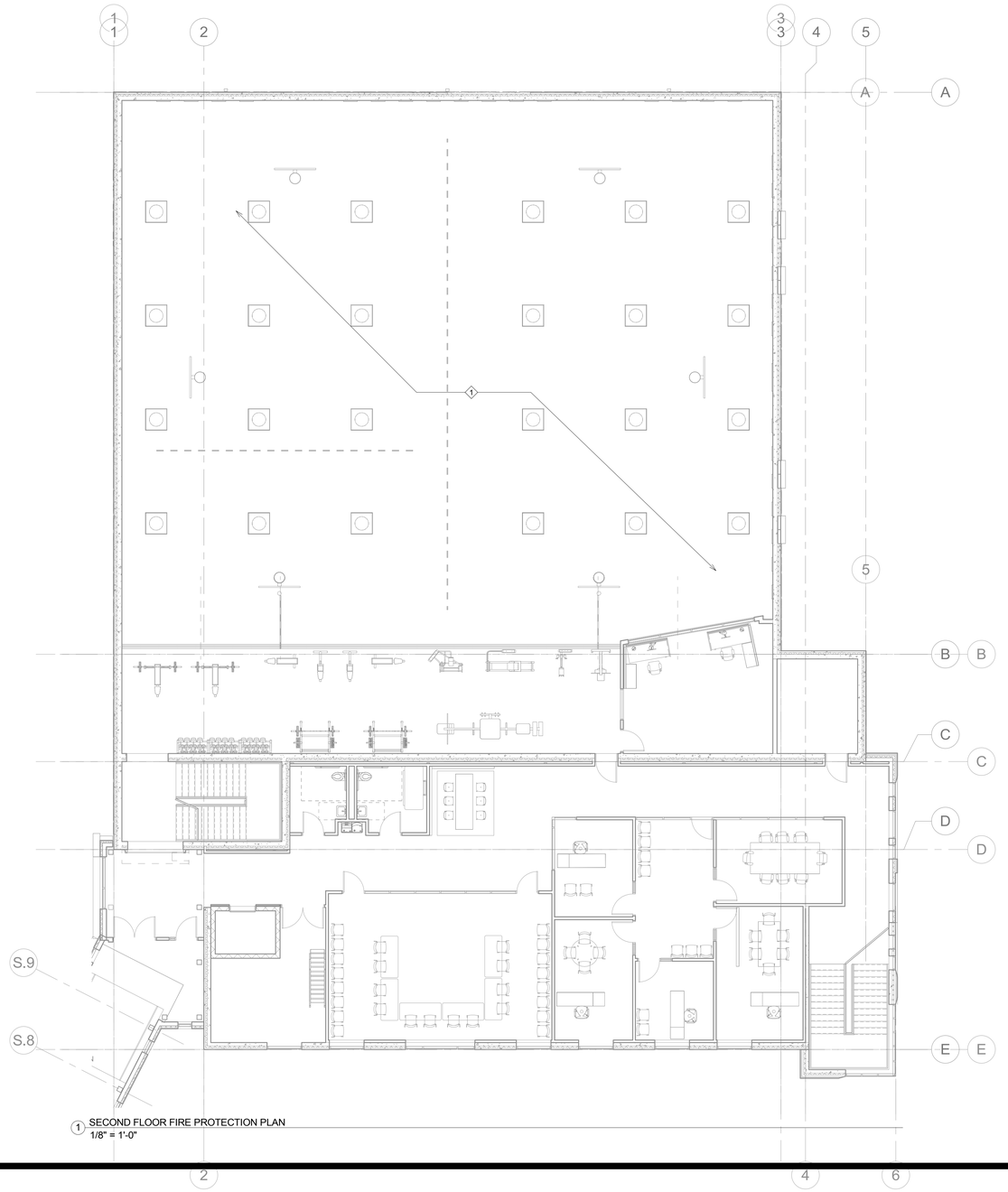
E. ALL SPRINKLER HEADS SHALL BE INSTALLED AT THE CENTER OF ALL LAY-IN CEILING TILES. SPRINKLER HEADS IN GYPSUM CEILING SHALL BE ARRANGED IN AN ARCHITECTURALLY SYMMETRIC MANNER. COORDINATE WITH ARCHITECTURAL CEILING PLANS.

F. COORDINATE WITH ARCHITECTURAL CEILING PLANS TO PROVIDE FULL COVERAGE THROUGHOUT. VERIFY SOFFITS, COLUMNS, AND OTHER POTENTIAL OBSTRUCTIONS WHEN LAYING OUT SPRINKLER HEAD COVERAGE.

G. COORDINATE WITH PROJECT SPECIFICATION MANUAL AND DRAWING DETAILS FOR ADDITIONAL AUXILIARY DRAIN, MANUAL VENTS, INSPECTOR'S TEST STATIONS, AND OTHER REQUIRED PIPING COMPONENTS THAT MAY NOT BE INDICATED DIRECTLY ON THIS DRAWING.

KEY NOTES:

1. ALL SPRINKLER HEADS WITHIN GYM SPACE SHALL HAVE GUARDS. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.



1 SECOND FLOOR FIRE PROTECTION PLAN
1/8" = 1'-0"

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Bryan J. Schmidt, P.E.
PRINT NAME

SIGNATURE

26566
LICENSE NO.

05/07/2025
DATE

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SHEET TITLE:
SECOND FLOOR FIRE PROTECTION PLAN

SHEET NUMBER:

FP102

2008 bar ITSIBEN, P.A.,
CLIENT/OWNER

ELECTRICAL ABBREVIATIONS

A, AMP	AMPERES	M	METER
ABV	ABOVE	MC	MOMENTARY CONTACT OR MECHANICAL CONTRACTOR
AG	ABOVE GRADE		
AA	AUDIBLE ALARM	MCB	MAIN CIRCUIT BREAKER
AC	ABOVE COUNTER	MCC	MOTOR CONTROL CENTER
ACH	ABOVE COUNTER HEIGHT	MH	MAN HOLE
ADD	ADDENDUM	MLO	MAIN LUG ONLY
AFC	AVAILABLE FAULT CURRENT	MMFO	MULTI MODE FIBER OPTIC
AFCI	ARC FAULT CIRCUIT INTERRUPTER	MRS	MOTOR RATED SWITCH
AFF	ABOVE FINISHED FLOOR	MSB	MAIN SWITCHBOARD
AHU	AIR HANDLING UNIT	MT	EMPTY
AL	ALUMINUM	MTR	MOTOR
ANT	ANTENNA	N	NEUTRAL
ATS	AUTOMATIC TRANSFER SWITCH	NC	NORMALLY CLOSED
AV	AUDIO VISUAL	NEC	NATIONAL ELECTRICAL CODE
AWG	AMERICAN WIRE GUAGE	NIC	NOT IN CONTRACT
BAS	BUILDING AUTOMATION SYSTEM	NO	NORMALLY OPEN
BFC	BELOW FINISHED CEILING	NTS	NOT TO SCALE
BPS	BOLTED PRESSURE SWITCH	OC	ON CENTER
C	CONDUIT OR CONTROLLED RECEPT	PB	PULL BOX OR PUSHBUTTON
CAB	CABINET	PE	PNEUMATIC ELECTRIC
CB	CIRCUIT BREAKER	PF	POWER FACTOR
CCTV	CLOSED CIRCUIT TV	PH	PHASE
CKT	CIRCUIT	PNL	PANEL
CLG	CEILING	PRI	PRIMARY
COMM	COMMUNICATIONS	PT	POTENTIAL TRANSFORMER
CT	CURRENT TRANSFORMER	R	RACEWAY
CTRL	CONTROL	RECEPT	RECEPTACLE
CU	COPPER	REFG	REFRIGERATOR
DAS	DISTRIBUTED ANTENNA SYSTEM	RTU	ROOF TOP UNIT
DED	DEDICATED	SEC	SECONDARY
DN	DOWN	SGB	SERVICE GROUND BAR
EC	ELECTRICAL CONTRACTOR	SMFO	SINGLE MODE FIBER OPTIC
EGB	ELECTRICAL GROUND BAR	SPKR	SPEAKER
ELEC	ELECTRIC OR ELECTRICAL	STP	SHIELDED TWISTED PAIR
EM	EMERGENCY	SUB	SUBSTATION
EMT	ELECTRICAL METALLIC TUBING	SW	SWITCH
ENCL	ENCLOSURE	SWBD	SWITCHBOARD
EP	ELECTRIC PNEUMATIC	TEL	TELEPHONE
EPO	EMERGENCY POWER OFF	TELCOM	TELECOMMUNICATIONS
EWC	ELECTRIC WATER COOLER	TGB	TELECOMMUNICATIONS GROUND BAR
F	FUSE OR FUSED	TMGB	TELECOMMUNICATIONS MAIN GROUND BAR
FA	FIRE ALARM	TR	TAMPER RESISTANT
FAAP	FIRE ALARM ANNUNCIATOR PANEL	TSTAT	THERMOSTAT
FACP	FIRE ALARM CONTROL PANEL	TYP	TYPICAL
FB	FLOOR BOX	UC	UNDER COUNTER
FO	FIBER OPTIC	UF	UNDER FLOOR
FSD	FIRE-SMOKE DAMPER	UG	UNDER GROUND
FV	FILM VIEWER	UH	UNIT HEATER
G, GND	GROUND	UNO	UNLESS NOTED OTHERWISE
GC	GENERAL CONTRACTOR	USB	UNIVERSAL SERIAL BUS
GFEP	GROUND FAULT EQUIPMENT PROTECTION	UTP	UNSHIELDED TWISTED PAIR
GFI, GFCI	GROUND FAULT CIRCUIT INTERRUPTER	V	VOLT OR VOLTAGE
HH	HAND HOLE	VA	VOLT-AMP
HOA	HAND OFF AUTO	VAC	VOLTS ALTERNATING CURRENT
IG	ISOLATED GROUND	VDC	VOLTS DIRECT CURRENT
JBOX	JUNCTION BOX	W	WATT, WIRE OR WALL PHONE
KV	KILOVOLT	WAP	WIRELESS ACCESS POINT
KVA	KILOVOLT-AMP	WP	WEATHERPROOF
KW	KILOWATT	X	EXISTING
KWH	KILOWATT-HOUR	XFMR	TRANSFORMER

ELECTRICAL SYMBOLS LEGEND

SYMBOL SCHEDULE NOTES

A. THESE SYMBOLS COMPRISE A STANDARD LIST, NOT ALL SYMBOLS MAY APPEAR ON THESE DRAWINGS.

B. MOUNTING HEIGHTS INDICATED ARE STANDARD. DIMENSIONAL NUMBERS INDICATED AT DEVICES SHALL OVERRIDE THESE STANDARDS. MOUNTED HEIGHTS ARE TO THE CENTER OF THE DEVICE, UNLESS NOTED OTHERWISE.

C. MOUNTING HEIGHTS INDICATED ARE FOR STUD WALL CONSTRUCTION. WHEN BLOCK OR BRICK CONSTRUCTION IS USED, ADJUST MOUNTING HEIGHTS TO ALIGN DEVICE PLATES WITH RUNNING JOINT.

D. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.

GENERAL

SYMBOL	DESIGNATIONS
	LIGHT SOLID LINE WEIGHT INDICATES EXISTING ITEM TO REMAIN.
	DARK DASHED LINE WEIGHT INDICATES EXISTING ITEM TO BE REMOVED.
	DARK SOLID LINE WEIGHT INDICATES NEW ITEM OR NEW LOCATION.
R	REMOVE EXISTING ITEM
RL	REMOVE EXISTING ITEM AND RELOCATE AS INDICATED
X	EXISTING ITEM TO REMAIN
NL	NEW LOCATION FOR RELOCATED ITEM

NOTES & TAGS

SYMBOL	DESIGNATIONS
XX / ##	EQUIPMENT IDENTIFICATION TAG - SEE EQUIPMENT SCHEDULES
XXX-X	FEEDER SIZE TAG - SEE POWER RISER SCHEDULE
#/C	ELEC EQUIP CONNECTION TAG - SEE EQUIP SCHEDULE
#	KEYNOTE
#	MISCELLANEOUS NOTE
LC / #	LIGHTING CONTROL SEQUENCE - SEE SCHEDULE
X" W / X" H / X' - X" AFF	CABLE TRAY TAG X" W - WIDTH OF CABLE TRAY X" H - HEIGHT OF CABLE TRAY X' - X" AFF - MOUNTING HEIGHT OF CABLE TRAY (FROM FINISH FLOOR TO BOTTOM OF TRAY)

RACEWAYS

SYMBOL	DESIGNATIONS
	CONDUIT CONCEALED IN CEILING OR WALLS
	CONDUIT CONCEALED IN THE FLOOR OR BELOW
	CONDUIT EXPOSED ON THE CEILING OR WALLS
UG	CONDUIT BURIED UNDERGROUND (# = DEPTH)
	CONDUIT WITH BEND DOWN
	CONDUIT WITH BEND UP
	CONDUIT WITH BUSHED END
	CONDUIT WITH BREAK OR CONTINUATION
L1 1,3,5	CIRCUIT HOME RUN - L1 INDICATES PANEL - NUMBER
1 2	JUNCTION BOX - WALL/CEILING MOUNT
	WIREWAY, DUCT BANK, OR FLOOR DUCT AS NOTED
	CABLE TRAY, TYPE/SIZE AS INDICATED

LIGHTING

SYMBOL	DESIGNATIONS	MTG HT
A / # / b	LIGHT FIXTURE ID - REFER TO LIGHT FIXTURE SCHEDULE (SCHEDULE OVERRIDES SYMBOL ABBREVIATION) A - INDICATES LIGHT FIXTURE TYPE # - INDICATES CIRCUIT NUMBER b - INDICATES SWITCHING	
	LIGHT FIXTURE CIRCUIT TYPE - NO HATCH INDICATES NORMAL CIRCUIT - ANGLED HATCH INDICATES CRITICAL CIRCUIT - SOLID HATCH INDICATES LIFE SAFETY CIRCUIT	
	TROFFER TYPE LIGHT FIXTURE, SIZE AS INDICATED - CEILING MOUNT	
	CHANNEL OR INDUSTRIAL, LENGTH AS INDICATED	
	CHANNEL OR INDUSTRIAL WALL MOUNT, LENGTH AS INDICATED	
	ROUND DOWNLIGHT, RECESSED OR SURFACE MOUNT	
	SQUARE DOWNLIGHT, RECESSED OR SURFACE MOUNT	
	CEILING WALL WASH FIXTURE OR TRACK HEAD	
	WALL MOUNT FIXTURE OR SCONCE	VERIFY
	LINEAR SUSPENDED , LENGTH AS INDICATED	VERIFY
	LINEAR RECESSED, LENGTH AS INDICATED	VERIFY
	ROUND OR SQUARE PENDANT	
	TAPE OR ROPE LIGHT	
	UNDER CABINET FIXTURE, LENGTH AS INDICATED	
	TRACK FIXTURE, NUMBER OF HEADS AS INDICATED	
	VANITY FIXTURE	
	EMERGENCY BATTERY LIGHT - WALL/CEILING MOUNT	
	EXIT LIGHT, FILLED QUADRANT INDICATES FACES - WALL/CEILING MOUNT	VERIFY
	WALL PACK	VERIFY
	FLAG OR FLOOD LIGHT	
	SITE LIGHTING POLE FIXTURE, ROUND/RECTANGLE HEAD - NUMBER OF HEADS INDICATED	
	SITE LIGHTING ROUND OR SQUARE BOLLARD	

POWER

SYMBOL	DESIGNATIONS	MTG HT
	BRANCH CIRCUIT PANEL	VERIFY
	EQUIPMENT CABINET	VERIFY
	TRANSFORMER	VERIFY
	MOTOR OR MOTOR CONNECTION	VERIFY
	MOTOR CONTROLLER, STARTER OR VFD	VERIFY
	COMBINATION STARTER & DISCONNECT SWITCH	VERIFY
	FUSED DISCONNECT SWITCH	VERIFY
	DISCONNECT SWITCH	VERIFY
MR	MOTOR RATED TOGGLE	VERIFY
MMS	MANUAL MOTOR STARTER SWITCH WITH THERMAL OVERLOAD	VERIFY
	DUPLEX RECEPTACLE - WALL/CEILING MOUNT	18"
	EMERGENCY DUPLEX RECEPTACLE - WALL/CEILING MOUNT	18"
	SPLIT DUPLEX RECEPTACLE - WALL/CEILING MOUNT	18"
	EMERGENCY SPLIT DUPLEX RECEPTACLE - WALL/CEILING MOUNT	18"
	SIMPLEX RECEPTACLE - WALL/CEILING MOUNT	18"
	EMERGENCY SIMPLEX RECEPTACLE - WALL/CEILING MOUNT	18"
	QUADPLEX RECEPTACLE - WALL/CEILING MOUNT	18"
	EMERGENCY QUADPLEX RECEPTACLE - WALL/CEILING MOUNT	18"
	GFI RECEPTACLE, DUPLEX/QUADPLEX - WALL MOUNT	18"
	GFI RECEPTACLE, DUPLEX/QUADPLEX - CEILING MOUNT	
C	GFI RECEPTACLE, DUPLEX/QUADPLEX - CONTROLLED - CEILING MOUNT	
C	DUPLEX RECEPTACLE - CONTROLLED - WALL/CEILING MOUNT	18"
	GFI DEAD FRONT DEVICE, NORMAL/EMERGENCY - WALL MOUNT	18"
	SPECIAL PURPOSE RECEPTACLE - WALL/CEILING MOUNT	18"
	EMERGENCY SPECIAL PURPOSE RECEPTACLE - WALL/CEILING MOUNT	18"
	FLOOR BOX - DEVICES AS INDICATED	
P	POWER POLE - DEVICES AS INDICATED	VERIFY
	GROUND REFERENCE BUS - AS NOTED - WALL/CEILING MOUNT	VERIFY

SWITCHES AND CONTROLS

SYMBOL	DESIGNATIONS	MTG HT
$	SINGLE POLE TOGGLE SWITCH	48"
$2	DOUBLE POLE TOGGLE SWITCH	48"
$3	THREE WAY TOGGLE SWITCH	48"
$4	FOUR WAY TOGGLE SWITCH	48"
$a	TOGGLE SWITCH - "a" INDICATES SWITCHING	48"
$I	PILOT LIGHT TOGGLE SWITCH	48"
$L	ILLUMINATED TOGGLE - TOGGLE SWITCH	48"
$K	KEYED SWITCH	48"
$MC	MOMENTARY CONTACT TOGGLE SWITCH	48"
$TS	TIMER SWITCH	48"
	MULTI SWITCH, MULTI GANG BOX	48"
D	DIMMER SWITCH	48"
B	PUSH BUTTON SWITCH	48"
OS	OCCUPANCY SENSOR - CLG MOUNT	
$OS	OCCUPANCY SENSOR WALL SWITCH	48"
	PHOTO ELECTRIC CELL	VERIFY
	TIME CLOCK	60"
C	CONTACTOR	60"
R	RELAY	VERIFY
	PUSH BUTTON STATION - BUTTONS AS INDICATED	48"

FIRE ALARM

SYMBOL	DESIGNATIONS	MTG HT
F	FIRE ALARM - WALL MOUNTED - TYPICAL	NOTED
MP - MANUAL PULL STATION (48")	DH - DOOR HOLD	
RS - REMOTE STATION (72")	RI - REMOTE INDICATOR LAMP (72")	
F	FIRE ALARM - CEILING MOUNTED - TYPICAL	
# - HEAT DETECTOR (FIXED TEMP)	P - SMOKE DETECTOR (PHOTO ELEC)	
R - HEAT DETECTOR (RATE OF RISE)	I - SMOKE DETECTOR (IONIZATION)	
B-T - BEAM DETECTOR (TRANSMITTER)	RS - REMOTE STATION	
B-R - BEAM DETECTOR (RECEIVER)	RI - REMOTE INDICATOR LAMP	
FS - FLOW SWITCH	MM - MONITOR MODULE	
TS - TAMPER SWITCH	CM - CONTROL MODULE	
AS - AIR SAMPLING	SA - COMBINATION SMOKE DETECTOR AND ALARM	
CP - CEILING PROTECTION	SD - FIRE/SMOKE DAMPER CONNECTION	
FP - FLOOR PROTECTION		
	DUCT MOUNTED PHOTOELECTRIC DETECTOR	
FS	FIREMAN'S STATION - WALL MOUNT	48"
	STROBE - WALL/CEILING MOUNT (# = CANDELA)	82"
	BELL - WALL/CEILING MOUNT	82"
	BELL/STROBE - WALL/CEILING MOUNT (# = CANDELA)	82"
	CHIME - WALL/CEILING MOUNT	82"
	CHIME/STROBE - WALL/CEILING MOUNT (# = CANDELA)	82"
	HORN - WALL/CEILING MOUNT	82"
	HORN/STROBE - WALL/CEILING MOUNT (# = CANDELA)	82"
	SPEAKER - WALL/CEILING MOUNT	82"
	SPEAKER/STROBE - WALL/CEILING MOUNT (# = CANDELA)	82"
FAIP	FIRE ALARM/MASS NOTIFICATION: SPEAKER/STROBE - WALL/CEILING MOUNT (# = CANDELA)	82"
	FIRE ALARM PANEL - WALL MOUNT	VERIFY
FACP - FIRE ALARM CONTROL PANEL	FAAP - FIRE ALARM ANNUNCIATOR PANEL	
AMP - AMPLIFIER	VESDA - ASPIRATING SMOKE DETECTION	
	NAC - NOTIFICATION APPLIANCE CIRCUIT	

SIGNAL AND COMMUNICATIONS

SYMBOL	DESIGNATIONS	MTG HT
# #	DATA OUTLET - WALL/CEILING MOUNT (# = WIRE COUNTS)	18"
# # #	VOICE/DATA OUTLET - WALL/CEILING MOUNT FLOOR OUTLET (# = WIRE COUNTS)	18"
W	WALL PHONE - HIGH WALL MOUNT	48"
	WIRELESS ACCESS POINT - WALL/CEILING MOUNT	VERIFY
	SPEAKER - WALL/CEILING MOUNT	96"
	HORN SPEAKER - WALL MOUNT	96"
	VOLUME SWITCH - WALL MOUNT	60"
	AUDIO JACK (M=MICROPHONE, A=AUXILIARY)	18"
ICD	WALL INTERCOM STATION (M=MASTER, R=REMOTE)	48"
	BUZZER - WALL/CEILING MOUNT	96"
	BELL - WALL/CEILING MOUNT	96"
	CHIME - WALL/CEILING MOUNT	96"
	CLOCK - WALL/CEILING MOUNT (# = DIAMETER)	96"
PRJ VID	PROJECTOR/VIDEO CAMERA/DOCUMENT CAMERA - WALL/CEILING MOUNT	VERIFY
	TV SYSTEM OUTLET - WALL/CEILING MOUNT	18"
	AUDIO VIDEO SYSTEM OUTLET - WALL/CEILING MOUNT	18"
	A/V SYSTEMS CONTROLLER - WALL MOUNT	18"
	A/V MONITOR - WALL MOUNT	18"
ANN	ANNUNCIATOR PANEL - WALL MOUNT TYPICAL	VERIFY
	TWO-POST RACK	FLOOR
	FOUR-POST RACK	FLOOR
	DATA CABINET	FLOOR

SECURITY

SYMBOL	DESIGNATIONS	MTG HT
S	SECURITY - WALL MOUNT - TYPICAL	48"
CR - CARD READER	EP - EXIT PUSHBUTTON	
CR/KP - CARD READER W/ KEY PAD	M - MASTER STATION	
KP - KEYPAD	PB - PUSH BUTTON	
KS - KEY SWITCH	DS - DURRESS SYSTEM	
S	SECURITY - CEILING MOUNT - TYPICAL	CLG
RX - REQUEST TO EXIT	DC - DOOR CONTACT	
ES - ELECTRIC STRIKE	ODC - OVERHEAD DOOR CONTACT	
EL - ELECTRIC LOCK	MS - MONITOR STRIKE	
ML - MAGNETIC LOCK	MD - MOTION DETECTOR	
TH - POWER TRANSFER HINGE	GB - GLASS BREAKER DETECTOR	
	SECURITY PANEL - WALL MOUNT - TYPICAL	VERIFY
SEC - SECURITY	CA - CARD ACCESS	
IDS - INTRUSION DETECTION SYSTEM		
	SECURITY CAMERA - WALL/CEILING MOUNT	VERIFY

NURSE CALL

SYMBOL	DESIGNATIONS	MTG HT
N	NURSE CALL - WALL MOUNT - TYPICAL	VERIFY
AI - AUXILIARY INPUT STATION	D - DUTY STATION	
ANN - ANNUNCIATOR PANEL	E - EMERGENCY PULL STATION	
BD - PATIENT BED STATION	M - MASTER STATION	
C - CODE BLUE STATION	M1 - SECONDARY MASTER STATION	
C/SA - CODE BLUE/STAFF ASSIST COMBINATION STATION	P - PATIENT STATION (ENHANCED)	
	P1 - PATIENT STATION (BASIC)	
C-B - CODE BABY STATION	SA - STAFF ASSIST STATION	
C-B/SA - CODE BABY/STAFF ASSIST COMBINATION STATION	TV - PATIENT TV STATION	
	WF - WORK FLOW (TOUCH SCREEN)	
CC - CALL CANCEL	WF1 - WORK FLOW (4-BUTTON)	
N	LOCATOR ANTENNA	
N N	DOME LIGHT - WALL/CEILING MOUNT (BLANK = 4 LIGHTS, # = NUMBER OF LIGHTS, Z = ZONE INDICATOR LIGHTS)	96"
NCP	NURSE CALL PANEL - WALL MOUNT	VERIFY

ONE LINE AND RISER

SYMBOL	DESIGNATIONS
ID V, Ø, W	UTILITY SERVICE: EQUIPMENT ID VOLTAGE, PHASE, 3 OR 4 WIRE
ID KW/KVA V, Ø, W PF	ENGINE GENERATOR: EQUIPMENT ID KW/KVA RATING OF GENERATOR VOLTAGE, PHASE, 3 OR 4 WIRE, POWER FACTOR
XX AF/AT	600 VOLT MOLDED CASE CIRCUIT BREAKER: AF = AMP FRAME, AT = AMP TRIP XX = OPTIONS TO BE PROVIDED, MAY BE BLANK
XX AF/AT	600 VOLT INSULATED CASE CIRCUIT BREAKER: AF = AMP FRAME, AT = AMP TRIP XX = OPTIONS TO BE PROVIDED, MAY BE BLANK
XX AF/AT	600 VOLT DRAWOUT CIRCUIT BREAKER: AF = AMP FRAME, AT = AMP TRIP XX = OPTIONS TO BE PROVIDED, MAY BE BLANK
XX AF/AT	15,000 VOLT DRAWOUT CIRCUIT BREAKER: AF = AMP FRAME, AT = AMP TRIP XX = OPTIONS TO BE PROVIDED, MAY BE BLANK
XX AS	DISCONNECT SWITCH: AS = AMP SWITCH XX = OPTIONS TO BE PROVIDED, MAY BE BLANK
XX AF	FUSE: AF = AMP FUSE XX = OPTIONS TO BE PROVIDED, MAY BE BLANK
XX AS/AF	FUSED DISCONNECT SWITCH: AS = AMP SWITCH, AF = AMP FUSE XX = OPTIONS TO BE PROVIDED, MAY BE BLANK
ID KVA V	TRANSFORMER: EQUIPMENT ID KVA RATING OF TRANSFORMER PRIMARY VOLTAGE SECONDARY VOLTAGE
ID KVA V	TRANSFORMER WITH SPECIAL CORE: EQUIPMENT ID KVA RATING OF TRANSFORMER PRIMARY VOLTAGE SECONDARY VOLTAGE
ID V, Ø, W A MCB SPACES KAIC	PANELBOARD: EQUIPMENT ID VOLTAGE, PHASE, 3 OR 4 WIRE, AMP RATING MCB OR MLO SPACES AVAILABLE CALCULATED FAULT CURRENT
ID V, Ø, W A XX KAIC	TRANSFER SWITCH: EQUIPMENT ID VOLTAGE, PHASE, 3 OR 4 WIRE, AMP RATING OPEN/CLOSED/DELAYED CALCULATED FAULT CURRENT
ID HP Ø	MOTOR: EQUIPMENT ID HORSEPOWER, PHASE
MF	MULTIFUNCTION RELAY: NUMBERS INDICATE ANSI DEVICE NUMBERS
XX	FEEDER DESCRIPTION: SEE ELECTRICAL ONE LINE SHEET FOR SCHEDULE
	STATIC SWITCH
	MOTOR OVERLOAD PROTECTION DEVICE
ID TR:XX	POTENTIAL TRANSFORMER: TR = TURNS RATIO
ID TR:XX	CURRENT TRANSFORMER: TR = TURNS RATIO
	LIGHTNING ARRESTER
	GROUND CONNECTION
	CAPACITOR
	BATTERY
NO	CONTACTOR - NORMALLY OPEN
NC	CONTACTOR - NORMALLY CLOSED
K1	KIRK KEY INTERLOCK
M A V	METER: M = WATTHOUR METER, A = AMMETER, V = VOLT METER
	15,000 VOLT TEE AND ELBOW
	LINEWORK:
	EQUIPMENT ENCLOSURE LINE
	SWITCHGEAR BUS LINE
	BUSWAY
	NEW WORK
	EXISTING WORK
	DEMO WORK
	FUTURE WORK

OPTIONS ABBREVIATIONS:
LSI = LONG TIME/SHORT TIME/INSTANTANEOUS TRIP SETTINGS
LSIG = LSI WITH GROUND FAULT PROTECTION
EO=ELECTRICALLY OPERATED
M1=METER (REFER TO METER SCHEDULE)
ST=SHUNT TRIP
K1=KIRK KEYED (REFER TO KIRK KEY SCHEDULE)

ELECTRICAL SHEET LIST

SHEET NUMBER	SHEET NAME
E000	ELECTRICAL SYMBOLS AND ABBREVIATIONS
E100	ELECTRICAL SITE PLAN
E200	SELECTIVE ELECTRICAL DEMOLITION PLAN
E201	SELECTIVE ELECTRICAL PLAN
E211	FIRST FLOOR LIGHTING PLAN
E212A	SECOND FLOOR LIGHTING PLAN
E212B	SECOND FLOOR LIGHTING PLAN
E221	FIRST FLOOR POWER PLAN
E222A	SECOND FLOOR POWER PLAN
E222B	SECOND FLOOR POWER PLAN
E223	ROOF FLOOR POWER PLAN
E231	FIRST FLOOR SYSTEMS PLAN
E232A	SECOND FLOOR SYSTEMS PLAN
E232B	SECOND FLOOR SYSTEMS PLAN
E300	ELECTRICAL RISER DIAGRAM
E400	PANELBOARD SCHEDULES
E450	LIGHTING SCHEDULES
E500	ELECTRICAL DETAILS
E501	ELECTRICAL DETAILS
E502	ELECTRICAL DETAILS
E503	ELECTRICAL DETAILS
E504	ELECTRICAL DETAILS

SHEET TOTAL: 22

BLOOM HAY DOBBS

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mechanical + electrical consulting engineering

Dunham Project Number: 0425231-000

Project Name: NOVA CLASSICAL ACADEMY
Project Number: 23008.003
Date: 05/07/2025

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.

Madeline M. Folin, P.E.
PRINT NAME

SIGNATURE

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LICENSE NO.

ISSUE DATE
DATE

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SHEET TITLE:
ELECTRICAL SYMBOLS AND ABBREVIATIONS

SHEET NUMBER:

E000

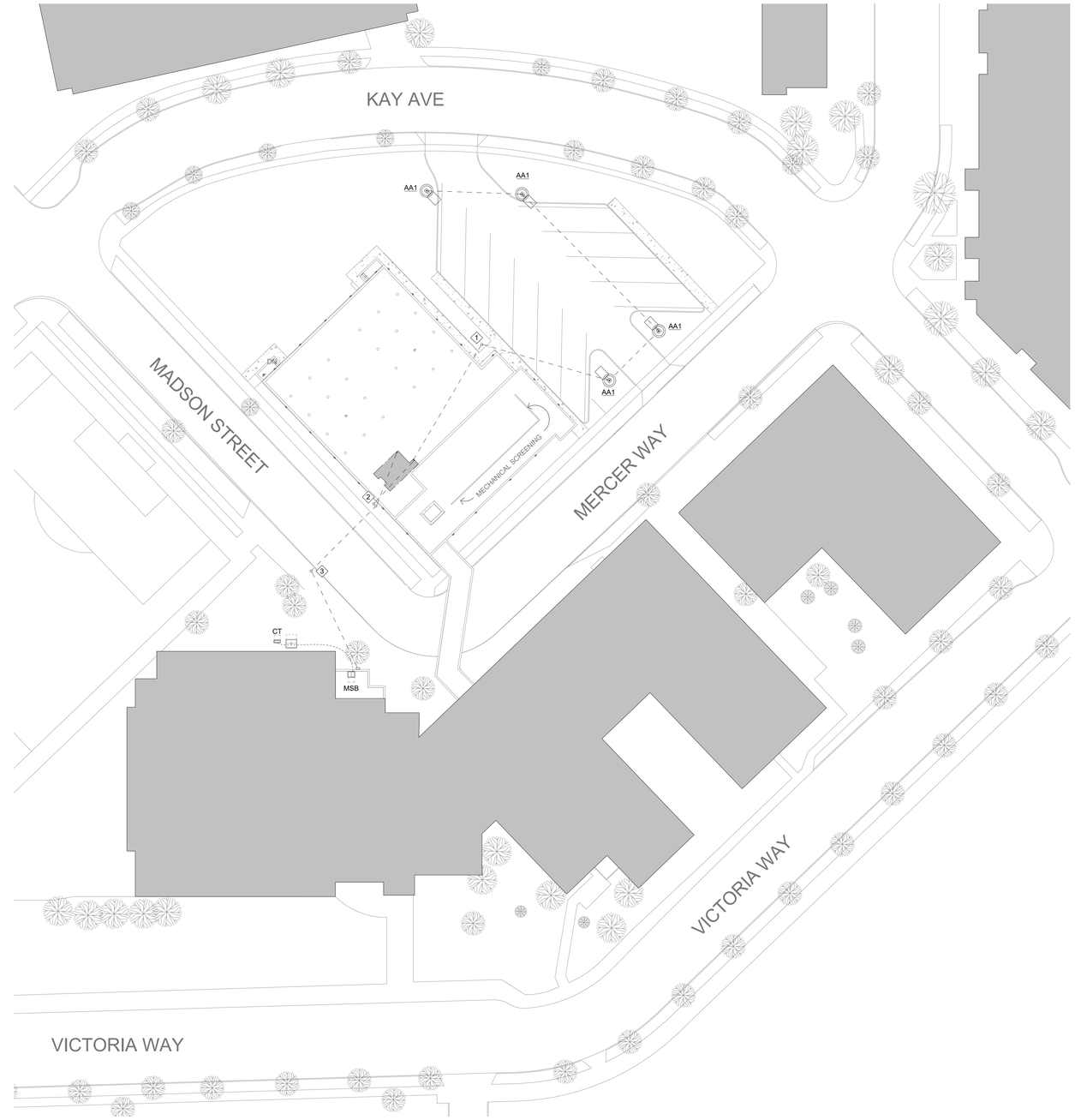
DOR NOT SCALE, P.A. - CONFORMED

GENERAL NOTES:

A. VERIFY LOCATIONS OF UNDERGROUND UTILITIES PRIOR TO ANY SITE WORK. UTILIZE A SURVEY SERVICE TO PROVIDE ADDITIONAL INFORMATION REGARDING EXISTING ELECTRICAL AND COMMUNICATION CABLING LOCATED ON THIS SITE.

KEY NOTES:

1. PROVIDE 1"C PVC STUB UP FROM BUILDING ELECTRICAL ROOM TO AN EXTERIOR HANDHOLE. UTILIZE THIS PATHWAY FOR POLE LIGHTS.
2. PROVIDE 4"C PVC STUB UP FROM BUILDING ELECTRICAL ROOM TO AN EXTERIOR HANDHOLE FOR FUTURE.
3. PROVIDE EXTERIOR PULL BOX AND NECESSARY HANDHOLES FOR 600A FEEDER BETWEEN MSB AND HP1S. REFER TO RISER DIAGRAM FOR ADDITIONAL INFORMATION.



1 ELECTRICAL SITE PLAN
1" = 30'-0"

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02/03/25
DATE

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SHEET TITLE:
ELECTRICAL SITE PLAN

SHEET NUMBER:

E100

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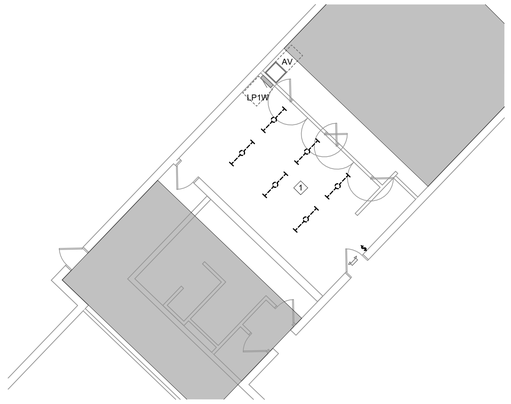
1 ELECTRICAL DEMOLITION - ENTRY & ADMIN
1/8" = 1'-0"



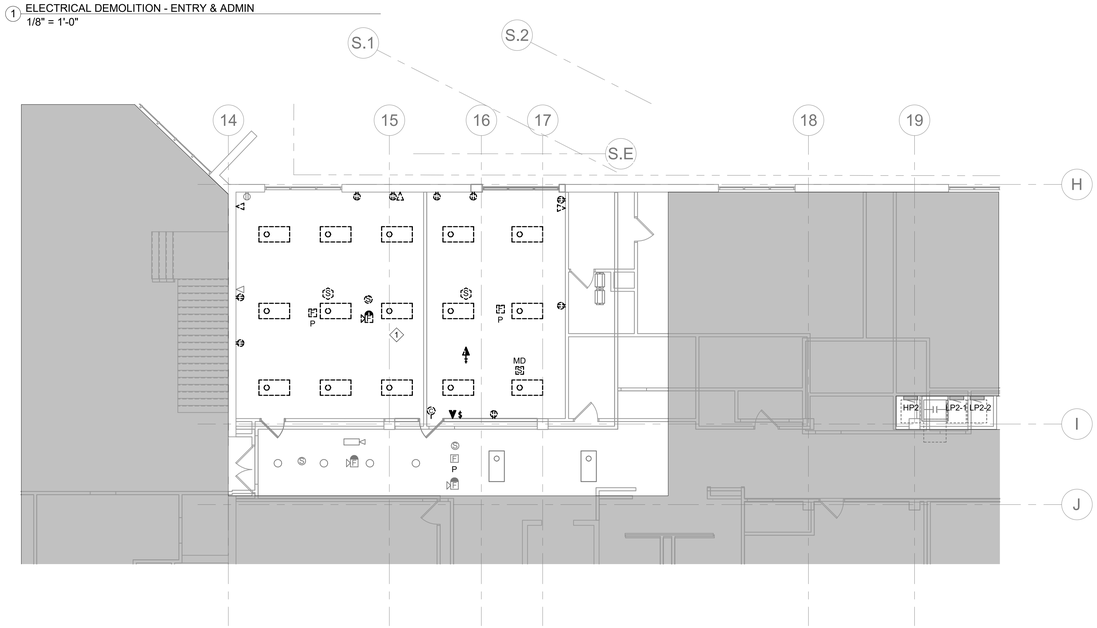
2 ELECTRICAL DEMOLITION - MUSIC ROOM
1/8" = 1'-0"

GENERAL NOTES:

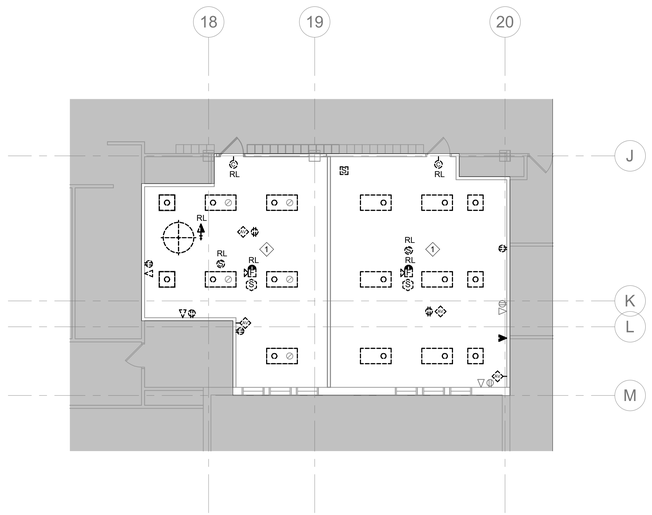
A. NOTE NOT USED.

KEY NOTES:

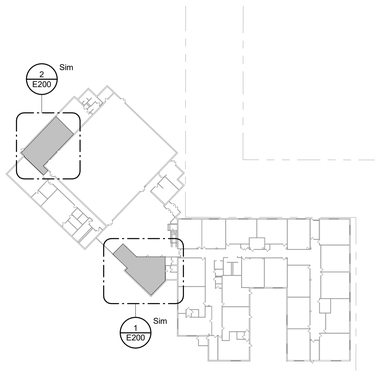
1 DEMOLISH LIGHT FIXTURES AND CONTROLS IN THIS ROOM. PRESERVE CIRCUIT IN AREA FOR NEW LIGHTS.



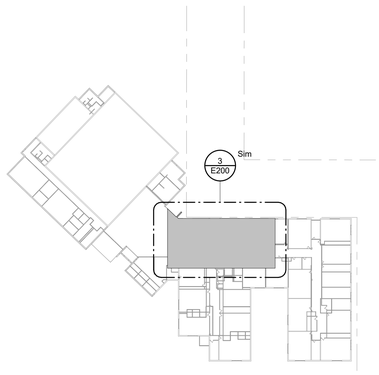
3 ELECTRICAL DEMOLITION - SKYWAY AT EXISTING
1/8" = 1'-0"



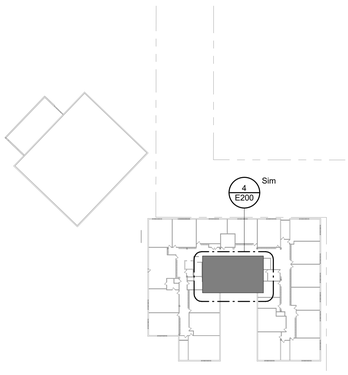
4 ELECTRICAL DEMOLITION - EX HALL
1/8" = 1'-0"



5 FIRST FLOOR - NOVA CLASSICAL ACADEMY OVERALL
1/64" = 1'-0"



6 SECOND FLOOR - NOVA CLASSICAL ACADEMY OVERALL
1/64" = 1'-0"



7 THIRD FLOOR - NOVA CLASSICAL ACADEMY OVERALL
1/64" = 1'-0"

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Dunham Project Number: 0425231-000

Project Name: NOVA CLASSICAL ACADEMY
Project Number: 23008.003
Date: 05/07/2025

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SHEET TITLE:
SELECTIVE ELECTRICAL DEMOLITION PLAN

SHEET NUMBER:

E200

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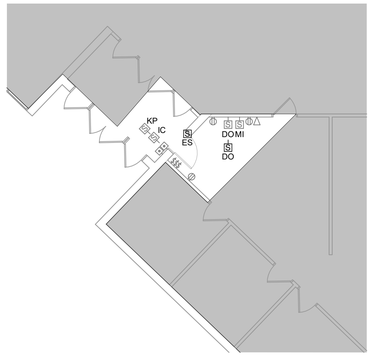
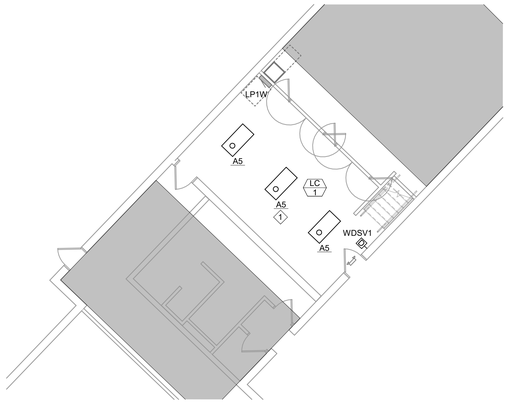
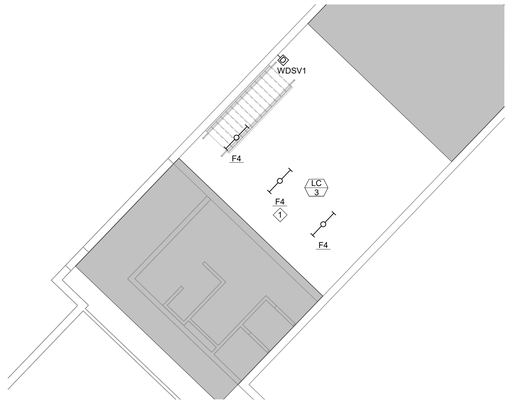


1 ELECTRICAL PLAN - ENTRY & ADMIN
1/8" = 1'-0"



2 ELECTRICAL PLAN - MUSIC ROOM
1/8" = 1'-0"



3 ELECTRICAL PLAN - MEZZANINE
1/8" = 1'-0"

4 ELECTRICAL PLAN - EX HALL
1/8" = 1'-0"

GENERAL NOTES:

A. VERIFY CEILING TYPES, RECESSED CONDITIONS, AND MOUNTING HARDWARE REQUIRED PRIOR TO PURCHASING LIGHT FIXTURES.

B. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS.

C. REFER TO LIGHTING CONTROL SCHEDULES FOR ADDITIONAL REQUIREMENTS OF THE LIGHTING CONTROL SYSTEM.

D. PROVIDE CUTTING AND PATCHING FOR ELECTRICAL WORK.

E. PROVIDE A MINIMUM OF #10 AWG CONDUCTOR SIZE (INCREASING IN SIZE AS REQUIRED) FOR A MAXIMUM OF 3% VOLTAGE DROP FROM PANEL TO LOAD FOR 120V/20A CIRCUITS LONGER THAN 75 FEET AND FOR 277V/20A CIRCUITS LONGER THAN 150 FEET.

F. EXIT SIGNS AND EMERGENCY LIGHT FIXTURES SHALL BE WIRED WITH A CONTINUOUS HOT CIRCUIT AND SHALL ALWAYS BE "ON".

G. MOUNT ANY REQUIRED POWER PACKS OR RELAYS ABOVE ACCESSIBLE CEILING AT THE DOOR INTO THE ROOM.

H. PROVIDE CUTTING AND PATCHING FOR ELECTRICAL WORK.

KEY NOTES:

1 FEED LIGHT FIXTURES IN THIS AREA FROM CIRCUIT MADE AVAILABLE FROM DEMOLITION.

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SHEET TITLE:
SELECTIVE ELECTRICAL PLAN

SHEET NUMBER:

E201

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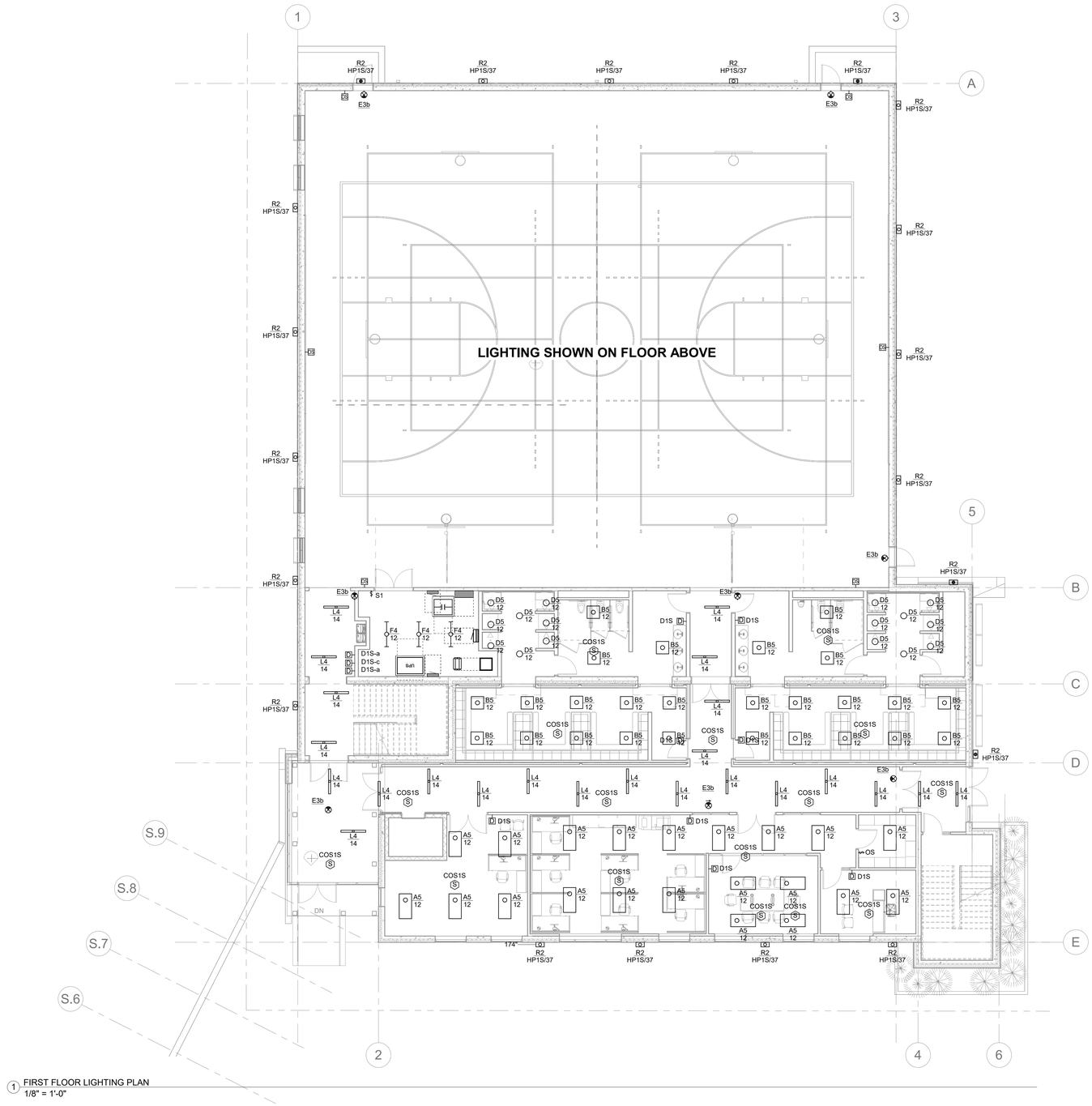

1 FIRST FLOOR LIGHTING PLAN
1/8" = 1'-0"

GENERAL NOTES:

A. VERIFY CEILING TYPES, RECESSED CONDITIONS, AND MOUNTING HARDWARE REQUIRED PRIOR TO PURCHASING LIGHT FIXTURES.

B. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS.

C. REFER TO LIGHTING CONTROL SCHEDULES FOR ADDITIONAL REQUIREMENTS OF THE LIGHTING CONTROL SYSTEM.

D. WHERE LIGHTING CONTROL DEVICES (OCCUPANCY SENSORS, PHOTOCELLS, ETC.) ARE SHOWN ON PLANS, LOCATE DEVICES IN EACH SPACE PER DEVICE TYPE AND MANUFACTURER'S RECOMMENDATIONS. PROVIDE A NEUTRAL CONDUCTOR DOWN TO LINE VOLTAGE SWITCH BOXES.

E. EXIT SIGNS AND EMERGENCY LIGHT FIXTURES SHALL BE WIRED WITH A CONTINUOUS HOT CIRCUIT AND SHALL ALWAYS BE "ON".

F. MOUNT ANY REQUIRED POWER PACKS OR RELAYS ABOVE ACCESSIBLE CEILING AT THE DOOR INTO THE ROOM.

G. PROVIDE CUTTING AND PATCHING FOR ELECTRICAL WORK.

H. PROVIDE A MINIMUM OF #10 AWG CONDUCTOR SIZE (INCREASING IN SIZE AS REQUIRED) FOR A MAXIMUM OF 3% VOLTAGE DROP FROM PANEL TO LOAD FOR 120V/20A CIRCUITS LONGER THAN 75 FEET AND FOR 277V/20A CIRCUITS LONGER THAN 150 FEET.

I. CIRCUIT NORMAL FIXTURES TO PANEL X AND EMERGENCY FIXTURES TO PANEL X.

KEY NOTES:

1 NOTE NOT USED.

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DATE

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SHEET TITLE:
FIRST FLOOR LIGHTING PLAN

SHEET NUMBER:

E211

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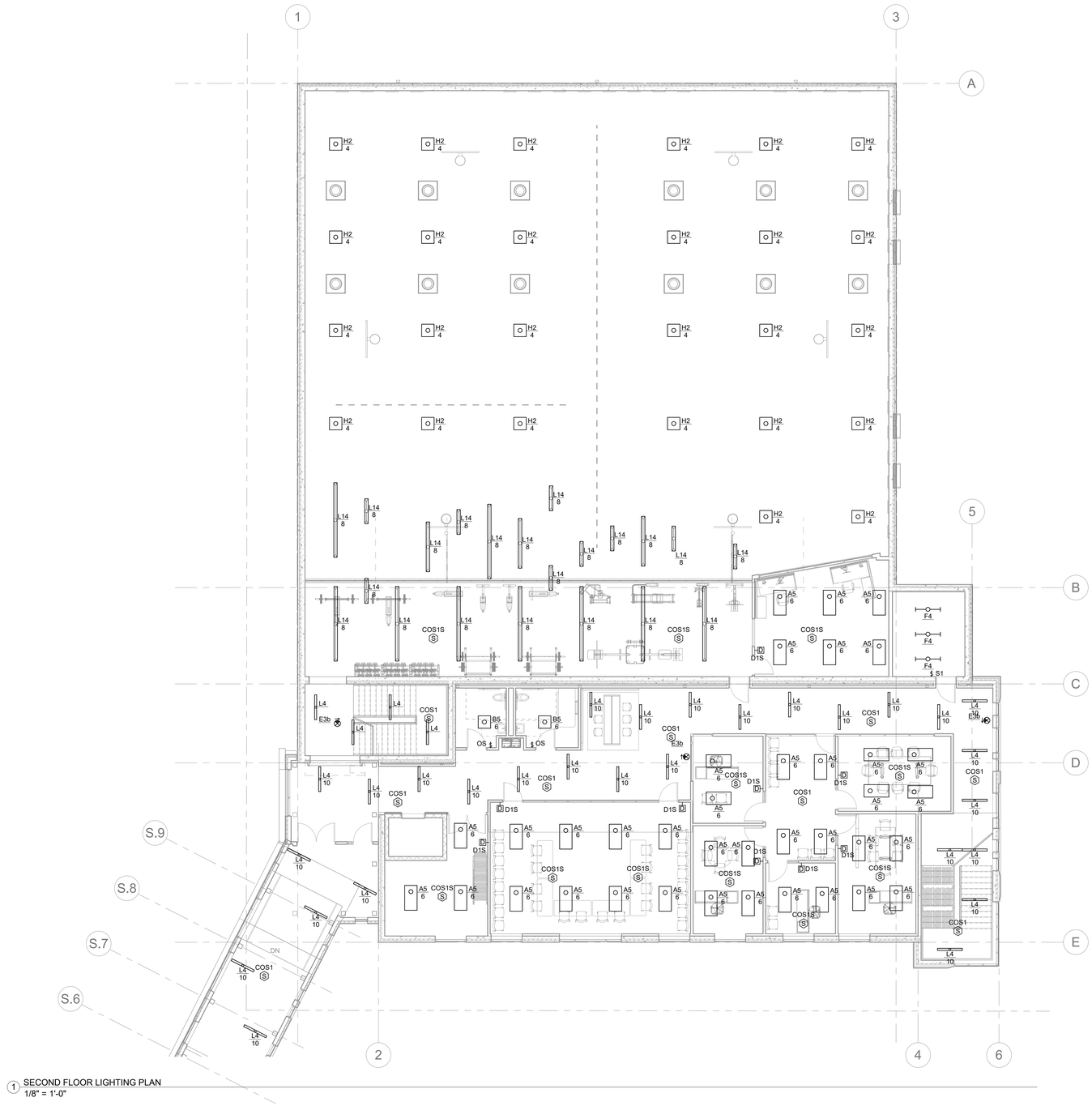

1 SECOND FLOOR LIGHTING PLAN
1/8" = 1'-0"

GENERAL NOTES:

A. VERIFY CEILING TYPES, RECESSED CONDITIONS, AND MOUNTING HARDWARE REQUIRED PRIOR TO PURCHASING LIGHT FIXTURES.

B. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS.

C. REFER TO LIGHTING CONTROL SCHEDULES FOR ADDITIONAL REQUIREMENTS OF THE LIGHTING CONTROL SYSTEM.

D. WHERE LIGHTING CONTROL DEVICES (OCCUPANCY SENSORS, PHOTOCELLS, ETC.) ARE SHOWN ON PLANS, LOCATE DEVICES IN EACH SPACE PER DEVICE TYPE AND MANUFACTURER'S RECOMMENDATIONS. PROVIDE A NEUTRAL CONDUCTOR DOWN TO LINE VOLTAGE SWITCH BOXES.

E. EXIT SIGNS AND EMERGENCY LIGHT FIXTURES SHALL BE WIRED WITH A CONTINUOUS HOT CIRCUIT AND SHALL ALWAYS BE "ON".

F. MOUNT ANY REQUIRED POWER PACKS OR RELAYS ABOVE ACCESSIBLE CEILING AT THE DOOR INTO THE ROOM.

G. PROVIDE CUTTING AND PATCHING FOR ELECTRICAL WORK.

H. PROVIDE A MINIMUM OF #10 AWG CONDUCTOR SIZE (INCREASING IN SIZE AS REQUIRED) FOR A MAXIMUM OF 3% VOLTAGE DROP FROM PANEL TO LOAD FOR 120V/20A CIRCUITS LONGER THAN 75 FEET AND FOR 277V/20A CIRCUITS LONGER THAN 150 FEET.

I. CIRCUIT NORMAL FIXTURES TO PANEL X AND EMERGENCY FIXTURES TO PANEL X.

KEY NOTES:

1 NOTE NOT USED.

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PRINT NAME

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02/03/25
DATE

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SHEET TITLE:
SECOND FLOOR LIGHTING PLAN

SHEET NUMBER:

E212A

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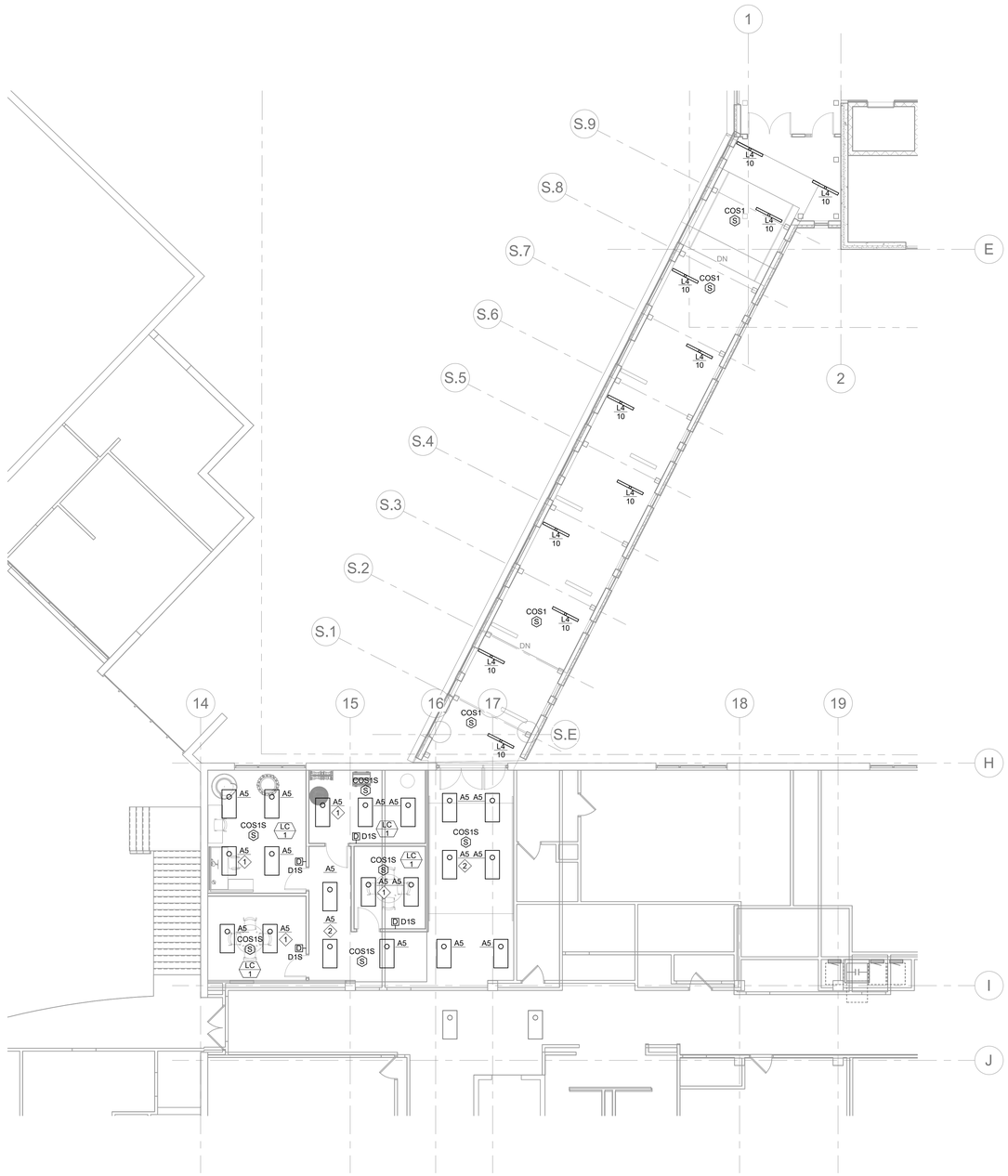

1 SECOND FLOOR LIGHTING PLAN
1/8" = 1'-0"

GENERAL NOTES:

A. VERIFY CEILING TYPES, RECESSED CONDITIONS, AND MOUNTING HARDWARE REQUIRED PRIOR TO PURCHASING LIGHT FIXTURES.

B. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS.

C. REFER TO LIGHTING CONTROL SCHEDULES FOR ADDITIONAL REQUIREMENTS OF THE LIGHTING CONTROL SYSTEM.

D. WHERE LIGHTING CONTROL DEVICES (OCCUPANCY SENSORS, PHOTOCELLS, ETC.) ARE SHOWN ON PLANS, LOCATE DEVICES IN EACH SPACE PER DEVICE TYPE AND MANUFACTURER'S RECOMMENDATIONS. PROVIDE A NEUTRAL CONDUCTOR DOWN TO LINE VOLTAGE SWITCH BOXES.

E. EXIT SIGNS AND EMERGENCY LIGHT FIXTURES SHALL BE WIRED WITH A CONTINUOUS HOT CIRCUIT AND SHALL ALWAYS BE "ON".

F. MOUNT ANY REQUIRED POWER PACKS OR RELAYS ABOVE ACCESSIBLE CEILING AT THE DOOR INTO THE ROOM.

G. PROVIDE CUTTING AND PATCHING FOR ELECTRICAL WORK.

H. PROVIDE A MINIMUM OF #10 AWG CONDUCTOR SIZE (INCREASING IN SIZE AS REQUIRED) FOR A MAXIMUM OF 3% VOLTAGE DROP FROM PANEL TO LOAD FOR 120V/20A CIRCUITS LONGER THAN 75 FEET AND FOR 277V/20A CIRCUITS LONGER THAN 150 FEET.

KEY NOTES:

1 FEED LIGHT FIXTURES IN THIS AREA FROM CIRCUIT MADE AVAILABLE FROM DEMOLITION.

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SIGNATURE

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LICENSE NO.

02/03/25
DATE

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SHEET TITLE:
SECOND FLOOR LIGHTING PLAN

SHEET NUMBER:

E212B

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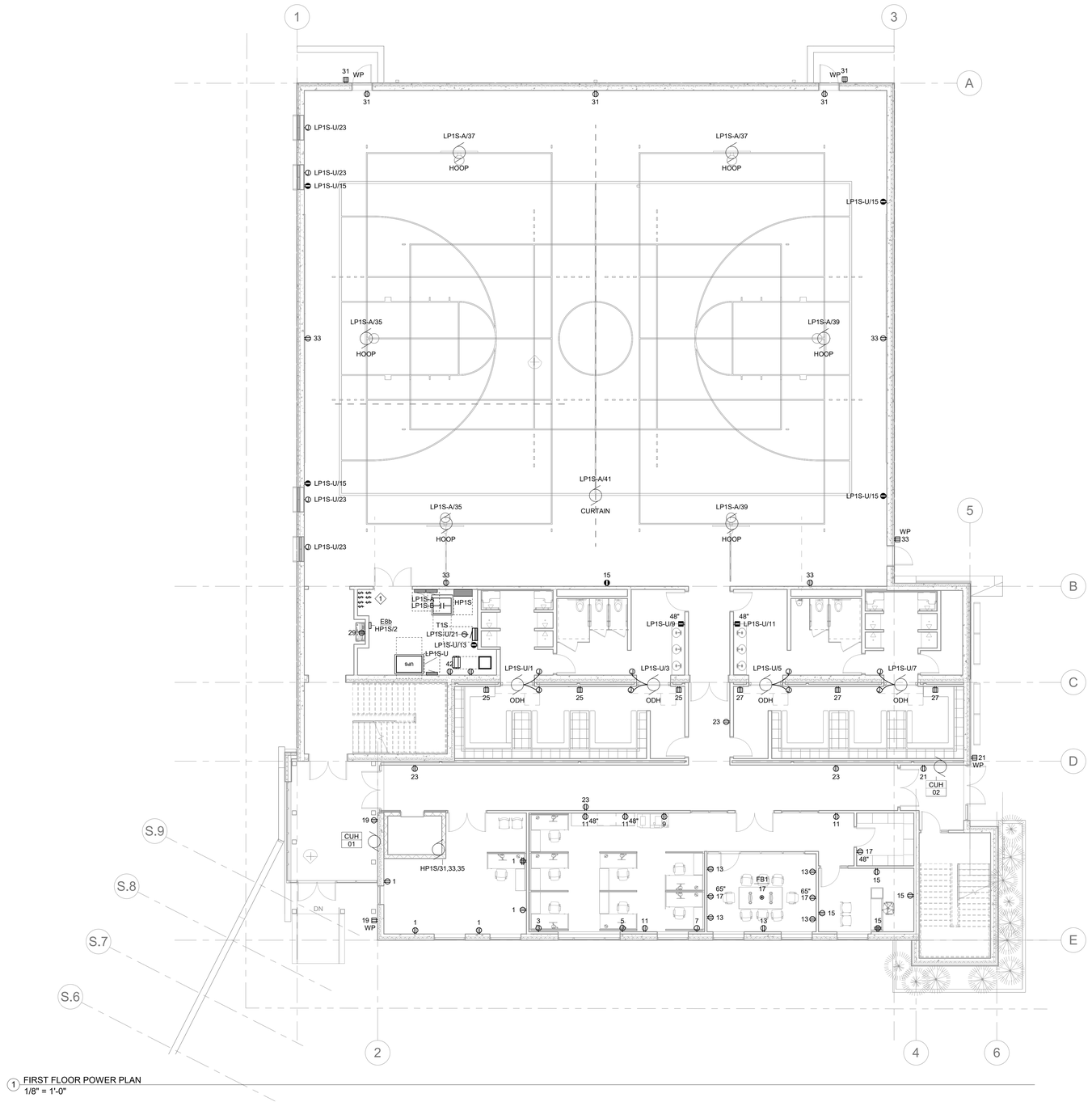

1 FIRST FLOOR POWER PLAN
1/8" = 1'-0"

GENERAL NOTES:

A. REFER TO MECHANICAL ELECTRICAL SCHEDULES FOR ELECTRICAL CONNECTION REQUIREMENTS OF MECHANICAL EQUIPMENT.

B. PROVIDE DEDICATED NEUTRALS IN ALL BRANCH CIRCUITS.

C. PROVIDE POWER OUTLETS ADJACENT TO COMMUNICATION DEVICES, MOUNTED AT THE SAME HEIGHT AND WITHIN 12 INCHES, ON CENTER, OF EACH OTHER. UTILIZE MOUNTING STRAPS BETWEEN STUDS FOR ADJACENT INSTALLATION. DIVISION 26 SPECIFIED HEIGHTS SHALL TAKE PREFERENCE.

D. PROVIDE CUTTING AND PATCHING FOR ELECTRICAL WORK.

E. PROVIDE MINIMUM #10 AWG CONDUCTOR SIZE (INCREASING IN SIZE AS REQUIRED) FOR A MAXIMUM OF 3 PERCENT VOLTAGE DROP FROM PANEL TO LOAD FOR 120V/20A CIRCUITS LONGER THAN 75 FEET AND FOR 277V/20A CIRCUITS LONGER THAN 150 FEET.

F. DEVICES SHALL NOT BE INSTALLED BACK TO BACK TO PREVENT NOISE TRAVEL UNLESS NOTED OTHERWISE.

KEY NOTES:

1 PROVIDE KEYED SWITCH FOR BASKETBALL HOOPS AND CURTAIN

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NOVA CLASSICAL ACADEMY
1455 VICTORIA WAY

CONSULTANT

DUNHAM

DUNHAM
50 South Sixth Street / Suite 1100
Minneapolis, Minnesota 55402-1540
PHONE 612.465.7550 FAX 612.465.7551
WEB dunhameng.com
mechanical + electrical consulting engineering
Dunham Project Number: 0425231-000

Project Name: NOVA CLASSICAL ACADEMY
Project Number: 23008.003
Date: 05/07/2025

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.

Madeline M. Folin, P.E.
PRINT NAME

SIGNATURE

57233
LICENSE NO.

02/03/25
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
FIRST FLOOR POWER PLAN

SHEET NUMBER:

E221

208 BAY DOBBS, P.A. -
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GENERAL NOTES:

A. REFER TO MECHANICAL ELECTRICAL SCHEDULES FOR ELECTRICAL CONNECTION REQUIREMENTS OF MECHANICAL EQUIPMENT.

B. PROVIDE DEDICATED NEUTRALS IN ALL BRANCH CIRCUITS.

C. PROVIDE POWER OUTLETS ADJACENT TO COMMUNICATION DEVICES, MOUNTED AT THE SAME HEIGHT AND WITHIN 12 INCHES, ON CENTER, OF EACH OTHER. UTILIZE MOUNTING STRAPS BETWEEN STUDS FOR ADJACENT INSTALLATION. DIVISION 26 SPECIFIED HEIGHTS SHALL TAKE PREFERENCE.

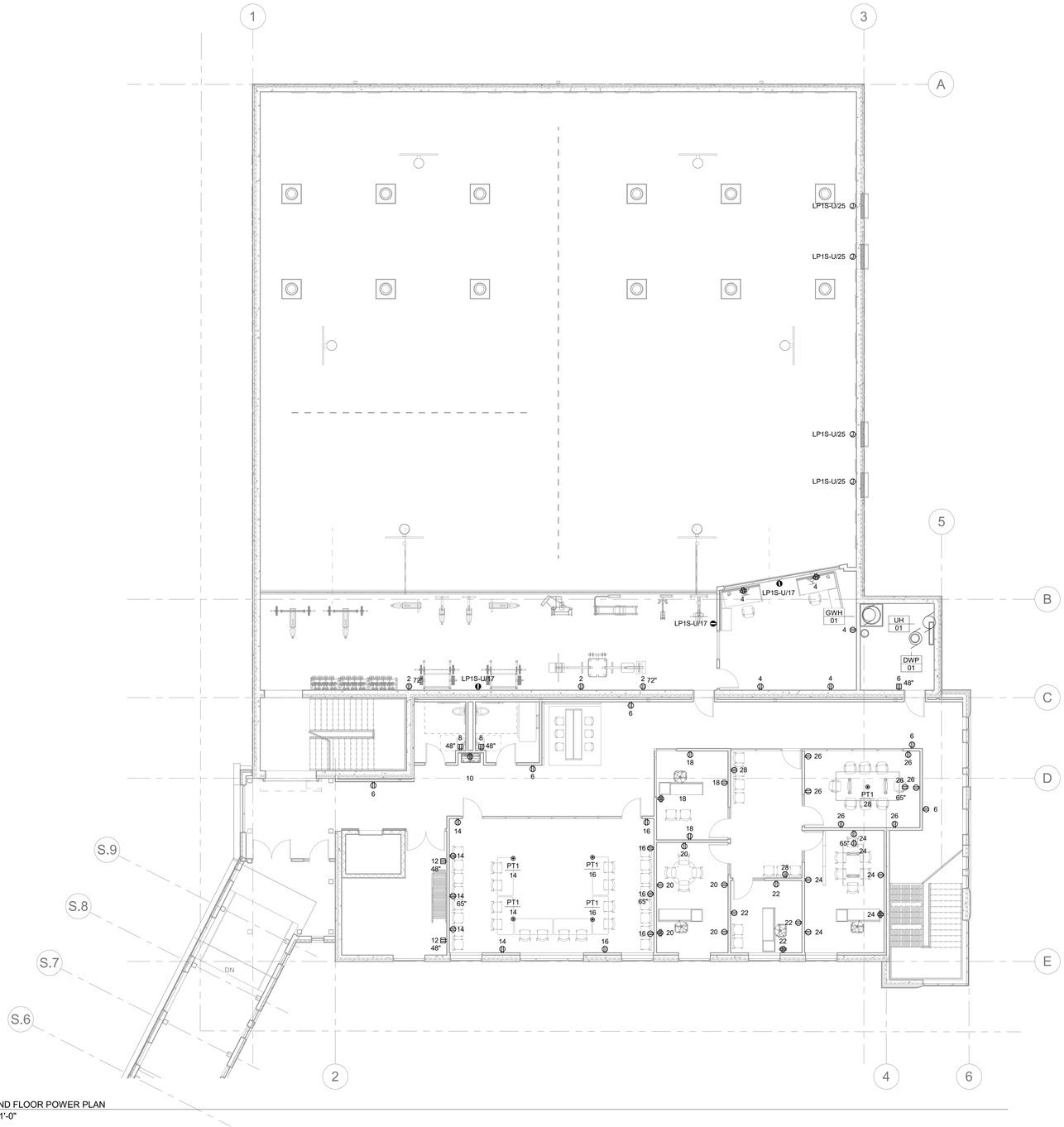
D. PROVIDE CUTTING AND PATCHING FOR ELECTRICAL WORK.

E. PROVIDE MINIMUM #10 AWG CONDUCTOR SIZE (INCREASING IN SIZE AS REQUIRED) FOR A MAXIMUM OF 3 PERCENT VOLTAGE DROP FROM PANEL TO LOAD FOR 120V/20A CIRCUITS LONGER THAN 75 FEET AND FOR 277V/20A CIRCUITS LONGER THAN 150 FEET.

F. DEVICES SHALL NOT BE INSTALLED BACK TO BACK TO PREVENT NOISE TRAVEL UNLESS NOTED OTHERWISE.

KEY NOTES:

1 NOTE NOT USED.



1 SECOND FLOOR POWER PLAN
1/8" = 1'-0"

BLOOM HAY DOBBS

Midtown Commons
2324 University Ave. W,
Suite 200
St. Paul, MN 55114
Tel. 612.338.4590

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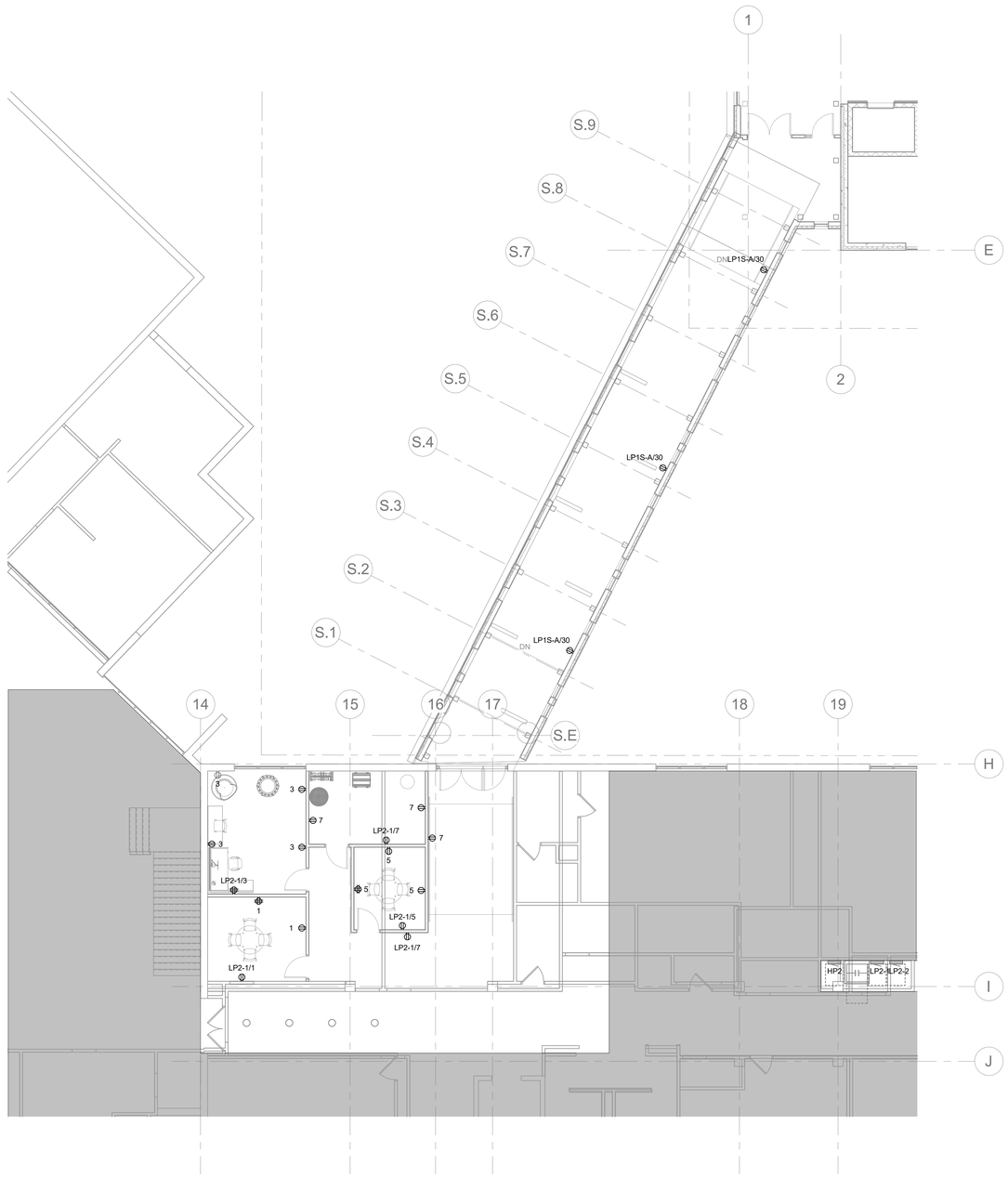
SHEET TITLE:
SECOND FLOOR POWER PLAN

SHEET NUMBER:

E222A

2008 RAY FOGELS, P.A. - CONSTRUCTION



1 SECOND FLOOR POWER PLAN
1/8" = 1'-0"

GENERAL NOTES:

A. REFER TO MECHANICAL ELECTRICAL SCHEDULES FOR ELECTRICAL CONNECTION REQUIREMENTS OF MECHANICAL EQUIPMENT.

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C. PROVIDE POWER OUTLETS ADJACENT TO COMMUNICATION DEVICES, MOUNTED AT THE SAME HEIGHT AND WITHIN 12 INCHES, ON CENTER, OF EACH OTHER. UTILIZE MOUNTING STRAPS BETWEEN STUDS FOR ADJACENT INSTALLATION. DIVISION 26 SPECIFIED HEIGHTS SHALL TAKE PREFERENCE.

D. PROVIDE CUTTING AND PATCHING FOR ELECTRICAL WORK.

E. PROVIDE MINIMUM #10 AWG CONDUCTOR SIZE (INCREASING IN SIZE AS REQUIRED) FOR A MAXIMUM OF 3 PERCENT VOLTAGE DROP FROM PANEL TO LOAD FOR 120V/20A CIRCUITS LONGER THAN 75 FEET AND FOR 277V/20A CIRCUITS LONGER THAN 150 FEET.

F. DEVICES SHALL NOT BE INSTALLED BACK TO BACK TO PREVENT NOISE TRAVEL UNLESS NOTED OTHERWISE.

KEY NOTES:

1 NOTE NOT USED.

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SHEET TITLE:
SECOND FLOOR POWER PLAN

SHEET NUMBER:

E222B

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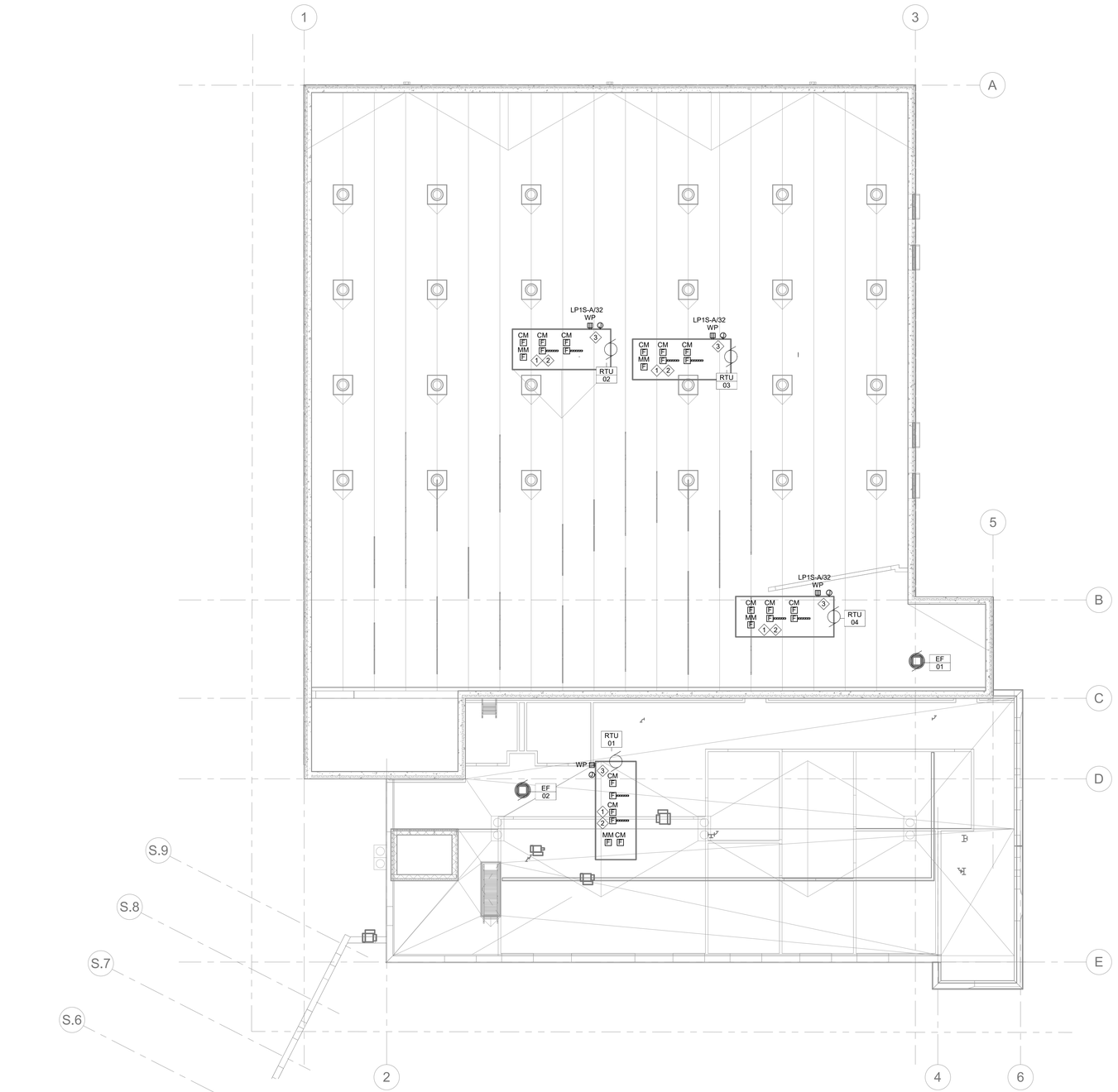
GENERAL NOTES:

A. REFER TO MECHANICAL ELECTRICAL SCHEDULES FOR ELECTRICAL CONNECTION REQUIREMENTS OF MECHANICAL EQUIPMENT.

KEY NOTES:

1. DUCT DETECTOR FOR AIR HANDLING UNIT SHUT DOWN. VERIFY LOCATION WITH MECHANICAL CONTRACOTR. REFER TO FIRE ALARM DETAILS FOR ADDITIONAL INFORMATION.
2. CONTROL AND MONITOR MODULES FOR AHU SHUTDOWN AND STATUS MONITORING. REFER TO DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
3. PROVIDE 120V POWER CONNECTION TO UNIT LIGHTS AND RECEPTACLE.



1 ROOF FLOOR POWER & SYSTEMS PLAN
1/8" = 1'-0"

BLOOM HAY DOBBS

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SIGNATURE

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02/03/25
DATE

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SHEET TITLE:
ROOF FLOOR POWER PLAN

SHEET NUMBER:

E223

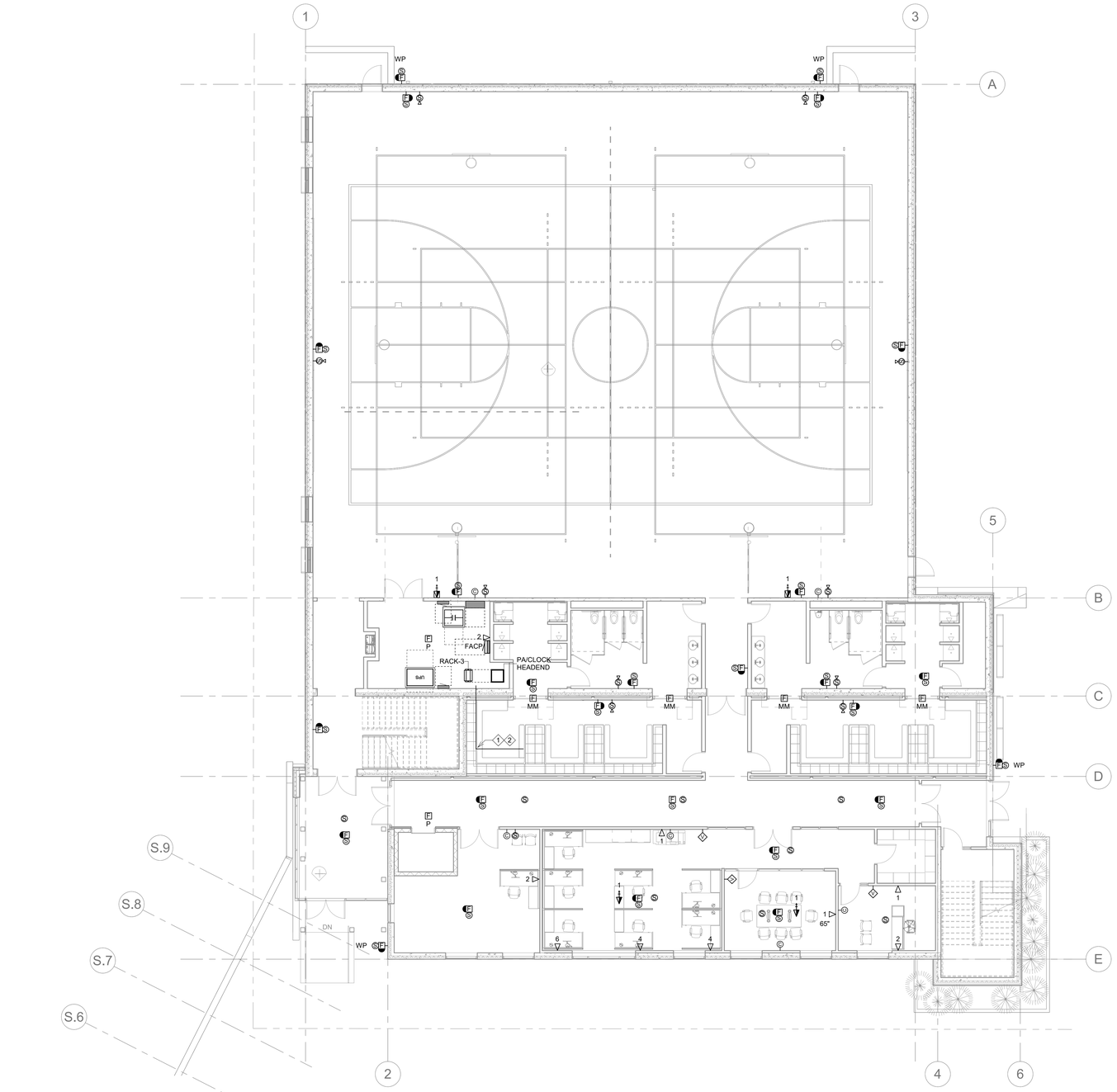
DOR NOT FOREL P.A. - CONFIDENTIAL

GENERAL NOTES:

A. NOTE NOT USED.

KEY NOTES:

1. PROVIDE ARMORED FIBER FROM EXISTING IDF TO NEW DATA RACK. REFER TO RISER DIAGRAM FOR ADDITIONAL INFORMATION. RECOMMENDED PATHWAY SHOWN
2. PROVIDE INTERCONNECTION FROM EXISTING FIRE ALARM CONTROL PANEL TO NEW FIRE ALARM CONTROL PANEL. RECOMMENDED PATHWAY SHOWN.



1 FIRST FLOOR SYSTEMS PLAN
1/8" = 1'-0"

BLOOM HAY DOBBS

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NOVA CLASSICAL ACADEMY
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SHEET TITLE:
FIRST FLOOR SYSTEMS PLAN

SHEET NUMBER:

E231

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GENERAL NOTES:

A. NOTE NOT USED.

KEY NOTES:

1. PROVIDE ARMORED FIBER FROM EXISTING IDF TO NEW DATA RACK. REFER TO RISER DIAGRAM FOR ADDITIONAL INFORMATION. RECOMMENDED PATHWAY SHOWN
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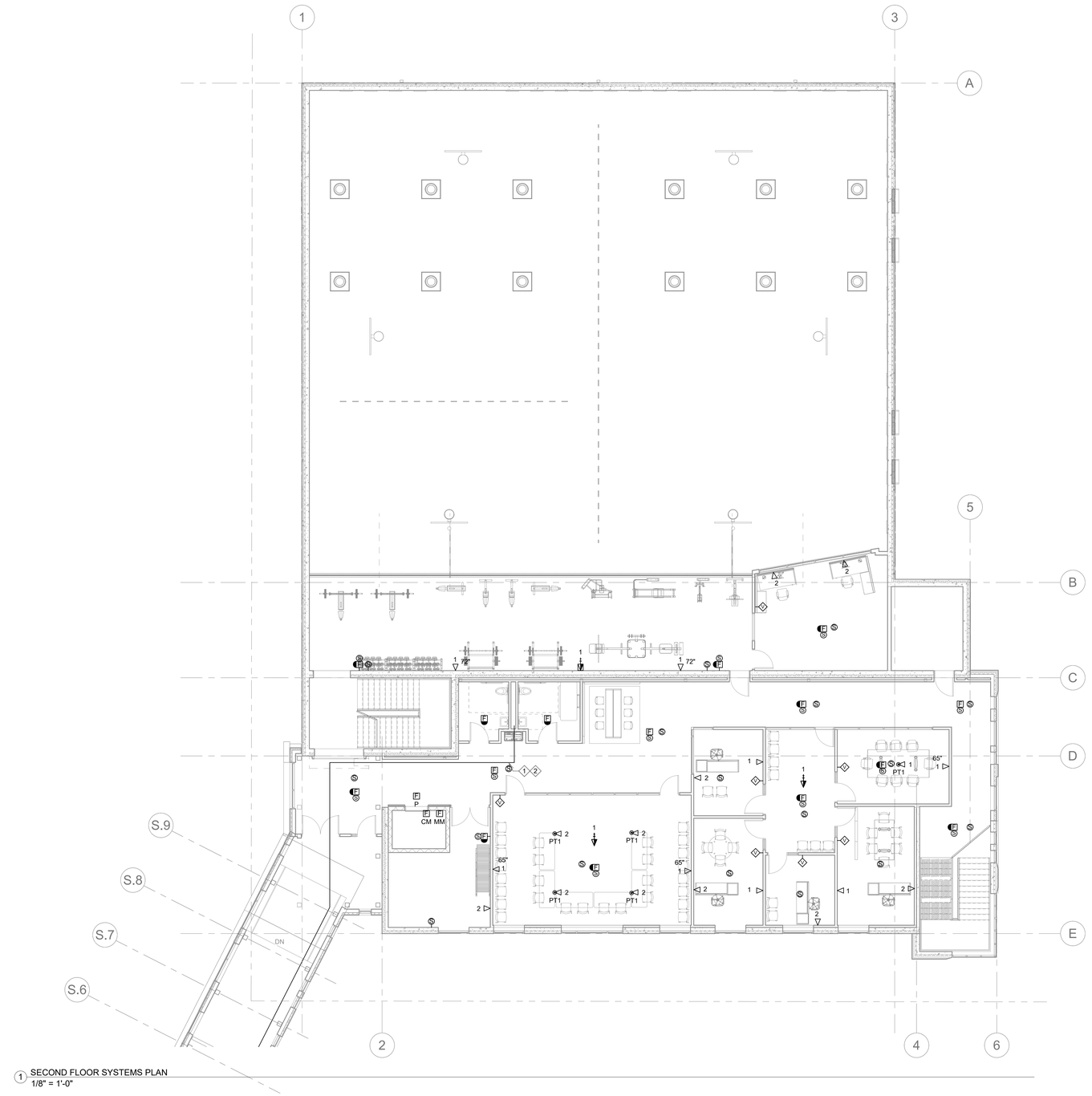

1 SECOND FLOOR SYSTEMS PLAN
1/8" = 1'-0"

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SECOND FLOOR SYSTEMS PLAN

SHEET NUMBER:

E232A

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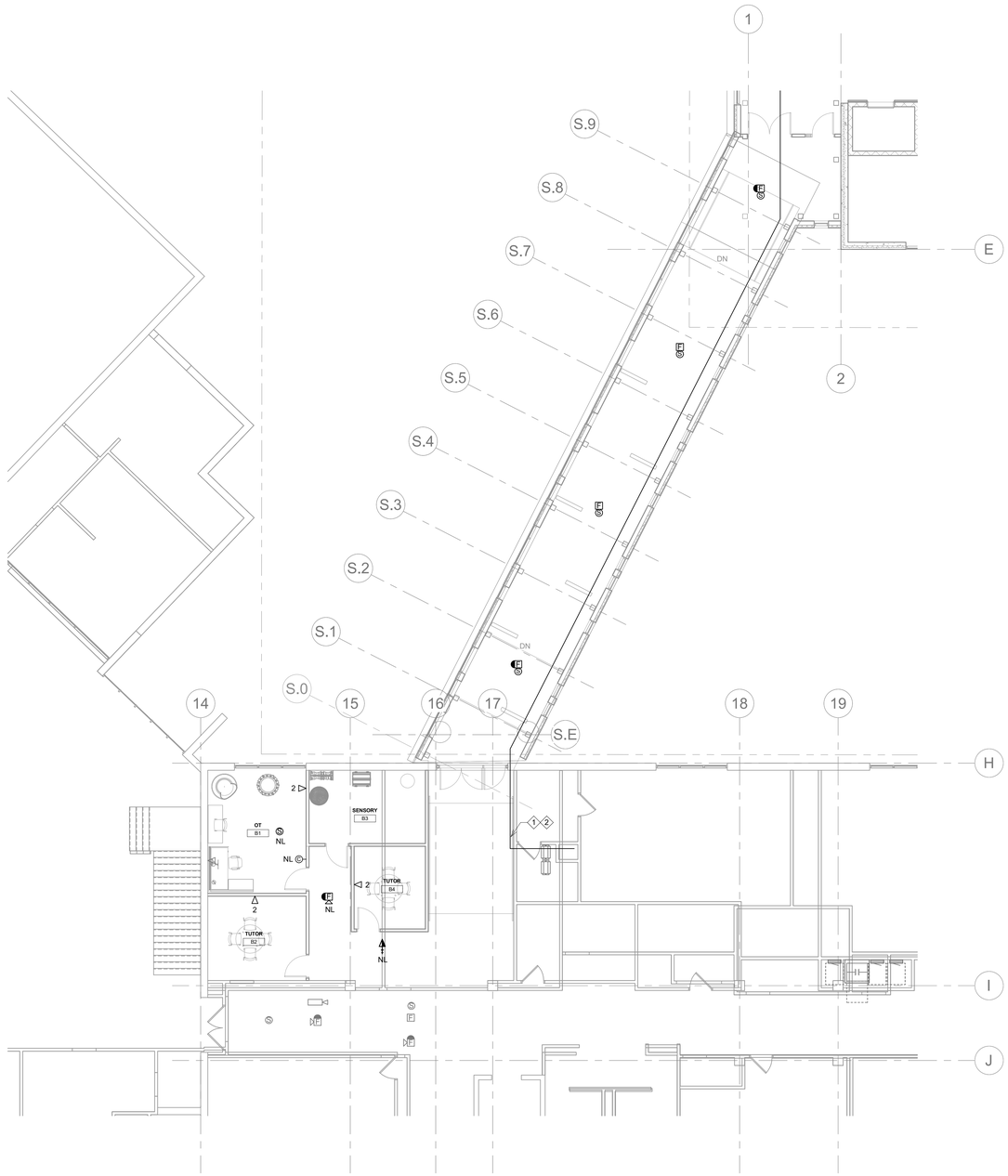

1 SECOND FLOOR SYSTEMS PLAN
1/8" = 1'-0"

GENERAL NOTES:

A. NOTE NOT USED.

KEY NOTES:

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SHEET TITLE:
SECOND FLOOR SYSTEMS PLAN

SHEET NUMBER:

E232B

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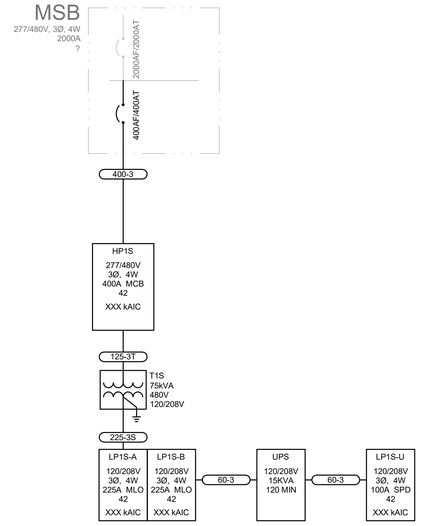
GENERAL NOTES:

A. NOTE NOT USED.

KEY NOTES:

(1) NOTE NOT USED.



1 One Line Diagram
12" = 1'-0"

FEEDER SCHEDULE

XXXX

FEEDER	FEEDER DESCRIPTION	CONDUIT
60-3	1"C, 4#6 + #10 G	EMT
125-3T	1-1/2"C, 3#1 + #6 G	EMT
225-3S	2-1/2"C, 4#4/0 + #2 G	EMT
400-3	3-1/2"C, 4#500KCMIL + #3 G	EMT

-2	SINGLE PHASE
-3	THREE PHASE
SE	SERVICE ENTRANCE
S	SECONDARY (LV TRANSFORMER)
D	SIZED FOR VOLTAGE DROP
P	PVC
U	UNDERGROUND
L	ALUMINUM
N	ADDED NEUTRAL
T	THREE WIRE ONLY, NO NEUTRAL

GENERAL NOTES:

A. NOMENCLATURE DEFAULTS WITH A SINGLE NEUTRAL AND A GROUND.

NOTES:

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SHEET TITLE:
ELECTRICAL RISER DIAGRAM

SHEET NUMBER:

E300

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NAME: HP1S

ENCLOSURE: NEMA 1 **MOUNTING:** SURFACE **INCOMING FEED:**
SUPPLY FROM: MSB **FEED THRU LUGS:** **FTL SUB PANEL:**
VOLTAGE: 277/480 **PHASE:** 3 **WIRE:** 4 **CALCULATED AFC:** SEE RISER
MIN. BUS RATING: 400 A **MAIN SIZE:** 400 A **MAIN OPTIONS:** MCB

CKT	CIRCUIT DESCRIPTION	NOTE	TRIP	POLE	A		B		C		POLE	TRIP	NOTE	CIRCUIT DESCRIPTION	CKT
1					13380	150					1	20		DA_L	2
3	T1S		20	3			12400	2730			1	20		DA_L	4
5									11700	1368	1	20		DA_L	6
7					17528	1260					1	20		DA_L	8
9	RTU 01		20	3			17528	816			1	20		DA_L	10
11									17528	1480	1	20		DA_L	12
13					13620	552					1	20		DA_L	14
15	RTU 02		20	3			13620								16
17									13620						18
19					13620										20
21	RTU 03		20	3			13620								22
23									13620						24
25					4434										26
27	RTU 04		20	3			4434								28
29									4434						30
31					0										32
33	ELEVATOR		20	3			0								34
35									0						36
37	DA_L		20	1	1000										38
39															40
41															42
					TOTAL LOAD:		65545 VA		65149 VA		63751 VA				
					TOTAL AMPS:		237 A		236 A		230 A				

LOAD CLASSIFICATION	CONNECTED LOAD (VA)	DEMAND FACTOR	LOAD DEMAND (VA)	TOTALS	
LIGHTING LOAD (DA_L)	9356 VA	125%	11695 VA		
RECEPTACLE LOAD (DA_R)	23400 VA	10 KVA @ 100%, Remaining @ 50%	16700 VA	**TOTAL CONN. LOAD:**	194444 VA
MTR LOAD - HEATING (DA_HM)		100%		**TOTAL EST. DEMAND:**	190083 VA
MTR LOAD - COOLING (DA_CM)		100%		**TOTAL CONN. CURRENT:**	234 A
MTR LOAD - GENERAL (DA_M)	158528 VA	100%	158528 VA	**TOTAL EST. DEMAND CURRENT:**	229 A
LARGEST MTR - BRANCH (DA_LBM)		125%	0 VA		
MOTOR LOAD TOTALS:	**158528 VA**		**158528 VA**		
KITCHEN LOAD (DA_K)		DEMAND PER NEC			
ELECTRONIC LOAD (DA_EL)		100%			
ELECTRIC HEATING (DA_E)		100%			
DWELLING UNIT - GEN. LOAD (DA_D)		10 KVA @ 100%, Remaining @ 40%			
MISCELLANEOUS LOAD (DA_MI)	1000 VA	100%	1000 VA		
SPARE CAPACITY (DA_SP)		100%			
NON-COINCIDENT (DA_NC)		0%			

GENERAL NOTES:
A.
B.
C.

NOTES:
1.
2.
3.
4.
5.
6.

NAME: LP1S-A

ENCLOSURE: NEMA 1 **MOUNTING:** SURFACE **INCOMING FEED:**
SUPPLY FROM: T1S **FEED THRU LUGS:** Yes **FTL SUB PANEL:**
VOLTAGE: 120/208 **PHASE:** 3 **WIRE:** 4 **CALCULATED AFC:** SEE RISER
MIN. BUS RATING: 200 A **MAIN SIZE:** **MAIN OPTIONS:** MLO

CKT	CIRCUIT DESCRIPTION	NOTE	TRIP	POLE	A		B		C		POLE	TRIP	NOTE	CIRCUIT DESCRIPTION	CKT
1	DA_R		20	1	1080	540					1	20		DA_R	2
3	DA_MI		20	1			0	1260			1	20		DA_R	4
5	DA_MI		20	1					0	1080	1	20		DA_R	6
7	DA_MI		20	1	0	360					1	20		DA_R	8
9	DA_R		20	1			1000	180			1	20	1	DA_R	10
11	DA_R		20	1					720	360	1	20		DA_R	12
13	DA_R		20	1	900	1620					1	20		DA_R	14
15	DA_R		20	1			900	1620			1	20		DA_R	16
17	DA_R		20	1					900	900	1	20		DA_R	18
19	DA_R		20	1	360	1080					1	20		DA_R	20
21	DA_R		20	1			360	900			1	20		DA_R	22
23	DA_R		20	1					720	1260	1	20		DA_R	24
25	DA_R		20	1	540	1080					1	20		DA_R	26
27	DA_R		20	1			540	900			1	20		DA_R	28
29	DA_R	1	20	1					180	540	1	20		DA_R	30
31	DA_R		20	1	900	720					1	20		DA_R	32
33	DA_R		20	1			900	0			1	20		DA_M	34
35	DA_M		20	1					3120	180					36
37	DA_M		20	1	3120	1080					3	20		UPS	38
39	DA_M		20	1			3120	720							40
41	DA_M		20	1					1560	180	1	20		DA_R	42
					TOTAL LOAD:		13380 VA		12400 VA		11700 VA				
					TOTAL AMPS:		112 A		104 A		98 A				

LOAD CLASSIFICATION	CONNECTED LOAD (VA)	DEMAND FACTOR	LOAD DEMAND (VA)	TOTALS	
LIGHTING LOAD (DA_L)		125%			
RECEPTACLE LOAD (DA_R)	23400 VA	10 KVA @ 100%, Remaining @ 50%	16700 VA	**TOTAL CONN. LOAD:**	37480 VA
MTR LOAD - HEATING (DA_HM)		100%		**TOTAL EST. DEMAND:**	30780 VA
MTR LOAD - COOLING (DA_CM)		100%		**TOTAL CONN. CURRENT:**	104 A
MTR LOAD - GENERAL (DA_M)	10920 VA	100%	10920 VA	**TOTAL EST. DEMAND CURRENT:**	85 A
LARGEST MTR - BRANCH (DA_LBM)		125%	0 VA		
MOTOR LOAD TOTALS:	**10920 VA**		**10920 VA**		
KITCHEN LOAD (DA_K)		DEMAND PER NEC			
ELECTRONIC LOAD (DA_EL)		100%			
ELECTRIC HEATING (DA_E)		100%			
DWELLING UNIT - GEN. LOAD (DA_D)		10 KVA @ 100%, Remaining @ 40%			
MISCELLANEOUS LOAD (DA_MI)	1000 VA	100%	1000 VA		
SPARE CAPACITY (DA_SP)		100%			
NON-COINCIDENT (DA_NC)		0%			

GENERAL NOTES:
A.
B.
C.

NOTES:
1. PROVIDE GFCI BREAKER
2.
3.
4.
5.
6.

NAME: LP1S-U

ENCLOSURE: NEMA 1 **MOUNTING:** SURFACE **INCOMING FEED:**
SUPPLY FROM: UPS **FEED THRU LUGS:** **FTL SUB PANEL:**
VOLTAGE: 120/208 **PHASE:** 3 **WIRE:** 4 **CALCULATED AFC:**
MIN. BUS RATING: 100 A **MAIN SIZE:** **MAIN OPTIONS:**

CKT	CIRCUIT DESCRIPTION	NOTE	TRIP	POLE	A		B		C		POLE	TRIP	NOTE	CIRCUIT DESCRIPTION	CKT
1	DA_M		20	1	0										2
3	DA_M		20	1			0								4
5	DA_M		20	1					0						6
7	DA_M		20	1	0										8
9	DA_R		20	1			180								10
11	DA_R		20	1					180						12
13	DA_R		20	1	180										14
15	DA_R		20	1			900								16
17	DA_R		20	1					540						18
19	DA_M		20	1	0										20
21	DA_MI		20	1			0								22
23	DA_MI		20	1					0						24
25	DA_MI		20	1	0										26
27															28
29															30
31															32
33															34
35															36
37															38
39															40
41															42
					TOTAL LOAD:		180 VA		1080 VA		720 VA				
					TOTAL AMPS:		2 A		10 A		7 A				

LOAD CLASSIFICATION	CONNECTED LOAD (VA)	DEMAND FACTOR	LOAD DEMAND (VA)	TOTALS	
LIGHTING LOAD (DA_L)		125%			
RECEPTACLE LOAD (DA_R)	1980 VA	10 KVA @ 100%, Remaining @ 50%	1980 VA	**TOTAL CONN. LOAD:**	1980 VA
MTR LOAD - HEATING (DA_HM)		100%		**TOTAL EST. DEMAND:**	1980 VA
MTR LOAD - COOLING (DA_CM)		100%		**TOTAL CONN. CURRENT:**	5 A
MTR LOAD - GENERAL (DA_M)	0 VA	100%	0 VA	**TOTAL EST. DEMAND CURRENT:**	5 A
LARGEST MTR - BRANCH (DA_LBM)		125%	0 VA		
MOTOR LOAD TOTALS:	**0 VA**		**0 VA**		
KITCHEN LOAD (DA_K)		DEMAND PER NEC			
ELECTRONIC LOAD (DA_EL)		100%			
ELECTRIC HEATING (DA_E)		100%			
DWELLING UNIT - GEN. LOAD (DA_D)		10 KVA @ 100%, Remaining @ 40%			
MISCELLANEOUS LOAD (DA_MI)	0 VA	100%	0 VA		
SPARE CAPACITY (DA_SP)		100%			
NON-COINCIDENT (DA_NC)		0%			

GENERAL NOTES:
A.
B.
C.

NOTES:
1.
2.
3.
4.
5.
6.

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Project Name: NOVA CLASSICAL ACADEMY
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Madeline M. Folin, P.E.
PRINT NAME

SIGNATURE

57233
LICENSE NO.

02/03/25
DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
PANELBOARD SCHEDULES

SHEET NUMBER:

E400

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LIGHT FIXTURE SCHEDULE

ELECTRICAL

FIXTURE LETTER	FIXTURE STYLE	VOLTAGE	MOUNTING	LAMPS		BALLAST/ DRIVER	FIXTURE MAX VA	CONTROL MEDIA (LENS, LOUVER, ETC.)	MANUFACTURER'S SERIES NUMBER	FIXTURE DESCRIPTION	NOTES
				TYPE	COLOR						
A5	2X4 LED EDGE-LIT FLAT PANEL	120/277	LAY-IN GRID INVERTED TEE	LED 4000 LUM MIN	3500K	DIMMING 0-10V (10%)	36 VA	ACRYLIC WHITE FROST	COOPER-METALUX FPANEL SERIES COLUMBIA CFP SERIES LITHONIA EPANL SERIES ORACLE 24-FPL1-LED SERIES	EXTRUDED ALUMINUM FRAME, SEAMLESS CORNERS, WHITE; 3" DEEP OR LESS	
B5	2X2 LED EDGE-LIT FLAT PANEL	120/277	LAY-IN GRID INVERTED TEE	LED 2000 LUM MIN	3500K	DIMMING 0-10V (10%)	18 VA	ACRYLIC WHITE FROST	COOPER-METALUX FPANEL SERIES COLUMBIA CFP SERIES LITHONIA EPANL SERIES ORACLE 22-FPL1-LED SERIES	EXTRUDED ALUMINUM FRAME, SEAMLESS CORNERS, WHITE; 3" DEEP OR LESS	
D5	4" ROUND DOWNLIGHT - WET LOCATION	120/277	RECESSED GYP-BOARD AND/OR LAY-IN GRID INVERTED TEE	LED 1000 LUM MIN	3500K	DIMMING 0-10V (1%)	16 VA	SEMI-SPECULAR CLEAR SELF FLANGED MEDIUM DISTRIBUTION	HALO COMMERCIAL HC4 SERIES PRESCOLITE LF4 SERIES GOTHAM EVO4SG SERIES MAXILUME HH4-LED SERIES	PRE-PAINTED WHITE ALUMINUM HOUSING, PRE-WIRED J-BOX, TWO 27" HANGER BARS, IP66	
E3b	EXIT SIGN, SINGLE FACE, DIECAST, BATTERY	120/277	RECESSED	LED	RED	N/A	5 VA	RED LETTERS	ISOLITE LPDC SERIES DUAL LITE SE SERIES LITHONIA LQC SERIES EMERGI-LITE PRECEPTOR SERIES	WHITE FINISH, DIE-CAST ALUMINUM CONSTRUCTION, UNIVERSAL FACEPLATE KIT, MOUNTING PER FLOOR PLAN, FULLY RECESSED EMERGENCY BATTERY UL924, SELF DIAGNOSTICS	
E8b	EMERGENCY INVERTER BATTERY	120/277	SURFACE	N/A	N/A	N/A	150VA	N/A	SURE LITES INV110SI SERIES POWER SENTRY EAC ISSM SERIES DUAL-LITE LG125 SERIES EMERGI-LITE MINI INVERTER SERIES	STEEL HOUSING, VARIABLE RATE TEMPERATURE- COMPENSATED CHARGER, 90 MINUTE RUN TIME, WHITE FINISH, EMERGENCY BATTERY UL924, SELF DIAGNOSTICS	
F4	4' INDUSTRIAL	120/277	SURFACE/ CHAIN HUNG	LED 4000 LUM MIN	3500K	DIMMING 0-10V (10%)	24 VA	SEMI FROSTED ACRYLIC LENS	COOPER-METALUX SNLED SERIES COLUMBIA LCL SERIES LITHONIA CLX SERIES ORACLE OEC-LED SERIES	STEEL CHANNEL, WHITE POWDER COAT	
H2	SUSPENDED HIGH BAY	120/277	CHAIN HUNG	LED 18000 LUM MIN	3500K	DIMMING 0-10V (10%)	105 VA	MEDIUM DISTRIBUTION, FROSTED DIFFUSER	COOPER METALUX OHB SERIES COLUMBIA PEL SERIES LITHONIA IBG SERIES ORACLE CB2-LED SERIES	STEEL CHANNEL, WIRE GUARD, POST PAINTED STEEL HOUSING	
L4	4" X 4' RECESSED LINEAR	120/277	LAY-IN GRID INVERTED TEE	LED 600 LUM/FT	3500K	DIMMING 0-10V (10%)	24 VA	FLUSH, SNAP-IN SATIN LENS	NULITE RG4 SERIES AXIS BEAM 4 SERIES MARK SL4L SERIES LITECONTROL MOD SERIES	CONTINUOUS WHITE ALUMINUM HOUSING	
L14	2" PENDANT LINEAR	120/277	PENDANT	LED XXX LUM/FT	3500K	DIMMING 0-10V (10%)	XXX VA	FROSTED WHITE ACRYLIC, 100% DIRECT	AXIS BEAM 2 SERIES CORONET L2S SERIES NULITE RP24 SERIES LITECONTROL MODL SERIES	EXTRUDED ALUMINUM HOUSING, 2 1/2" WIDE LENS, LENGTHS MADE TO MEASURE, POWDER-COATED WHITE	
R2	WEATHER PROOF WALL PACK - TRAPEZOID	120/277	WALL	LED 6000 LUM MIN	3500K	DIMMING 0-10V	50 VA	CLEAR TEMPERED GLASS, TYPE III DISTRIBUTION	COOPER-MCGRAW-EDISON IST SERIES HUBBELL TRP SERIES LITHONIA WST SERIES GARDCO 111L SERIES	BRONZE, INTEGRAL PHOTOCELL	

GENERAL ELECTRICAL NOTES:

A. REFER TO SPECIFICATION SECTIONS 265100 AND 265600 FOR LIGHT FIXTURE REQUIREMENTS.
B. BRING CONFLICTS BETWEEN THE MANUFACTURER'S CATALOG NUMBER AND DESCRIPTIONS TO THE ATTENTION OF THE ENGINEER.
C. LIGHT SOURCE SHALL HAVE COLOR TEMPERATURE 3500K WITH MINIMUM CRI OF 80 UNLESS OTHERWISE NOTED.
D. UNLESS A SPECIFIC CATALOG NUMBER OR SERIES IS NAMED, THE MANUFACTURER'S NAMED ALTERNATES MUST SUBMIT CATALOG CUT SHEETS AND IES FORMATTED PHOTOMETRIC REPORT TO THE ENGINEER FOR APPROVAL AT LEAST 10 DAYS PRIOR TO BID DATE. THE ENGINEER MAY REQUEST SAMPLE OF LUMINAIRE TO BE SUPPLIED.
E. MINIMUM LUMENS LISTED FOR LIGHT FIXTURES ARE DELIVERED LUMENS BASED ON PHOTOMETRIC TESTING COMPLETED IN ACCORDANCE WITH IES LM-79 STANDARDS.
F. SUBSTITUTE LIGHT FIXTURE IS SUBJECT TO ARCHITECT/ENGINEER APPROVAL.

NOTES:

LIGHTING CONTROL DEVICE SCHEDULE

DEVICE TYPE	LIGHTING DEVICE DESCRIPTION	LIGHTING DEVICE OPERATION
COS1	STAND ALONE DUAL TECHNOLOGY CEILING MOUNTED OCCUPANCY SENSOR	STAND ALONE CEILING SENSOR. TIME OUT AT 30 MINUTES.
COS1S	CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR TO WORK WITH LIGHTING CONTROL SYSTEM AND TO BE COMPATIBLE WITH DIMMER D1S.	DUAL TECHNOLOGY TO CONTROL DIMMER SWITCH D1S OR TO BE OVERRIDE CONTROL FOR LIGHTING CONTROL SYSTEM. TIME OUT AT 30 MINUTES.
D1S	0-10V DIMMER SWITCH. DIMMER TO WORK WITH CEILING MOUNTED SENSOR COS1S.	0-10V DIMMING. DIMMER TO BE CAPABLE OF DIMMING TO 1%. DIMMER TO WORK WITH CEILING MOUNTED SENSOR COS1S.
OS	WALL MOUNTED 0-10 SWITCH WITH INTEGRAL OCCUPANCY SENSOR.	BASIC ON/OFF CONTROL
S1	TOGGLE SWITCH	BASIC ON/OFF CONTROL
WDSV1	WALL MOUNTED 0-10V DIMMER SWITCH WITH INTEGRAL VANCANCY SENSOR.	0-10V DIMMING. MANUAL ON, AUTO OFF AFTER 20 MINUTES. DIMMER TO BE CAPABLE OF DIMMING TO 1%.

GENERAL NOTES:

A. ALL LIGHTING CONTROLS NOT INDICATED AS STAND ALONE SHALL BE PART OF THE LIGHTING CONTROL SYSTEM. SYSTEM IS DESIGNED AROUND A WATTSTOPPER DLM SERIES SYSTEM. DOCUMENTS INDICATE CONTROL DEVICES, SEQUENCE OF OPERATION, AND OVERRIDE CONTROL LOCATIONS. CONTRACTOR SHALL PROVIDE ALL REQUIRED POWER PACKS, DIMMING POWER PACKS, BRIDGES, GATEWAYS, AND PROGRAMMING AS REQUIRED TO ACCOMPLISH THE CONTROL SEQUENCES INDICATED. NOT ALL PARTS AND PIECES ARE SHOWN ON PLAN. CONTRACTOR TO PROVIDE ALL PIECES THAT ARE REQUIRED.

ELECTRICAL NOTES:

LIGHTING CONTROL SEQUENCE SCHEDULE

LC # — LIGHTING CONTROL SEQUENCE SYMBOL FOUND ON LIGHTING PLAN(S).

LIGHTING CONTROL SEQUENCE	EMS/BAS CAPABILITIES	NETWORK CONTROL SYSTEM	TIME CLOCK	VACANCY SENSOR	OCCUPANCY SENSOR	AUTO OFF TIME (MINUTES)	LIGHT REDUCTION % SWITCHING (MIN 50%)	DIMMING TYPE	DIMMING LEVEL	SIDELIGHT DAYLIGHT HARVEST (AUTOMATIC/ SWITCHED)	TOPLIGHT DAYLIGHT HARVEST (AUTOMATIC/ SWITCHED)	AFTERHOURS OVERRIDE	OVERRIDE DURATION	MANUAL ON/OFF	NOTES
LC 1				DT		20		0-10V	0.01					YES	
LC 1D				DT		20		0-10V	0.01	AUTOMATIC				YES	
LC 2	X	X	X					0-10V	0.01			X	2 HOURS		
LC 3				PIR		5								YES	

GENERAL NOTES:

A. PROVIDE ALL PARTS AND PIECES NECESSARY TO MAKE A FUNCTIONAL LIGHTING CONTROL SYSTEM WITH ALL CONTROLS AS MARKED ABOVE.
B. SUPPLIER TO PROVIDE COMPLETE WIRING DIAGRAM PRIOR TO INSTALLATION.
C. IF DIMMING IS CALLED FOR IN SCHEDULE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY AND PROVIDE ALL NECESSARY PARTS, BALLASTS, DRIVERS, ETC. TO PROVIDE THE DIMMING FUNCTION.
D. CONTRACTOR TO PROVIDE ALL WIRING NECESSARY INCLUDING ANY 0-10V CONTROL WIRING AS REQUIRED.
E. CONTRACTOR MUST COMPLY WITH THE CONTROLS INTENT AS INDICATED ON THE DRAWINGS.
F. AT MINIMUM, CONTRACTOR SHALL HOLD TWO PRE CONSTRUCTION MEETINGS, PRIOR TO BID, WITH THEIR SELECTED LIGHTING CONTROLS VENDOR OR SUPPLIER.
G. THE INTENT OF (2) PRE CONSTRUCTION MEETINGS IS TO DEVELOP AN UNDERSTANDING OF THE CONTROLS SYSTEM TO ACCURATELY ACCOUNT FOR ALL POWER, CONTROLS, CABLING, EQUIPMENT AND CONNECTION REQUIREMENTS.
H. CONTRACTOR SHALL PROVIDE ALL NECESSARY COMPONENTS, ACCESSORIES AND ASSOCIATED LABOR FOR THEIR SELECTED LIGHTING CONTROLS SYSTEM.

ELECTRICAL NOTES:

LIGHT FIXTURE SCHEDULE - SITE

ELECTRICAL

FIXTURE LETTER	FIXTURE STYLE	VOLTAGE	MOUNTING	LAMPS		BALLAST/ DRIVER	FIXTURE MAX VA	CONTROL MEDIA (LENS, LOUVER, ETC.)	MANUFACTURER'S SERIES NUMBER	FIXTURE DESCRIPTION	POLE DESCRIPTION									BASE DESCRIPTION						NOTES
				TYPE	COLOR						POLE LENGTH	POLE SHAPE	POLE MATERIAL	POLE COLOR/ FINISH	FIXTURE MOUNTING	SUPPORTS CCTV CAMERA (EPA RATING)	SUPPORTS FLAG OR BANNER (EPA RATING)	INTEGRAL DUPLEX RECEPTACLE	VIBRATION DAMPERS	FOUNDATION	BASE HEIGHT ABOVE GRADE	BASE DEPTH BELOW GRADE	BASE DIAMETER	VERTICAL REBARS	REBAR TIES	
AA1	POLE MOUNTED AREA LIGHT - 1 HEAD	480	POLE	LED 14500 LUM MIN	4000K	HVOLT DRIVER	150 VA	TYPE III DISTRIBUTION	LUMARK PREVAIL SERIES BEACON VIPER LARGE SERIES LITHONIA DSX SERIES NLS LIGHTING NV-1 SERIES	DARK SKY COMPLIANT, DIE-CAST ALUMINUM CONSTRUCTION, TOOLESS OPENING, MATCH COLOR LISTED IN EXTERIOR LIGHT POLE SCHEDULE, MOTION/AMBIENT SENSOR	25'	SQUARE	STEEL	BRONZE	POLE	-	YES	-	YES	CONCRETE BASE	3'	6'	24"	#4	#3	

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NOTES:

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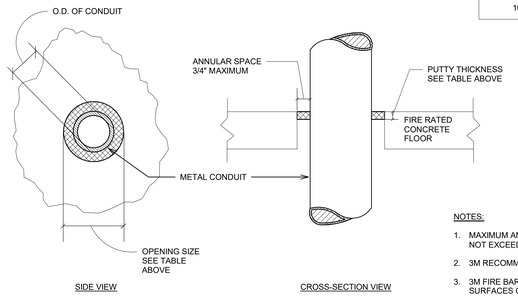
SHEET TITLE:
LIGHTING SCHEDULES

SHEET NUMBER:

E450

MAXIMUM O.D. OF CONDUIT	MAXIMUM OPENING SIZE	MINIMUM PUTTY THICKNESS	FIRE RATING OF ASSEMBLY
5"	6 1/4 INCH	1/2 INCH	2 HOUR
10"	12 1/4 INCH	1 INCH	3 HOUR

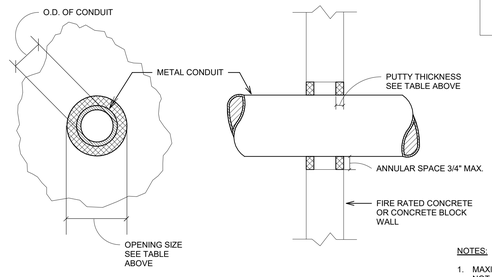


NOTES:

1. MAXIMUM ANNULAR SPACE BETWEEN CONDUIT AND OPENING SHALL NOT EXCEED 3/4 INCH.
2. 3M RECOMMENDATIONS ARE BASED ON U.L. FIRESTOP SYSTEM 202.
3. 3M FIRE BARRIER MP MOLDABLE PUTTY INSTALLED FLUSH TO BOTH SURFACES OF THE WALL.

1 PENETRATION FIRESTOP FOR CONDUIT THROUGH CONCRETE FLOOR (2,3 HOUR) DETAIL
NO SCALE

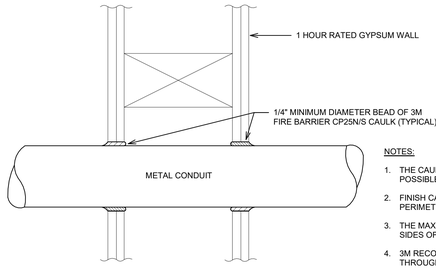
MAXIMUM O.D. OF CONDUIT	MAXIMUM OPENING SIZE	MINIMUM PUTTY THICKNESS	FIRE RATING OF ASSEMBLY
5"	6 1/4 INCH	1/2 INCH	2 HOUR
10"	12 1/4 INCH	1 INCH	3 HOUR



NOTES:

1. MAXIMUM ANNULAR SPACE BETWEEN CONDUIT AND OPENING SHALL NOT EXCEED 3/4 INCH.
2. 3M RECOMMENDATIONS ARE BASED ON U.L. FIRESTOP SYSTEM 202.
3. 3M FIRE BARRIER MP MOLDABLE PUTTY INSTALLED FLUSH TO BOTH SURFACES OF THE WALL.

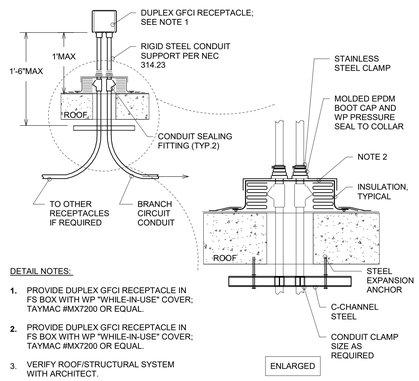
2 PENETRATION FIRESTOP FOR CONDUIT THROUGH CONCRETE WALL (2,3 HOUR) DETAIL
NO SCALE



NOTES:

1. THE CAULK SHALL BE FORCED INTO THE ANNULAR SPACE TO THE MAXIMUM EXTENT POSSIBLE, FLUSH WITH THE EXTERIOR OF PENETRATION SURFACE.
2. FINISH CAULKING WITH 1/4" MINIMUM BEAD OF CP25N/S CAULK APPLIED TO THE PERIMETER OF THE CONDUIT AT ITS EGRESS FROM THE WALL.
3. THE MAXIMUM ANNULAR SPACE SHALL NOT EXCEED 3/16" INSTALL 3M FIRESTOP ON BOTH SIDES OF THE WALL.
4. 3M RECOMMENDATION ARE BASED ON ASTM E-814 (UL 1479) FIRE TEST AND U.L. THROUGH -PENETRATION FIRESTOP SYSTEM #147.

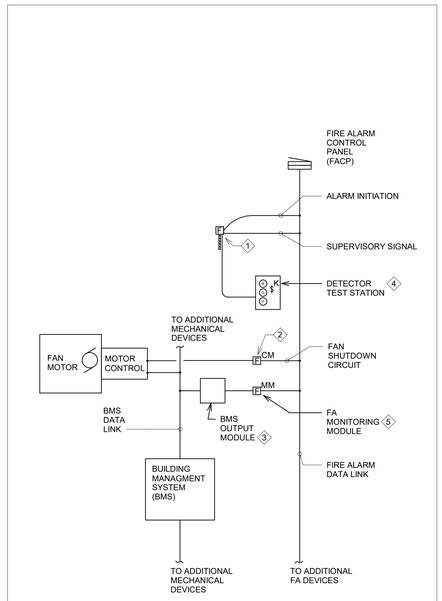
3 PENETRATION FIRESTOP FOR CONDUIT THROUGH GYPSUM WALL (1 HOUR) DETAIL
NO SCALE



DETAIL NOTES:

1. PROVIDE DUPLEX GFCI RECEPTACLE IN FS BOX WITH WP "WHILE-IN-USE" COVER; TAYMAC #MX7200 OR EQUAL.
2. PROVIDE DUPLEX GFCI RECEPTACLE IN FS BOX WITH WP "WHILE-IN-USE" COVER; TAYMAC #MX7200 OR EQUAL.
3. VERIFY ROOF/STRUCTURAL SYSTEM WITH ARCHITECT.

4 RECEPTACLE MOUNT ROOF PENETRATION
NO SCALE



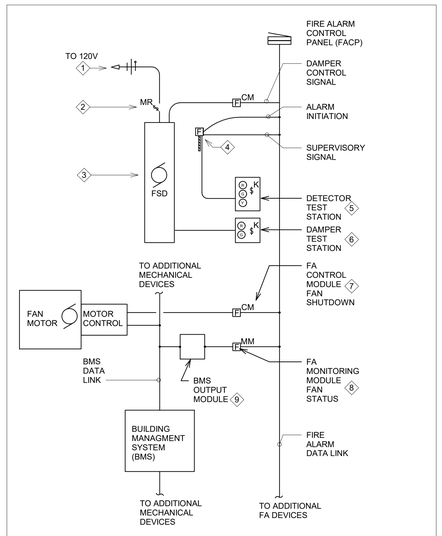
GENERAL DETAIL NOTES:

A. PROVIDE LISTED COMPONENTS APPROVED FOR USE AS A SYSTEM

DETAIL NOTES:

1. ADDRESSABLE PHOTOELECTRIC DUCT SMOKE DETECTOR WITH EOL RESISTOR
2. FIRE ALARM CONTROL MODULE FOR UNIT SHUT DOWN (1 FOR EACH FAN UNIT)
3. BMS OUTPUT MODULE (1 PER FAN UNIT)
4. PROVIDE DETECTOR TEST STATION WHERE DETECTORS ARE CONCEALED AND MORE THAN 10FT AFF, OR WHERE DETECTOR ALARM ARE NOT VISIBLE. SHALL HAVE RED LED FOR ALARM, GREEN LED FOR POWER, YELLOW LED FOR TROUBLE AND KEYED TEST SWITCH
5. FIRE ALARM MONITORING MODULE; STATUS OF UNIT RUNNING OR LOSS OF FLOW IN THE SYSTEM THROUGH THE MOTOR CONTROL TO SHUT THE DAMPERS UPON LOSS OF AIR FLOW (1 FOR EACH FAN UNIT)

5 DUCT DETECTOR DETAIL
NO SCALE



GENERAL DETAIL NOTES:

A. PROVIDE LISTED COMPONENTS APPROVED FOR USE AS A SYSTEM

DETAIL NOTES:

1. REFER TO PLANS FOR CIRCUITING
2. PROVIDE MOTOR RATED TOGGLE SWITCH FOR EACH DAMPER MOTOR
3. FIRE/SMOKE DAMPER, AS SCHEDULED; WITH 120V MOTOR
4. ADDRESSABLE PHOTOELECTRIC DUCT SMOKE DETECTOR WITH EOL RESISTOR
5. PROVIDE DETECTOR TEST STATION WHERE DETECTORS ARE CONCEALED AND MORE THAN 10FT AFF, OR WHERE DETECTOR ALARM ARE NOT VISIBLE. SHALL HAVE RED LED FOR ALARM, GREEN LED FOR POWER, YELLOW LED FOR TROUBLE AND KEYED TEST SWITCH
6. DAMPER TEST STATION. SHALL HAVE RED LED FOR CLOSED, GREEN FOR OPEN, AND KEYED TEST SWITCH.
7. FIRE ALARM CONTROL MODULE FOR UNIT SHUT DOWN (1 FOR EACH FAN UNIT)
8. FIRE ALARM MONITORING MODULE; STATUS OF UNIT RUNNING OR LOSS OF FLOW IN THE SYSTEM THROUGH THE MOTOR CONTROL TO SHUT THE DAMPERS UPON LOSS OF AIR FLOW (1 FOR EACH FAN UNIT)
9. BMS OUTPUT MODULE (1 PER FAN UNIT).

6 FIRE/SMOKE DAMPER DUCT DETECTOR DIAGRAM
NO SCALE

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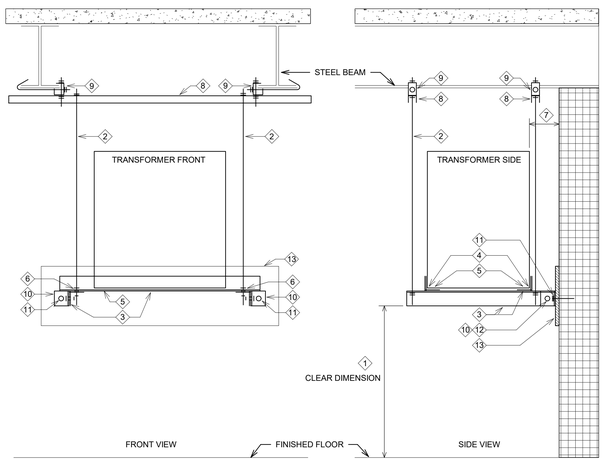
SHEET TITLE:
ELECTRICAL DETAILS

SHEET NUMBER:

E500

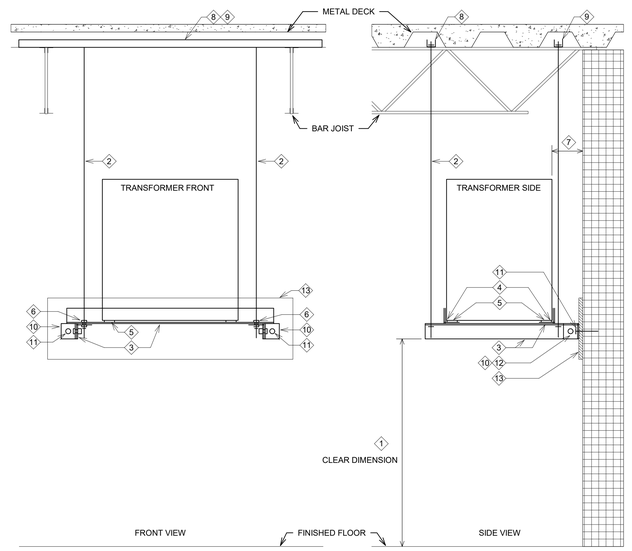
2008 BKV O'DOBBS, P.A. - CONSTRUCTION



KEY NOTES:

1. SEE TRANSFORMER SCHEDULE FOR DIMENSION ABOVE FINISHED FLOOR.
2. 1/2" DIA. THREADED ROD (4 THUS).
3. 3"X3"X1/4" STEEL ANGLE (4 THUS). PAINTED TO MATCH TRANSFORMER.
4. ANCHOR 4 CORNERS OF TRANSFORMER TO ANGLE FRAME.
5. NEOPRENE PAD VIBRATION ISOLATORS.
6. BOLT 4 SECTIONS OF 3"X3"X1/4" STEEL ANGLE TOGETHER WITH 5/8" BOLTS.
7. CLEAR DIMENSION SHALL BE A MINIMUM OF 6".
8. 1-3/8"H X 1-5/8"W UNISTRUT #P3000.
9. BEAM CLAMP - UNISTRUT #P2824 SERIES. PROVIDE 1/2" DIA. THREADED RODS FOR CONNECTION TO UNISTRUT #P3000 BARS.
10. 3" LONG, 3"X3"X1/4" STEEL ANGLE FOR POURED CONCRETE, PRECAST CONCRETE, OR CONCRETE BLOCK WALLS. 6" LONG, 3"X3"X1/4" FOR METAL STUD WALLS (ANCHORED TO WOOD BACK PLATE).
11. 1/2" DIA. X 4" EXPANSION ANCHOR FOR POURED CONCRETE OR PRECAST CONCRETE WALLS. 1/2" DIA. TOGGLE BOLTS IN HOLLOW CONCRETE BLOCK WALL. (2) 5/16" LAG BOLTS FOR ANCHOR TO PLYWOOD BACK PLATE ON METAL STUD WALLS.
12. BOLT WALL ANGLE TO TRANSFORMER FRAME ANGLES WITH 5/8" BOLTS.
13. 3/4" X 12"H PLYWOOD OF SUFFICIENT WIDTH TO SPAN 3 METAL STUDS. ATTACH PLYWOOD TO EACH STUD (20 GAUGE OR HEAVIER; FOR LIGHTER GAUGE STUDS, CONSULT ENGINEER FOR DIFFERENT MOUNTING DETAIL) WITH MINIMUM OF 3#8 SCREWS PER STUD.

1 TRANSFORMER BEAM (PERPENDICULAR TO WALL) SUPPORT MOUNTING DETAIL (15-75KVA)
NO SCALE



KEY NOTES:

1. SEE TRANSFORMER SCHEDULE FOR DIMENSION ABOVE FINISHED FLOOR.
2. 1/2" DIA. THREADED ROD (4 THUS).
3. 3"X3"X1/4" STEEL ANGLE (4 THUS). PAINTED TO MATCH TRANSFORMER.
4. ANCHOR 4 CORNERS OF TRANSFORMER TO ANGLE FRAME.
5. NEOPRENE PAD VIBRATION ISOLATORS.
6. BOLT 4 SECTIONS OF 3"X3"X1/4" STEEL ANGLE TOGETHER WITH 5/8" BOLTS.
7. CLEAR DIMENSION SHALL BE A MINIMUM OF 6" OR SUCH THAT THE TRANSFORMER IS BETWEEN HANGING RODS (WHICHEVER DIMENSION IS GREATER).
8. 1-3/8"H X 1-5/8"W UNISTRUT #P3000 THROUGH WEBBING OF METAL DECKING. LOCATE AS CLOSE TO PANEL POINTS AS POSSIBLE.
9. 1-3/8"H X 1-5/8"W UNISTRUT #P3000 THROUGH WEBBING OF METAL DECKING. LOCATE AS CLOSE TO FIRST PANEL POINT AS POSSIBLE.
10. 3" LONG, 3"X3"X1/4" STEEL ANGLE FOR POURED CONCRETE, PRECAST CONCRETE, OR CONCRETE BLOCK WALLS. 6" LONG, 3"X3"X1/4" FOR METAL STUD WALLS (ANCHORED TO WOOD BACK PLATE).
11. 1/2" DIA. X 4" EXPANSION ANCHOR FOR POURED CONCRETE OR PRECAST CONCRETE WALLS. 1/2" DIA. TOGGLE BOLTS IN HOLLOW CONCRETE BLOCK WALL. (2) 5/16" LAG BOLTS FOR ANCHOR TO PLYWOOD BACK PLATE ON METAL STUD WALLS.
12. BOLT WALL ANGLE TO TRANSFORMER FRAME ANGLES WITH 5/8" BOLTS.
13. 3/4" X 12"H PLYWOOD OF SUFFICIENT WIDTH TO SPAN 3 METAL STUDS. ATTACH PLYWOOD TO EACH STUD (20 GAUGE OR HEAVIER. FOR LIGHTER GAUGE STUDS, CONSULT ENGINEER FOR DIFFERENT MOUNTING DETAIL.) WITH MINIMUM OF 3#8 SCREWS PER STUD.

2 TRANSFORMER BAR JOIST (PERPENDICULAR TO WALL) SUPPORT MOUNTING DETAIL (15-75KVA)
NO SCALE

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mechanical + electrical consulting engineering
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Project Name: NOVA CLASSICAL ACADEMY
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Madeline M. Folin, P.E.
PRINT NAME

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LICENSE NO.

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ELECTRICAL DETAILS

SHEET NUMBER:

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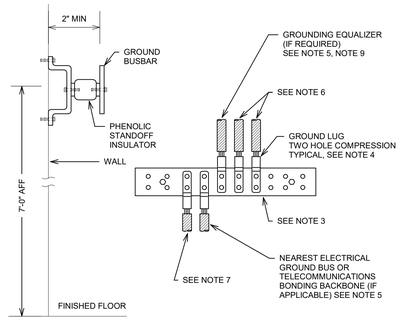


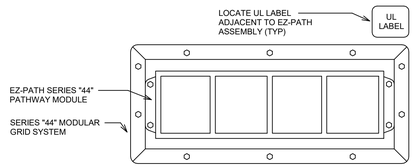
SECTION ELEVATION

DETAIL NOTES:

1. REFER TO TYPICAL SERVICE GROUNDING DETAIL AND GROUNDING RISER DIAGRAM FOR ADDITIONAL INFORMATION.
2. BUS BAR SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
3. PROVIDE ELECTRO-TIN PLATED, CU BUSBAR WITH HOLES FOR USE WITH CORRECTLY MATCHED LISTED LUGS AND HARDWARE. BUSBAR SHALL BE A MINIMUM OF 0.25" THICK BY 4 INCHES WIDE AND 18 INCHES IN LENGTH.
4. MAKE CONNECTIONS WITH UL LISTED, IRREVERSIBLE, COMPRESSION OR MECHANICAL CONNECTORS.
5. SIZE BONDING CONDUCTORS PER ANSI-607-B. REFER TO TABLE 1, THIS DETAIL.
6. TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR SHALL BE A MINIMUM OF #6AWG CU.
7. PROVIDE CONNECTION TO STRUCTURAL STEEL WITH A #6AWG CU CONDUCTOR, MINIMUM.
8. ALL CONDUCTORS SHALL BE GREEN OR MARKED WITH A DISTINCTIVE GREEN COLOR.
9. GROUNDING EQUALIZERS CONNECT MULTIPLE TMGB AND TGB ON THE SAME FLOOR.

BONDING CONDUCTOR SIZE VS LENGTH (TABLE 1)	
LINEAR LENGTH (FEET)	SIZE (AWG)
LESS THAN 13	6
14-20	4
21-26	3
27-33	2
34-41	1
42-52	1/0
53-66	2/0
67-84	3/0

1 TELECOMMUNICATIONS GROUND BAR DETAIL (TGB)
NO SCALE



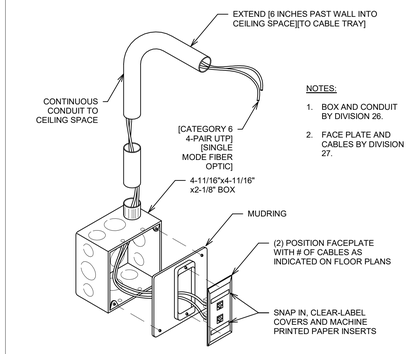
NOTES:

1. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. PART NUMBERS LISTED FOR REFERENCE AND MAY NOT REPRESENT ALL REQUIRED COMPONENTS FOR A COMPLETE INSTALLATION. SEE SPECIFICATIONS.

2 FIRE STOP DETAIL - CORRIDOR PENETRATION
NO SCALE

NOTES:

1. THIS CABLING TO APPLY AT ALL [◀#] LOCATIONS SHOWN ON PLAN DRAWINGS.



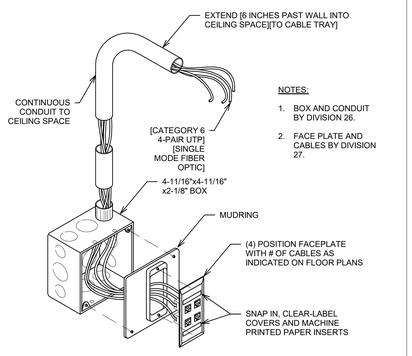
NOTES:

1. BOX AND CONDUIT BY DIVISION 26.
2. FACE PLATE AND CABLES BY DIVISION 27.

3 VOICE/DATA OUTLET DETAIL - 2 POSITION FACEPLATE - DATA
NO SCALE

NOTES:

1. THIS CABLING TO APPLY AT ALL [◀#] LOCATIONS SHOWN ON PLAN DRAWINGS.



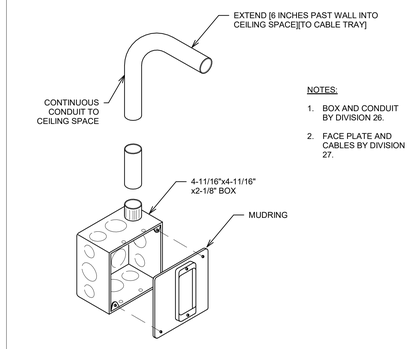
NOTES:

1. BOX AND CONDUIT BY DIVISION 26.
2. FACE PLATE AND CABLES BY DIVISION 27.

4 VOICE/DATA OUTLET DETAIL - 4 POSITION FACEPLATE - DATA
NO SCALE

NOTES:

1. THIS CABLING TO APPLY AT ALL [◀ #] LOCATIONS SHOWN ON PLAN DRAWINGS.



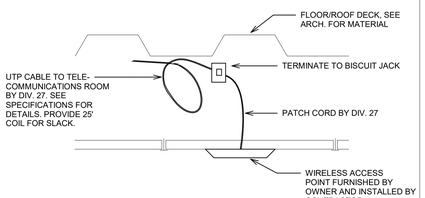
NOTES:

1. BOX AND CONDUIT BY DIVISION 26.
2. FACE PLATE AND CABLES BY DIVISION 27.

5 VOICE/DATA OUTLET DETAIL - MUDRING
NO SCALE

NOTES:

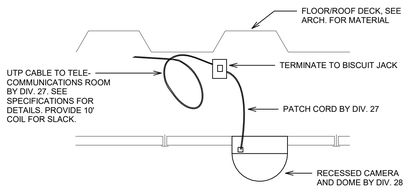
1. THIS CABLING TO APPLY AT ALL [◀--] LOCATIONS SHOWN ON PLAN DRAWINGS.



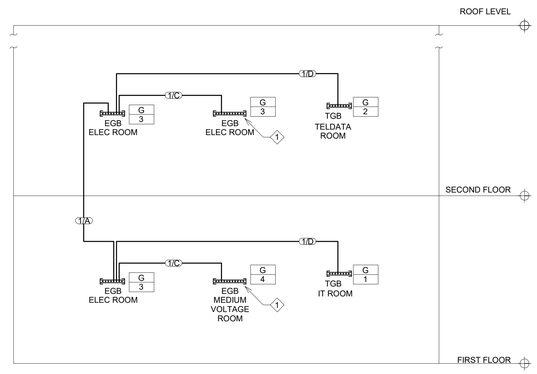
6 WIRELESS ACCESS POINT MOUNTING DETAIL
NO SCALE

NOTES:

1. THIS CABLING TO APPLY AT ALL [▭◁] LOCATIONS SHOWN ON PLAN DRAWINGS.



7 SURVEILLANCE CAMERA CEILING MOUNTED WIRING DETAIL
NO SCALE



8 GROUNDING RISER DIAGRAM
NO SCALE

GENERAL NOTES:

A. ALL CABLING SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURE.
B. ALL BONDING BACKBONE CABLING WORK BY DIVISION 26.
C. DIVISION 26 TO PROVIDE PULL STRING IN ALL CONDUIT RUNS.
D. REFER TO GROUNDING DETAILS FOR ADDITIONAL DIRECTION.

KEY NOTES:

1 MOUNT DEVICE AT 7'-0" AFF.

EQUIPMENT:

G 1 / 1 — DEVICE TYPE CALLOUT / INDIVIDUAL DEVICE CALLOUT

G 1 — TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB). PROVIDED AND INSTALLED BY DIVISION 26. SEE DETAILS FOR ADDITIONAL DIRECTION.

G 2 — TELECOMMUNICATIONS GROUNDING BUSBAR (TGB) PROVIDED AND INSTALLED BY DIVISION 26. SEE DETAILS FOR ADDITIONAL DIRECTION.

G 3 — ELECTRICAL ROOM GROUNDING BUS BAR (EGB) PROVIDED AND INSTALLED BY DIVISION 26. SEE DETAILS FOR ADDITIONAL DIRECTION.

G 4 — SERVICE GROUNDING BUS BAR (SGB) PROVIDED AND INSTALLED BY DIVISION 26. SEE DETAILS FOR ADDITIONAL DIRECTION.

CABLE TYPE:

#/A — CABLE TYPE CALLOUT / CABLE QUANTITIES

#/A #500 AWG CABLE [GROUND BONDING CONDUCTOR]. PROVIDE EXOTHERMIC WELDS TO ALL GROUND BUS BARS.
#/B #350 AWG CABLE [TELECOMMUNICATION BONDING].
#/C #4/0 AWG CABLE [BONDING BACKBONE].
#/D #1 AWG CABLE [TELECOMMUNICATION BONDING].
#/E #6 AWG CABLE [COMMON BONDING CONDUCTOR].

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mechanical + electrical consulting engineering

Dunham Project Number: 0425231-000

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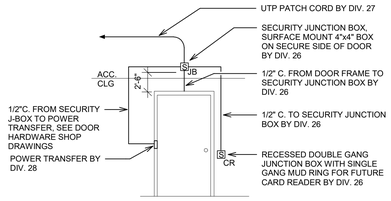
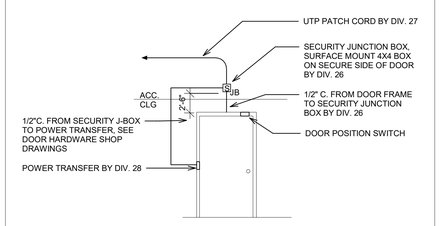
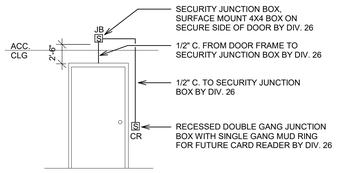
E502



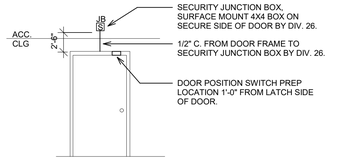
1 CARD READER CABLING DETAIL
NO SCALE



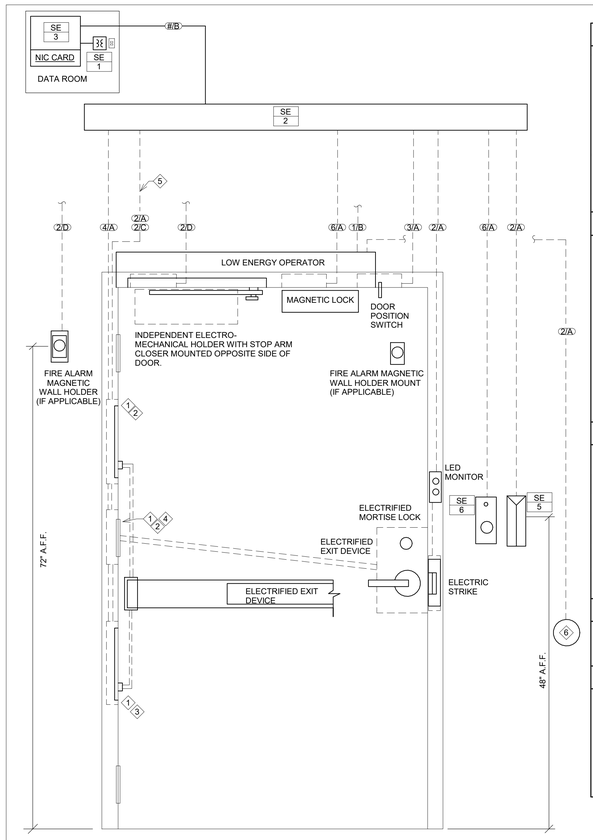
3 DOOR POSITION SWITCH CABLING DETAIL
NO SCALE



4 CARD READER ROUGH-IN DETAIL
NO SCALE



5 DOOR POSITION SWITCH ROUGH-IN DETAIL
NO SCALE



GENERAL NOTES

A. THE WIRING DIAGRAM IS CONCEPTUAL ONLY AND DOES NOT INDICATE ALL DEVICES, DEVICE TYPES OR QUANTITY OF ACCESS CONTROLLERS. REFER TO FLOOR PLANS AND SCHEDULES FOR DEVICE QUANTITIES AND LOCATIONS.

B. ALL WIRING AND CABLING SHALL BE IN CONDUIT (MINIMUM 3/4" C.) EMT CONDUIT USED FOR SECURITY WIRING SHALL INCLUDE FACTORY-APPLIED GREEN TOPCOAT.

C. EACH POWER SUPPLY SHALL ALLOW 15% SPARE CAPACITY TO ADD ADDITIONAL DEVICES TO ANY OF THESE CIRCUITS.

D. ALL DOOR HARDWARE AND AUTO OPERATORS BY DIVISION 8.

KEY NOTES

1. 16 Ga. COVER BOX WITH CONDUIT ATTACHED AND STUBBED 6" ABOVE TOP OF FRAME. COVER BOX AND CONDUIT SHALL BE WELDED TO FRAME AT EACH LOCATION ELECTRIFIED HARDWARE IS SPECIFIED.
2. POWER TRANSFER FOR ALUMINUM AND NON-RATED WOOD & HOLLOW METAL DOORS.
3. POWER TRANSFER FOR FIRE RATED WOOD AND HOLLOW METAL DOORS.
4. ELECTRIC TRANSFER HINGE BY DIVISION 8.
5. MAXIMUM CONDUCTOR RUN ON ELECTRIFIED EXITS IS 50 FT.
6. LOW ENERGY OPERATOR CONTROL SWITCHES. LOCATE 30" TO 36" A.F.F. AND AT LEAST 30" FROM THE PULL ARC OF THE SWINGING DOOR.

EQUIPMENT TAG

SE 1	120V/24V XFMR.
SE 2	ACCESS CONTROL UNITS (SECURE SIDE)
SE 3	UNIVERSAL DEVICE SERVER AND CENTRAL POWER SUPPLIES LOCATED IN DATA ROOM.
SE 4	CARD ACCESS NETWORK INTERFACE MODULE. PROVIDE RS-232 INTERCONNECTION BETWEEN CONTROLLER(S).
SE 5	CARD READER.
SE 6	KEY SWITCH PUSHBUTTON

ID TAG NOTATION

#/A — CABLE TYPE CALLOUT
CABLE QUANTITIES

CABLE TYPE

#/A	ACCESS CONTROL 18 AWG CONDUCTORS (BY DIV. 28)
#/B	(2)#12,#12G 120V POWER CONDUCTORS (BY DIV. 26)
#/C	ACCESS CONTROL 14 AWG CONDUCTORS (BY DIV. 28)
#/D	FIRE ALARM 18 AWG CONDUCTORS, 24DC (BY DIV. 28)
#/E	ACCESS CONTROL COMPOSITE RS-485 AND POWER CABLE (BY DIV. 28)

2 DOOR HARDWARE REQUIREMENTS
NO SCALE

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mechanical + electrical consulting engineering

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Project Name: NOVA CLASSICAL ACADEMY
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Date: 05/07/2025

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GENERAL NOTES

1. THE WIRING DIAGRAM IS CONCEPTUAL ONLY AND DOES NOT INDICATE ALL DEVICES, DEVICE TYPES OR QUANTITY OF LOOPS. REFER TO FLOOR PLANS FOR DEVICE QUANTITIES AND LOCATIONS.
2. THE SYSTEM DIAGRAM IS BASED ON A DIGITAL, ADDRESSABLE FIRE ALARM SYSTEM.
3. ALL WIRING AND CABLING SHALL BE IN CONDUIT (MINIMUM 3/4" C.) EMT CONDUIT USED FOR FIRE ALARM WIRING SHALL INCLUDE FACTORY-APPLIED RED TOPCOAT UL-LISTED FOR FIRE ALARM USE.
4. THE INSTALLATION SHALL BE FROM DRAWINGS THAT HAVE BEEN SUBMITTED, REVIEWED AND APPROVED BY THE AUTHORITIES HAVING JURISDICTION.
5. EACH SIGNALING CIRCUIT SHALL ALLOW 15% SPARE CAPACITY TO ADD ADDITIONAL AUDIO, VISUAL OR COMBINATION AUDIO/VISUAL SIGNALING DEVICES TO ANY OF THESE CIRCUITS.
6. PROVIDE THE CONTROL WIRING FROM FIRE ALARM CONTROLLER TO THE HVAC CONTROLLER.
7. ALL SPRINKLER HEADS, LOCATED IN ELEVATOR SHAFTS AND ELEVATOR EQUIPMENT ROOMS, ARE TO HAVE A HEAT DETECTOR MOUNTED WITHIN TWO (2) FEET OF HEAD FOR ACTIVATION OF SHUNT TRIP POWER DEVICE. VERIFY QUANTITY ON SITE.
8. REFER TO FIRE ALARM CONTROL MATRIX FOR ALL CONTROL REQUIREMENTS.

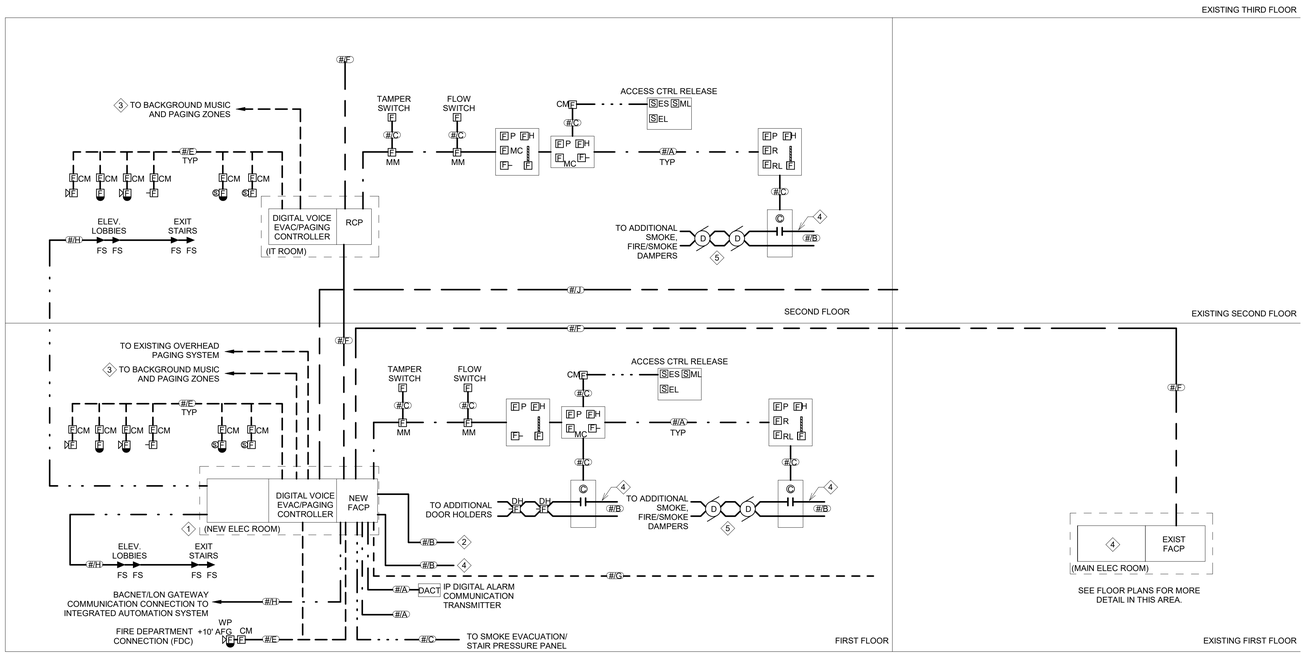
KEY NOTES

1. FIREFIGHTERS TELEPHONE SYSTEM FOR COMMUNICATIONS TO FIRE COMMAND CENTER. INTEGRATE NEW FF TELEPHONES WITH EXISTING SYSTEM.
2. DIGITAL VOICE EVACUATION AND PAGING SYSTEM INTERFACE WITH OWNERS' TELEPHONE SYSTEM.
3. SEE SPECIFICATIONS FOR BACKGROUND MUSIC AND PAGING ZONE SCHEDULE.
4. LIFE SAFETY BRANCH CIRCUIT (REFER TO POWER PLAN DWGS).
5. FIRE/SMOKE AND SMOKE DAMPER MOTORS ARE SHOWN ON MECHANICAL PLANS. VERIFY QUANTITIES AND LOCATIONS. PROVIDE FIRE ALARM CONNECTIONS TO RELAY SO THAT THE FIRE/SMOKE AND SMOKE DAMPERS CLOSE UPON LOSS OF POWER. (DIV. 26 SHALL PROVIDE RELAY AND CIRCUITING. SEE POWER PLANS FOR 120V CIRCUITING, RELAY LOCATIONS, ETC.) PROVIDE ONE (1) FIRE ALARM CONTROL MODULE PER FIRE/SMOKE DAMPER AND (1) ADDITIONAL FIRE ALARM CONTROL MODULE PER SMOKE ZONE FOR INTEGRATION WITH SMOKE EVACUATION SEQUENCE OF OPERATIONS. SEE ARCH. LIFE SAFETY PLANS FOR SMOKE ZONES.

CABLE TYPE

#/A CABLE TYPE CALLOUT
CABLE QUANTITIES

- #/A INITIATING LINE CIRCUIT
- #/B BRANCH CIRCUIT
- #/C CONTROL CIRCUIT
- #/D FIBER OPTIC CONNECTION
- #/E SIGNAL LINE CIRCUIT
- #/F TWO-HOUR RATED PRIMARY BACKBONE (CLASS A)
- #/G TWO-HOUR RATED REDUNDANT BACKBONE (CLASS A)
- #/H FUTURE FIRE FIGHTERS TELEPHONE HOMERUN
- #/J AUDIO INPUT



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PROJECT MANUAL

for

NOVA CLASSICAL ACADEMY
1455 Victoria Way
St. Paul, MN 55102

BUILDING IMPROVEMENTS
&
EXPANSION

May 9, 2025
Design Development Documents

Prepared by BLOOM HAY DOBBS (BLOOM COMPANIES, LLC)
Midtown Commons
2324 University Avenue, Ste. 200
St. Paul, MN 55114

Commission No.: 23008.003

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SECTION 000001 Title Page

Project Manual for:

NOVA CLASSICAL ACADEMY

BUILDING IMPROVEMENTS & EXPANSION

Owner:
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St. Paul, MN 55102
Contact: Jesse Prins
Phone: 651.209.6320

Architect:
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St. Paul, MN 55114
Contact: Adam Aalgaard
Ph. 612-338-4590
Email. aaalgaard@bloomcos.com

Civil Engineer:
BKBM Engineers
6120 Earle Brown Drive, Suite 700
Minneapolis, MN 55430
Contact: Joel Maier

Landscape Architect:

Structural Engineer:
BKBM Engineers
6120 Earle Brown Drive, Suite 700
Minneapolis, MN 55430
Contact: Tina Wyffels

Mechanical Engineer:
Dunham Associates, Inc.
50 South Sixth St., Suite 1100
Minneapolis, MN 55402
Contact:

Electrical Engineer:
Dunham Associates, Inc.
50 South Sixth St., Suite 1100
Minneapolis, MN 55402
Contact:

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SECTION 000002 - PROFESSIONAL CERTIFICATION

ARCHITECT

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

_____

[Architect] Date: [xx/xx/xx]
License No. [00000]

STRUCTURAL ENGINEER

I hereby certify this Specification 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.

_____

[Struct Engr signing spec] Date: [xx/xx/xx]
License No. [00000]

MECHANICAL ENGINEER

I hereby certify this Specification 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.

_____

[Mech Engr signing spec] Date: [xx/xx/xx]
License No. [00000]

ELECTRICAL ENGINEER

I hereby certify this Specification 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.

_____

[Elect Engr signing spec] Date: [xx/xx/xx]
License No. [00000]

CIVIL ENGINEER

I hereby certify this Specification 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.

_____

[Civil Engr signing spec] Date: [xx/xx/xx]
License No. [00000]

LANDSCAPE ARCHITECT

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

_____

[Landscape Architect] Date: [xx/xx/xx]
License No. [00000]

[ADD OTHER DISCIPLINES AS NEEDED]

END OF DOCUMENT

SECTION 000115 DRAWINGS INDEX

GENERAL
G000 TITLE SHEET

CIVIL
C100 TOPOGRAPHIC SURVEY
C200 GRADING, DRAINAGE, AND EROSION CONTROL PLAN
C300 UTILITY PLAN
C400 UTILITY PLAN
C500 CIVIL DETAILS
C501 CIVIL DETAILS
C502 CIVIL DETAILS
C600 STORM WATER POLLUTION PREVENTION PLAN
C601 STORM WATER POLLUTION PREVENTION PLAN

LANDSCAPE
L100 LANDSCAPE PLAN

ARCHITECTURAL
A001 BUILDING CODE SUMMARY
A100 ARCHITECTURAL SITE PLAN
A200 SELECTIVE DEMOLITION PLANS
A210 OVERALL PLAN - FIRST FLOOR
A210A FIRST FLOOR PLAN - SHELTER
A210B FIRST FLOOR PLAN - EXISTING BUILDING
A211 OVERALL PLAN - SECOND FLOOR
A211A SECOND FLOOR PLAN - SHELTER
A211B SECOND FLOOR PLAN - SKYWAY AND EXSITING BUILDING
A212 OVERALL PLAN - THIRD FLOOR
A220A FIRST FLOOR REFLECTED CEILING PLAN - SHELTER
A221A SECOND FLOOR REFLECTED CEILING PLAN - SHELTER
A240 FURNITURE PLAN - FIRST & SECOND FLOOR
A300 ROOM FINISH SCHEDULE & PARTITION TYPES
A310 OPENING SCHEDULE, DOOR, FRAME, WINDOW TYPES
A311 WINDOW TYPES
A400 ROOF PLAN - SHELTER & SKYWAY
A401 ROOF DETAILS
A501 BUILDING ELEVATIONS- NORTHEAST
A502 BUILDING ELEVATIONS - SOUTHWEST
A503 BUILDING ELEVATIONS - NORTH WEST & SOUTHEAST
A600 BUILDING SECTIONS
A701 WALL SECTIONS - SHELTER
A702 WALL SECTIONS - NORTHEAST WALL
A703 WALL SECTIONS - SOUTHEAST WALL
A704 WALL SECTIONS - SKYWAY
A705 WALL SECTIONS - SHELTER VESTIBULE
A706 WALL SECTIONS - ELEVATOR
A710 STAIR B113 - FLOOR PLANS & SECTION
A711 STAIR B107 - FLOOR PLANS & SECTION
A801 ENLARGED PLAN & DETAILS - RAMP AT SKYWAY
A802 ENLARGED PLAN & DETAILS - LOCKERS & TOILETS
A805 INTERIOR ELEVATIONS - SHELTER
A806 INTERIOR ELEVATIONS - SHELTER
A807 INTERIOR ELEVATIONS

STRUCTURAL
S000 STRUCTURAL TITLE SHEET
S210A FIRST FLOOR FOUNDATION PLAN - SHELTER
S210B FIRST FLOOR FOUNDATION PLAN - SKYWAY
S211A SECOND FLOOR FRAMING PLAN - SHELTER
S211B SECOND FLOOR FRAMING PLAN - SKYWAY
S212A ROOF FRAMING PLAN - SHELTER
S212B ROOF FRAMING PLAN - SKYWAY
S301 SECTIONS AND DETAILS
S311 SECTIONS AND DETAILS
S321 SECTIONS AND DETAILS
S331 SECTIONS AND DETAILS
S341 SECTIONS AND DETAILS
S401 SCHEDULES AND DETAILS

MECHANICAL
M000 MECHANICAL TITLE SHEET
M101 FIRST FLOOR PIPING PLAN
M102 SECOND FLOOR PIPING PLANS
M201 FIRST FLOOR DUCTWORK PLAN
M202 SECOND FLOOR DUCTWORK PLANS
M203 THIRD FLOOR DUCTWORK PLANS
M204 ROOF MECHANICAL PLAN
M700 MECHANICAL DETAILS
M701 MECHANICAL DETAILS
ME800 MECHANICAL ELECTRICAL SCHEDULES
ME801 MECHANICAL ELECTRICAL SCHEDULES
P100 BELOW GRADE PLUMBING PLAN
P101 FIRST FLOOR PLUMBING PLAN
P102 SECOND FLOOR PLUMBING PLAN
P103 ROOF PLUMBING PLAN
P200 ENLARGED PLUMBING PLANS
P300 PLUMBING RISER DIAGRAMS
P301 PLUMBING RISER DIAGRAMS
P400 PLUMBING DETAILS
P500 PLUMBING SCHEDULES
PE600 PLUMBING ELECTRICAL SCHEDULES

ELECTRICAL
E000 ELECTRICAL SYMBOLS AND
ABBREVIATIONS
E100 ELECTRICAL SITE PLAN
E200 SELECTIVE ELECTRICAL DEMOLITION PLAN
E201 SELECTIVE ELECTRICAL PLAN
E211 FIRST FLOOR LIGHTING PLAN
E212A SECOND FLOOR LIGHTING PLAN
E212B SECOND FLOOR LIGHTING PLAN
E221 FIRST FLOOR POWER PLAN
E222A SECOND FLOOR POWER PLAN
E222B SECOND FLOOR POWER PLAN
E223 ROOF FLOOR POWER PLAN
E231 FIRST FLOOR SYSTEMS PLAN
E232A SECOND FLOOR SYSTEMS PLAN
E232B SECOND FLOOR SYSTEMS PLAN
E300 ELECTRICAL RISER DIAGRAM

E400 PANELBOARD SCHEDULES
E450 LIGHTING SCHEDULES
E500 ELECTRICAL DETAILS
E501 ELECTRICAL DETAILS
E502 ELECTRICAL DETAILS
E503 ELECTRICAL DETAILS
E504 ELECTRICAL DETAILS

END OF SECTION

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SECTION 014516.1 – QA PLAN FOR STORM SHELTER

Contractor Quality Assurance Plan

The template below is to be completed by the following trades/fabricators:

1. Construction Manager
2. Earthwork Contractor
3. Aggregate Pier supplier and installer
4. Concrete supplier
5. Concrete installer
    a. Concrete placement
    b. Concrete reinforcing
6. Precast plank/double tee supplier
    a. Engineering and detailing (if not in-house)
    b. Erection
    c. Field installation of embeds
7. Precast wall supplier
    a. Engineering and detailing (if not in-house)
    b. Erection
    c. Field installation of embeds
8. Storm louvers
    a. Engineering and detailing of anchorage.
    b. Installation of louvers.
9. HM doors and frames
    a. Engineering and detailing of anchorage.
    b. Installation of frames.
10. Mechanical Storm Penetration devices.
    a. Engineering and detailing of anchorage.
    b. Installation of baffles.

In compliance with ICC 500 Section 107.3.3, each contractor shall submit a Quality Assurance plan to the architect, EOR, and building official. The below template is provided and may be completed, supplemented, or replaced by a quality assurance plan produced by the contractor, but must satisfy the requirements of Section 107.3.3 and be adhered to as work is completed on the storm shelter.

1. _____ (the contractor) is in possession of a copy of ICC 500 (adopted by the local AHJ) and has placed a member of the organization in responsible charge of overseeing the work associated with the scope the contractor has been contracted to perform. This individual is familiar with this specific project as well as ICC 500 and will be in control of the contractor's means to obtain compliance with the contract documents. If the person in responsible charge changes during the project, the contractor will resubmit this form with updated contact information within no later than three (3) working days of the change. The person in responsible charge is:
    a. Name:

    b. Title:

    c. Company address:

    d. Direct phone number:

e. Direct email:

f. Specific qualifications include:

2. The contractor will design, fabricate, deliver, and install components for the storm shelter complying with the structural documents and requirements of ICC 500. The person in responsible charge within the organization will specifically employ the following procedures, many of which may already be employed. List by contractor:

3. Proposed substitutions (if any) will be provided to architect, EOR, and code official prior to submitting shop drawings. A minimum of two weeks shall be allowed for review and response. Any costs incurred by EOR/architect associated with review of substitutions shall be reimbursed by the contractor.
4. The contractor is specifically aware of the requirements set forth in Section 106.2 and 106.3 of ICC 500 and will coordinate as necessary with the special inspector to ensure work is inspected at appropriate intervals and ensure work is sequenced/scheduled to permit timely inspections and implement corrective measures as required.
5. Contractor will submit the following documentation to the architect, EOR, third-party structural observer, and code official at the respective times (contractor to list milestone dates).
    a. This Quality Assurance plan
        i. Date:
    b. Shop drawings
        i. Date:
    c. Internal QA/QC reports for fabricated components
        i. Date:
    d. Letter certifying that products have been supplied/fabricated/installed in compliance with contract documents
        i. Date:
6. The contractor is aware of the structural observations proposed by the EOR and will coordinate with other trades, the Construction Manager, third-party structural observer, and the EOR to facilitate the proposed structural observations schedule.
7. The contractor will coordinate with the Construction Manager to ensure special inspections are performed at appropriate intervals.
8. Contractor acknowledges that compliance with contract documents, specifications, and special inspections will be strictly enforced. Due to the nature of this design, field fixes and deviations from contract documents will very likely be rejected.
9. Additional information:

SECTION 01 45 33 - STRUCTURAL TESTING AND SPECIAL INSPECTION

PART 1 GENERAL

1.1 INTENT AND CONDITIONS

A. Intent
   1. Define and coordinate structural testing and special inspection services.
   2. Provide a greater level of confidence that the specified work is constructed in compliance with the contract documents and the intent of applicable codes including Sections 1704 and 1705 of the International Building Code (IBC) as adopted by the current Minnesota State Building Code.
   3. Structural testing and special inspection services are intended to assist in determining probable compliance of the work with requirements specified. These services do not relieve the Contractor of responsibility for compliance with the requirements of the contract documents.

B. Conditions
   1. If inspection of a fabricator's work is required, the Owner's representative may require testing and inspection of the work at the plant, before shipment. Owner and Architect reserve the right to reject material not complying with the Contract Documents.
   2. Refer to individual technical specification sections for specific qualifications, inspections, tests, frequency and standards required. Testing and inspection shall be performed in accordance with the referenced standard for the specific material or procedure unless other criteria are specified. In the absence of a referenced standard, tests shall be performed in accordance with generally accepted industry standards.
   3. Work shall be checked as it progresses. Failure to detect any defective work or materials shall not prevent later rejection if defective work or materials are discovered, nor shall it obligate Owner to accept such work.
   4. Structural testing, special inspection, and periodic inspections by the Building Official do not preclude the normal field involvement and site observations by Architect or SER.
   5. Structural testing, special inspection, and periodic inspections by the Building Official do not relieve the Contractor of any responsibility to complete the work in accordance with the approved drawings and specifications.
   6. Testing agents and/or special inspectors may not waive or alter contract requirements, or approve or accept any portion of the work unless specifically authorized by the Architect or SER. They may not assume any duties of the Contractor, and they have no authority to stop or reject work.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications apply to this section.

1.3 DEFINITIONS

A. Testing: Evaluation of systems, primarily requiring physical manipulation and analysis of materials, in accordance with approved standards.

B. Inspection: Evaluation of systems, primarily requiring observation and judgment.

C. Structural Special Inspections: Structural special inspections include inspections of structural items required by the IBC as adopted by the current Minnesota State Building Code, and other items, which in the professional judgment of the Structural Engineer of Record, are critical to the integrity of the building structure and are indicated to be performed under the

requirements of this section. They do not include special inspections for non-structural items such as fireproofing, EIFS, and smoke control systems.

D. Structural Testing: Structural testing includes those tests of structural items required by the IBC as adopted by the current Minnesota State Building Code, or its referenced standards, and other tests, which in the professional judgment of the Structural Engineer of Record, are critical to the integrity of the building structure and are indicated to be performed under the requirements of this section.

E. Architect of Record: The prime consultant in charge of overall design and coordination of the project.

F. Structural Engineer of Record (SER): The licensed professional engineer in responsible charge of the structural design for the project.

G. Licensed Structural Engineer: A professional engineer with education and experience in the design of structures similar to this project licensed to practice in the State in which the Project is located.

H. Testing Agency (TA): The properly qualified firm performing testing services.

I. Special Inspector (SI): A properly qualified individual or firm performing special inspections.

J. Building Official: The officer or his or her duly authorized representative charged with the administration and enforcement of the building code for the project.

1.4 REFERENCES

A. ASTM C1077-13 – Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

B. ASTM C1093-12 - Practice for the Accreditation of Testing Agencies for Unit Masonry.

C. ASTM D3740-12a - Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

D. ASTM E329-14a - Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

E. ASTM E543-13 - Practice for Agencies Performing Nondestructive Testing.

F. International Building Code (IBC), 2018.

G. Minnesota State Building Code, 2020.

1.5 QUALIFICATIONS

A. Testing Agency: An approved independent testing agency acceptable to the Owner, Architect, and SER and meeting the following:

1. Authorized to operate in the State in which the Project is located and experienced with the requirements and testing methods specified in the Contract Documents.
2. Meet applicable requirements of References stated in Part 1, paragraph 4.
3. Have available testing equipment that is calibrated, at reasonable intervals, by devices of accuracy traceable to either the National Bureau of Standards, or to accepted values of natural physical constants.
4. Provide individuals performing tests and taking samples with appropriate certifications for work performed.

B. Special Inspector: Either an appropriately certified inspector or a civil/structural engineer performing under the direct supervision of a licensed structural engineer (as defined earlier in this section) and acceptable to the SER and Building Official. Unique special inspector requirements, for specific materials and systems, are noted in related technical specification sections.

1.6 RESPONSIBILITIES

A. Special Inspectors:

1. Inspect the work assigned for conformance with the building department approved plans, specifications, and applicable material and workmanship provisions of the code. Perform inspection in a timely manner to avoid delay of work.
2. Bring nonconforming items to the immediate attention of the contractor for correction. If not corrected within 24 hours or if inspector will not be on site the following day, bring to the attention of the SER by the end of the business day. If uncorrected after a reasonable period of time, bring to the attention of the Building Official, and to the Architect. Notify SER immediately if non-conforming items are enclosed, embedded, or obscured prior to verification of correction.
3. Submit inspection reports to the Building Official, Contractor, the Architect, the SER, and other designated persons in accordance with the structural testing and special inspection schedule.
4. 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, specifications and the applicable workmanship provisions of the code.
5. Sign the Statement of Special Inspections in conjunction with other responsible parties.
6. Attend preconstruction meeting to review scope of special inspection.

B. Testing Agency:
1. Test the work assigned for conformance with the building department approved plans, specifications, and applicable material provisions of the documents. Perform tests in a timely manner to avoid delay of work.
2. Submit test reports to the Building Official, Contractor, the Architect, the SER, and other designated persons in accordance with the structural testing and special inspection schedule.
3. Sign the structural testing and special inspection schedule in conjunction with other responsible parties.
4. Attend a preconstruction meeting to review scope of structural testing.

C. Contractor:
1. Attend a preconstruction meeting to review scope of structural testing and special inspection.
2. Post or make available the structural testing and special inspection schedule within its office at the job site. Also, provide adequate notification to those parties designated on the schedule so they may properly prepare for and schedule their work.
3. Provide special inspectors access to the approved plans and specifications at the job site.
4. Review all reports issued by special inspectors.
5. Retain, at the job site, all reports submitted by the special inspectors for review on the Building Official's request.
6. Correct deficiencies identified in inspection or testing reports in a timely manner.
7. Provide safe access to the work requiring inspection or testing.
8. Provide labor and facilities to provide access to the work, to obtain, handle and deliver samples, to facilitate testing and inspection and for storage and curing of test samples.
9. Verify conformance of the work with specified construction tolerances.
10. Inspections by Building Official: Provide adequate notice for inspections performed by the building official, as required by the Minnesota State Building Code and local ordinances.
11. Sign the Statement of Special Inspection in conjunction with other responsible parties prior to commencing construction.

D. Fabricator:
   1. Submit a Certificate of Compliance to the Building Official, Special Inspector, and SER that the work was performed in accordance with the approved plans and specifications.
   2. Sign the Statement of Special Inspection in conjunction with other responsible parties prior to commencing construction.

E. Owner:
   1. Establish direct funding to provide for cost of structural testing and special inspection services.
   2. Provide special inspector with approved plans, specifications and approved shop drawings.
   3. Provide special inspectors and testing agencies with full access to the site at all times.
   4. Sign the Statement of Special Inspection in conjunction with other responsible parties.

1.7 PAYMENT

A. Owner or Architect/SER, acting as the Owner's agent, will employ and pay for services of the special inspectors and testing agency to perform required structural testing and special inspection.

B. Unless noted otherwise, the Contractor shall provide and pay for all materials, samples, mock-ups, and assemblies required for testing and inspection and shall pay for shipping costs related to delivery of such items. Testing agency will pay for shipping costs of samples transported from site to lab.

C. If items requiring testing or inspection are enclosed, embedded or obscured prior to testing or inspection or if such items are placed without tests or inspections, the Contractor shall pay for the costs of any exploratory work deemed necessary by the Architect/SER to verify compliance with the Contract Documents.

D. Contractor shall pay for the costs of any retests or re-inspections caused by work that does not comply with the Contract Documents based on initial tests or inspections, or work that is later revised or replaced by the Contractor. This does not include revisions requested by the Owner.

1.8 INSPECTION NOTICE

A. Provide minimum of 24 hours notice for all items requiring testing or inspection. Items requiring testing and inspection services prior to or during placement shall not be placed until testing and inspection services are available. Items requiring testing and inspection services after placement shall not be enclosed or obscured until testing and inspection services are performed.

1.9 REPORTS

A. Testing agency and special inspectors shall submit reports for structural testing and special inspection in a timely manner to the Contractor, Building Official, SER, and Architect of Record. Provide reports of daily activities to the SER and Contractor. Submit reports to the Contractor on a daily basis and to the SER on a daily or weekly basis. Provide summary reports to the Building Official and Architect on a monthly basis unless they request otherwise.

B. Provide reports for ongoing work, containing the following information:
   1. Date issued.
   2. Project title and number.
   3. Firm name and address.
   4. Name and signature of tester or inspector.
   5. Date and time of sampling, test, or inspection.
   6. Identification of product and specification section.

7. Location in project, including elevations, grid location and detail.
8. Type of test or inspection.
9. Whether test specimens, test results or observations indicate compliance with Contract Documents. Specifically state any discrepancies
10. Types and locations of discrepancies found in work
11. Work required performed to correct discrepancies and work performed to correct previously noted discrepancies. Discrepancies corrected during an inspection need not be reported
12. Submit certified final special inspection report stating that, to the best of the special inspector's knowledge, the work requiring special inspection conformed to the Construction Documents.

1.10 FREQUENCY OF TESTING AND INSPECTION

A. For detailed requirements, see individual technical specification sections and the structural testing and special inspection schedule.

1.11 PROTECTION AND REPAIR

A. Upon completion of testing, sample-taking, or inspection, the Contractor shall repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed surfaces, as judged solely by the Architect/SER. Protect work exposed by or for testing and/or inspection and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for testing and/or inspection.

1.12 TESTS TO DEMONSTRATE QUALIFICATION

A. Any tests required to qualify the Contractor or the workers for any phase of the work, shall be performed at no additional cost to the Owner.

B. If the Contractor proposes a product material, method, or other system that has not been pre-qualified, the Architect/SER may require applicable tests to establish a basis for acceptance or rejection. The Contractor shall pay for these tests.

C. The Architect/Engineer of Record reserves the right to require certification or other proof that the system proposed is in compliance with specified tests, criteria or standards. A representative of an independent testing agency shall sign the certificate.

1.13 STATEMENT OF SPECIAL INSPECTIONS

A. The parties involved shall complete and sign the Statement of Special Inspection. Statement to be complete at time of permit issuance.

B. The completed Statement is an element of the construction documents and after permit issuance, becomes part of the building department approved plans and specifications.

END OF SECTION

SECTION 01 57 13 - EROSION AND SEDIMENT CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Provide protection of the environment during the construction of this project to reduce soil erosion and siltation to meet all local, state, and federal standards.

C. Erosion and sediment control; as indicated on the Drawings, specified herein; including, but not limited to;
   1. Erosion Control Blankets
   2. Inlet Sediment Prevention Devices
   3. Temporary and Permanent Seed
   4. Riprap
   5. Rock Construction Entrance
   6. Straw Mulch
   7. Straw Logs (Bio Logs)
   8. Stormwater Management Basins

D. Prevention of erosion due to construction activities.

E. Prevention of sedimentation of waterways, open drainage ways, and storm sewers due to construction activities.

F. Restoration of areas eroded due to insufficient preventive measures.

G. Maintain, replace, and remove all erosion control devices once vegetation has been established and all areas have been paved.

H. Compensation to Owner/Governing agencies for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.2 RELATED SECTIONS

A. Section 02 4113 - Selective Site Demolition.

B. Section 31 0000 - Earthwork.

C. Section 31 1000 - Site Clearing.

D. Section 31 2333 - Trenching and Backfilling.

E. Section 33 4000 - Storm Drainage Utilities.

1.3 REFERENCES

A. ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction; 2012 (Reapproved 2022).

B. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2022.

C. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2015.

D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a (Reapproved 2023).

E. ASTM D4751 - Standard Test Methods for Determining Apparent Opening Size of a Geotextile; 2021a.

F. ASTM D4884/D4884M - Standard Test Method for Strength of Sewn or Bonded Seams of Geotextiles; 2014A.

G. ASTM D6241 - Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile- Related Products Using a 50-mm Probe; 2014.

H. Minnesota Department of Transportation 2020 Edition "Standard Specifications for Construction". Only applicable portions of construction methods and materials apply. References to methods of measurement or payment are not applicable.
   1. MN/DOT 3601 - Riprap Materials
   2. MN/DOT 3733 - Geotextiles
   3. MN/DOT 3876 - Seed
   4. MN/DOT 3885 - Rolled Erosion Control Products

I. Minnesota Department of Labor and Industry - Minnesota State Building Code.

1.4 PERFORMANCE REQUIREMENTS

A. Comply with the requirements of the State of Minnesota Pollution Control Agency's NPDES Permit requirements and the National Pollutant Discharge Elimination System (NPDES), Phase II Permit.

B. Comply with all requirements of the City of St. Paul for erosion and sedimentation control.

C. The Contractor shall follow the Storm Water Pollution Prevention Plan and submit periodic inspection reports.

D. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.

E. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

F. Erosion On-site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

G. Erosion Off-site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

H. Sedimentation of Waterways On-site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways and sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

I. Sedimentation of Waterways Off-site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways and storm sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

J. Open Water: Prevent standing water that could become stagnant.

K. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.5 GENERAL

A. Exercise every precaution, throughout the life of the project, to prevent the eroding of soil and the silting of rivers, streams, lakes, reservoirs, other water impoundments, ground or

roadway surfaces, or other property. Erosion control practices to be used for this project are as indicated on the Drawings and directed by the local governing agency.

B. The Contractor is solely responsible for the cleanup of any rivers, streams, lakes, reservoirs, other water impoundments, ground or roadway surfaces or other property damaged by construction activity related to this project.

C. Coordinate the placement of temporary turf establishment provisions with the placement of permanent turf establishment.

1.6 QUALITY CONTROL

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.

B. Conform to all applicable code for materials and installation of the Work of this Section.

C. Verify that survey benchmark and intended elevations for the Work are as indicated.

D. All inspections and maintenance conducted during construction must be recorded in writing and these records must be retained with the SWPPP in accordance with the permit. Records of each inspection and maintenance activity shall include:

1. Date and time of inspections.
2. Name of person(s) conducting inspections.
3. Findings of inspections, including recommendations for corrective actions.
4. Corrective actions taken (including dates, times, and party completing maintenance activities).
5. Date and amount of all rainfall events greater than 1/2 inch in 24 hours.
6. Documentation of changes made to the SWPPP.

1.7 REGULATORY AGENCIES

A. Comply with requirements of state, regional, and local erosion and sediment control regulatory authorities.

B. A Storm Water Pollution Prevention Plan (SWPPP) has been prepared for this project and it shall be referenced prior to submitting the permit application.

C. The Contractor will be required to apply for and certify the Application for General Storm Water Permit for Construction Activity (#MN R100001) and pay the permit fee if the disturbed area is greater than or equal to one acre.

1. The Contractor is a permittee with the Owner and must ensure compliance with the terms and conditions of the permit.
2. The permit establishes conditions for discharging storm water from the site. Permit coverage becomes effective seven days after the post marked date of the completed permit application form and fee.

1.8 SUBMITTALS

A. Submit under provisions of Division One Specifications.

B. Product Data: Submit manufacturer's product data for silt fence materials; including fabrics and posts.

C. Shop Drawings: Indicate complete silt fence and erosion control layout, dimensions, and termination details prior to construction.

D. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

PART 2 PRODUCTS

2.1 EROSION CONTROL BLANKETS

A. Blankets are machine produced mats consisting of a uniform web of interlocking straw fibers with net backing. The blankets shall be a consistent thickness with the fiber evenly distributed over the entire area of the blanket. The top and bottom sides of each blanket are covered with a natural fiber mesh. The blanket is smolder-resistant without the use of chemical additives. The Blanket shall meet the requirements of MN/DOT 3885 Category 20. Provide erosion control blankets such as “Enviroscape ECM S2000BD, American Excelsior AEC Premier Straw Dbl. Net FiberNet, Erosion Control Blanket.com S32BD, EroGuard EG-2s NN” or approved equivalent by the Engineer.

1. Erosion blankets shall be used at slopes and berms, ditches, and other “hard to hold” problem areas.

2.2 INFRASAFE SEDIMENT CONTROL BARRIER

A. Infrasafe sediment barrier is manufactured by Royal Environmental Systems Inc. Stacy, MN.

B. The Infrasafe sediment control barrier device consists of a reusable polyethylene product. The barrier and frame set inside of the access opening or hole of the top slab or cone section of the catch basin structure. The polyethylene barrier is manufactured with perforations in its sidewalls and is wrapped in a geotextile fabric to allow storm water runoff to drain into the structure. A larger opening near the top of the barrier allows greater amounts of water into the system during large rainfall events.

2.3 WIMCO ROAD DRAIN PROTECTION DEVICES

A. WIMCO Road Drain protection devices are manufactured by WIMCO Inc. Shakopee, MN.

B. Material:

1. Model # RD23, Road Drain.
2. Model # CG3067, Curb and Gutter Drain.
3. The WIMCO road drain protection device consists of a reusable, open topped receptacle that sets inside the storm sewer grate. An incorporated rear deflector plate is connected to the receptacle directing the water into the basin for filtration.
4. The filter media shall meet all local specifications for inlet protection.

2.4 SILTSACK

A. Material:

1. The SILTSACK or approved equal shall be manufactured from woven polypropylene fabric with all seams double stitched using nylon thread.
2. The seams shall have certified average wide width strength per ASTM D4884/D4884M as follows:
   a. Regular flow seam strength:
      1) Maximum Load - 852 lbs
      2) Maximum strength - 1280 lbs/ft
   b. Hi flow seam strength:
      1) Maximum load - 800 lbs
      2) Maximum strength - 1200 lbs./ft.

B. Procurement of the devices shall be obtained from ACF Environmental, Inc., 1801-A Willis Road, Richmond, Virginia, 23237, phone number 1-800-644-9223.

2.5 TEMPORARY SEED AND PERMANENT SEED

A. For temporary spring/summer cover, a MN/DOT O (Oats) seed mix shall be applied. For a fall cover, a MN/DOT WW (Winter Wheat) seed mix applied. Apply seed mix at a rate of 100 pounds per acre.

B. For permanent seeding, place a MN/DOT RT Residential Turfgrass seed mix applied at a rate of 200 pounds per acre.
C. Fertilizer for permanent seeding: 24-0-24 commercial fertilizer at the rate of 300 pounds per acre.
D. The stormwater management basins shall be seeded with a MN/DOT WD (Wet Ditch) seed mix at a rate of 20 pounds per acre. The stormwater management basin side slopes shall be seeded with MN/DOT 35-221 seed mix at a rate of 35 pounds per acre. Supplement both seed mixes with a MN/DOT 21-111 oats cover crop at a rate of 10 pounds per acre. The stormwater management basins shall be fenced off with silt fence and protected from construction traffic. Temporary erosion control blankets shall be placed to prevent the seed mix from floating during wet conditions.

2.6 ROCK FOR TEMPORARY CONSTRUCTION ENTRANCE

A. One and one-half (1.5") inch to three (3") inch crushed rock meeting ASTM D448, Gradation Number two (2).

2.7 GEOTEXTILE FABRIC UNDER ROCK CONSTRUCTION ENTRANCE

A. MN/DOT Spec 3733, Type III shall be used under rock construction entrance.
B. Minimum grab tensile strength, ASTM D4632/D4632M, 100 pounds Class III.
C. Minimum elongation, ASTM D4632/D4632M 50%.
D. Minimum seam breaking strength, ASTM D4632/D4632M, 90 pounds Class III.
E. Apparent opening size ASTM D4751, 50 US Std. Sieve size.
F. Minimum permittivity falling head ASTM D4491, 0.5.

2.8 RIPRAP

A. Durable field stone or quarry stone, round or cubiform in shape, and free of contamination by soil or other debris.
B. MN/DOT Spec 3601 Class II.

2.9 GEOTEXTILE FABRIC UNDER RIPRAP

A. MN/DOT Spec 3733, Type III Fabric shall be used under Class I and Class II random riprap.
B. Minimum grab tensile strength, ASTM D4632/D4632M, 100 pounds Class III.
C. Minimum elongation, ASTM D4632/D4632M 50%.
D. Minimum seam breaking strength, ASTM D4632/D4632M, 90 pounds Class III.
E. Apparent opening size ASTM D4751, 50 US Std. Sieve size.
F. Minimum permittivity falling head ASTM D4491, 0.5.

2.10 STRAW MULCH

A. Straw: Dry, rot free small grain cuttings free of seed bearing stalks of noxious grasses and weeds. The mulch shall be in an air-dried condition.

2.11 STRAW LOGS (BIOLOGS)

A. Straw logs consist of 100-percent straw fibers, free of noxious weeds, and are sewn to a lightweight degradable net and densely rolled and bound with an outer high strength polyethylene netting with UV inhabitation. The logs shall be staked into the ground using one (1”) inch by one (1”) inch by two (2') foot wood stakes.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.2 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

B. A MN Pollution Control Agency General Storm Water Permit for Construction Activity is required for this site. The Contractor and Owner must coordinate the permit application and construction activities controlled by the permit.
   1. Permit coverage becomes effective seven days after the post marked date of the completed permit application and application fee.

3.3 AGENCY'S REGULATORY REQUIREMENTS

A. The requirements of the Minnesota NPDES General Stormwater Permit Associated with a Construction Activity can be found at the following link:
   1. https://www.pca.state.mn.us/sites/default/files/wq-strm2-80a.pdf

B. Storm Water Pollution Prevention Plan
   1. The Contractor is responsible for proper construction and maintenance of all temporary and permanent erosion and sedimentation controls.
   2. The Contractor shall amend the Storm Water Pollution Prevention Plan as needed to include additional requirements or modified BMPs to correct or modify problems whenever:
      a. There is a change in design, construction, operation, maintenance, weather or seasonal conditions that has a significant effect on the discharge of pollutants to surface waters or underground waters.
      b. Inspections or investigations by site operators, local, state or federal officials indicate the SWPPP is not effective in eliminating or significantly minimizing the discharge of pollutants to surface waters or underground waters or that the discharges are causing water quality standard exceedances.
      c. The SWPPP is not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity, or the SWPPP is not consistent with the terms and conditions of this permit.
      d. At any time after permit coverage is effective, the Agency may determine that the project's storm water discharges may cause, have reasonable potential to cause, or contribute to non-attainment of any applicable water quality standard, or that the SWPPP does not incorporate the requirements of the permit.
      e. Inspections indicate the Plan is not effective in eliminating or significantly minimizing the discharge of pollutants or that the discharges are causing water quality standard exceedances.
      f. The Plan is not achieving the general objectives of controlling pollutants in storm water discharges or the Plan is not consistent with the terms and conditions of the permit.

3.4 GENERAL

A. Construct and maintain all erosion control measures until the Substantial Completion of the project, or as directed by the Engineer.

B. Install temporary erosion and sediment control items prior to site preparation.

C. Install erosion control items as detailed and in locations shown on the Drawings and as required by permit.

D. The Contractor shall schedule and conduct their operations to minimize the erosion of soils, to prevent siltation, and to minimize the turbidity of storm sewer runoff entering storm sewers, streams, ditches and lakes.

E. No work shall be started in the affected area until the applicable erosion control schedules and methods have been accepted by the designated erosion control inspector.

F. The Contractor shall install adequate safeguards to minimize water pollution from haul roads, work platforms, temporary earthen fills and any other temporary construction that they uses to facilitate construction. The Contractor shall obtain all necessary permits from the regulatory agencies for temporary work not shown on the Drawings.

3.5 EROSION CONTROL

A. The Contractor shall install sediment traps at existing and proposed catch basins within the construction zone. Sediment traps shall remain in place until turf and pavement surfaces are established. Filter fabric between casting and frame will not be allowed. Contact Engineer prior to removal.

B. Repair or replace any erosion control devices that have been disrupted during operations as required by local regulation. This work and material shall be considered part of the Base Bid Contract and no additional compensation shall be made therefore.

C. Sediment control devices are to be installed and shall remain in place until turf has been established. Contact the Engineer prior to removal.

D. The Contractor shall schedule and conduct their operations so as to minimize erosion of soils and to prevent silting and muddying of streams, irrigation systems, and impoundments (lakes, reservoirs, etc.). Construction of drainage facilities, turf establishment items, and other Contract Work that will contribute to the control of erosion and sedimentation shall be carried out concurrently with earthwork operations or as soon thereafter as practicable.

E. While operations are in progress and prior to suspension of grading operations for longer than fourteen (14) days, areas of bare soil exposed to erosion possibility shall be shaped to permit storm runoff with minimum erosion. Temporary berms, dikes, slope drains or sedimentation basins will be required where possibilities for water pollution exist and the permanent erosion controls are not completely operative.

F. Erosion control devices shall remain in place until other means of permanent control such as turf establishment and paving has taken place.

G. Application of erosion control blanket: Where slopes are three (3') feet horizontal to one (1') foot vertical or greater and in the areas where indicated on the Drawings, erosion control blanket per MN/DOT Specification Section 3885.2 shall be applied.

H. Restoration:

1. Control of drainage and erosion shall include restoration work as the Engineer considers necessary in preventing siltation of public waters. Restoration shall include cleanup, shaping, and replacement of topsoil and establishment of vegetative cover on all disturbed areas where water pollution potentials have been increased due to the Contractor's operations.

I. Compensation:

1. All expenses incurred in complying with the provisions hereof and effectively preventing pollution of public waters or public infrastructure shall be borne by the Contractor with no direct compensation being made therefore.

3.6 INSTALLATION OF STRAW LOGS:

A. The straw logs shall be placed on slopes along the contour, perpendicular to the flow of water to help capture sediment. They may be placed within a channel or ditch along the contour to create mini dams within the ditch of trench. The hay bales should be installed on the contour with the ends flared upslope.

1. The spacing should be approximately ten (10') to twenty-five (25') feet apart depending on the site conditions. A closer spacing shall be used in areas with sandy soils and high storm water runoff areas of with heavy sediment loads. A wider spacing may be used in areas with dense soil, low storm water runoff or areas with light sediment load.

B. Straw logs may be used as perimeter sediment control along edges of pavement to remain.

C. Straw logs may be used as perimeter sediment control for limited/temporary site disturbance.

D. Straw logs may be used in lieu of silt fence if approved by the local erosion control permitting agency.

E. Maintenance:

1. When straw logs have sedimentation built-up to one-third height, the Contractor is to remove the build-up. The soils are either to be taken off the site or to a location on the site where it can be used (contact the Soils Engineer prior to placement). The relocation and cleanup of sediments is part of the Base Bid Contract.
2. The cost of installation, maintenance and removal shall be considered part of the Base Bid Contract with no additional compensation granted.

3.7 WIMCO ROAD DRAIN PROTECTION DEVICES - INSTALLATION

A. Remove the grate from the storm sewer casting.

B. Clean all edges of the casting frame.

C. Place filter media over the filter cartridge and install to unit.

D. Insert the receptacle into the casting frame.

E. Install casting grate on top of the model making sure the grate is secure for traffic.

F. The maximum height change should be 1/8” of the casting cover to frame

G. Installation, Maintenance and Removal:

1. The devices shall be sized to fit the catch basin opening and shall be fastened according to the manufacturer's instructions.
2. The sediment control device shall be removed, emptied and replaced when the level of silt rises above the midpoint.
3. The sediment control device shall be permanently removed only after permanent surfaces are established and all loose silt on the surface adjacent to the device has been removed. Removal shall be coordinated with the City Erosion Control Officer.

H. The cost of installation, maintenance and removal shall be considered part of the Base Bid Contract with no additional compensation granted.

3.8 EROSION CONTROL BLANKET - INSTALLATION

A. Properly prepare, fertilize and seed areas to be covered before blanket is applied. When the blanket is unrolled, netting should be on top and fibers in contact with the soil over the entire area.

B. In ditches, apply blankets in the direction the water flows, butting them at the ends and sides and then stapling.

C. On slopes, apply blankets vertically to the slope, parallel to the direction of flow, butting ends and sides and then staple.

D. Use wire staples, ninety-one one-thousandths (0.091") inch in diameter or greater, “U” shaped with legs six (6") inches in length and a one (1") inch crown. Size and gauge of staples used will vary with soil conditions. Drive staples vertically into the ground. Use four (4) staples across at the start of each roll. For slope installation, continue to staple along the length of the roll at six (6') foot intervals. For ditch liner, staple along the length of the roll at four (4') foot intervals. Another row of staples in the center of each blanket should be alternately spaced between each side of either the slope or the ditch. Use a common row of staples on adjoining blankets.

3.9 CONSTRUCTION ENTRANCE

A. Construct a gravel area or pad at points where vehicles enter and leave the construction site. The rock entrance shall be a minimum of 50 feet long and 12 feet wide.

B. Clear the entrance and exit area of all vegetation, roots and other objectionable material and properly grade and place gravel to the grade and dimensions shown on the Plans.

C. Construct drainage channels to carry water to a sediment trap or other suitable outlet.

D. Install geotextile fabric under rock to improve the stability of the foundation.
E. Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site by periodic top dressing with two (2") inch stone.
F. After each rainfall, inspect any structure used to trap sediment and clean it out as necessary.
G. Immediately remove sediment spilled, washed or tracked onto public roadways.

3.10 TEMPORARY AND PERMANENT SEEDING

A. Seeding:
   1. Apply seed per the rate indicated under Products - Temporary and Permanent Seed of this Section.
   2. The seedbed should be prepared to a depth of approximately 3 inches. In compacted or hard soils, use a disc or ripper to prepare the seedbed by loosening a minimum of the top three inches of soil. The seedbed preparation should not be prepared under excessively wet conditions.
   3. Apply a 24-0-24 fertilizer at the rate of 300 pounds per acre.
   4. Seed should be evenly applied with a cyclone seeder, drill or cultipacker seeder at a seeding depth of ½ inch, ensuring good seed to soil contract.
   5. The grass area shall be mulched with a MN/DOT 3882 Type 1 mulch at the rate of 2 tons per acre. Once the area is mulched, the mulch shall be disc-anchored into the soil.
   6. Erosion control blankets shall be installed as specified for the following areas:
      a. Slopes that are 3:1 or steeper.
      b. Stormwater management basins.
      c. Hard to hold problem areas.
B. Provide a temporary cover for erosion control on disturbed areas that will remain unstabilized for a period of more than thirty (30) days. This practice applies to cleared areas, diversions, dams, temporary sediment basins, temporary road banks and topsoil stockpiles where vegetation is needed for less than one (1) year.
C. Provide grass on slopes 5 percent or greater within fourteen (14) days of disturbance.
D. Provide water if necessary to aid the establishment of the turf.
E. After turf grasses reach a height of 6 inches, initially mow the area to a height of 2 to 3 inches.
F. Long term maintenance of the grass area includes fertilizing and watering as needed and mow a minimum of once per every 2 weeks.
G. Long term maintenance within the stormwater management areas includes the following:
   1. To reduce weed establishment, mow 2 to 3 times (30 days apart) during the first year with the mower deck about 6 to 8 inches off of the ground.
   2. Mow one time during the second year before weed set their seeds.
   3. Mow once every 3 to 5 years following the initial 2 years of maintenance to remove dead plant material and stimulate new seed.
H. Satisfactory Lawns:
   1. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass shall have been established, free of weeds and surface irregularities, with coverage exceeding ninety (90%) percent over any ten (10) square feet and bare spots not exceeding three by three (3"x3") inches.
   2. Re-establish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.11 INLET PROTECTION

A. Install WIMCO, Infrasafe or other approved sediment barrier devices around the storm drain inlets per manufacturer's specification and as detailed within the Drawings.

B. Infrasafe sediment barriers shall be surrounded with 3/4-inch minus washed rock to filter the storm water runoff prior to it draining through the weep holes in the barrier device.
C. Construct temporary sediment barriers around the storm drain curb inlets using block and gravel silt fence or interior sacks per City and State standards and specifications. Installation shall be as detailed on drawings.
D. Inspect the structure after each rainfall and repair, clean or replace as required.
E. Remove sediment when trap reaches one-third (1/3) capacity.
F. Remove structure when protected areas have been stabilized.

3.12 TEMPORARY SEDIMENT TRAPS

A. Utilize temporary sediment traps at the bottom of all disturbed slopes where run-off is parallel to the utility trench and draining into an existing ditch or stream, and where slopes are 5 percent or greater along the trench.
B. Provide at intervals of seventy-five (75') feet.

3.13 RIPRAP AND FILTER

A. Riprap:
   1. Riprap shall not be dropped on the fabric from a height greater than 1 foot, or if using a granular filter, 3 feet. Placement shall not damage filter fabric.
   2. Riprap shall be placed starting at the lowest elevation and work upwards.
   3. Riprap that is placed in high visibility areas, shall be hand placed. The architect shall approve its appearance.
   4. Place riprap as detailed and in locations as shown on drawings.
B. Geotextile Filter:
   1. The foundation surface on which the fabric is laid shall be relatively smooth and free of debris.
   2. Place with longest dimension of fabric parallel to direction of water flow.
   3. Overlap splices a minimum of 18 inches.
   4. Upgrade edges of the fabric shall be buried sufficiently to direct water over the fabric without undermining. The fabric shall be tucked a minimum of 3 feet under the pipes flared end section.
C. Granular Filter: Spread filter material to uniform thickness over the prepared foundation.

3.14 REMOVAL AND CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.
B. Clean out temporary sediment control structures that are to remain as permanent measures.
C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.
D. Submit a Notice of Termination to the Minnesota Pollution Control Agency to terminate the NPDES General Storm Water Permit.

3.15 INSPECTION LOG

A. An erosion and sediment control inspection log to aid the Erosion Control Contractor in determining when and what types of erosion control inspections are required by the NPDES Construction Storm Water Permit is contained on the following page.
B.

Inspection Requirement (Weekly or within 24 hours of a 1/2 inch rainfall)						

Date	___/___	___/___	___/___	___/___	___/___	___/___
Initials	_____	_____	_____	_____	_____	_____
Is soil stabilized where no construction activity has occurred for 14 days (including stockpiles)? (7 days where applicable, or 24 hours during Minnesota Department of Natural Resources [DNR] Fish Spawning restrictions)	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Has the need to disturb steep slopes been minimized?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
If steep slopes are disturbed, are stabilization practices designed for steep slopes used?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
All ditches/swales stabilized 200' back from point of discharge or property edge within 24 hours? (Mulch, hydro mulch, tackifier, or similar best management practices [BMPs] are not acceptable in ditches/swales if the slope is greater than 2%)	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Do pipe outlets have energy dissipation (within 24 hours of connection)?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Is construction phasing being followed in accordance with the SWPPP?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A

Are areas not to be disturbed marked off (flags, signs, etc.)?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are perimeter sediment controls installed properly on all down gradient perimeters?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are appropriate BMPs installed protecting inlets, catch basins, and culvert inlets?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Do all erodible stockpiles have perimeter control in place?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Is there a temporary sediment basin on site, and is it built as required in Section 14 of the permit?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Is soil compaction being minimized where not designed for compaction?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Is topsoil being preserved unless infeasible?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are all previously stabilized areas maintaining ground cover?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are perimeter controls maintained and functioning properly, sediment removed when one-half full?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are inlet protection devices maintained and adequately protecting inlets?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are the temporary sediment basins being maintained and functioning properly?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A

Are vehicle tracking BMPs at site exists in place and maintained and functioning properly?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Is all tracked sediment being removed within 24 hours?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Have all surface waters, ditches, conveyances, and discharge points been inspected?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Were discharges seen during this inspection (sediment, turbid water, or otherwise)?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are all construction materials that can leach pollutants under cover or protected?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are hazardous materials being properly stored?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are appropriate BMPs being used to prevent discharges associated with fueling and maintenance of equipment or vehicles?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Are all solid wastes being properly contained and disposed of?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Is there a concrete/other material washout area on site and is it being used?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Is the concrete washout area marked with a sign?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A

Are the concrete/other material washout areas properly maintained?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
Is any dewatering occurring on site? If yes, what BMPs are being used to ensure that clean water is leaving the site and the discharge is not causing erosion or scour?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A
If infiltration/filtration systems are being constructed, are they marked and protected from compaction and sedimentation?	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A	Y N N/A

END OF SECTION

SECTION 02 41 13 - SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Selective site demolition of designated items; including removal of materials from site, legal disposal off-site and salvage of items which are identified on the plan documents for Owner.

1. Selective demolition of existing structures including below grade foundations.
    a. Miscellaneous foundations in their entirety.
2. Asphalt paved areas, including saw cutting.
3. Concrete walks, slabs, and curb and gutter; including saw cutting.
4. Tree and landscape removal, including roots.
5. Site signage, posts, bollards, light poles, and fixtures and associated foundations.
6. Designated work in City right-of-way.

1.2 RELATED SECTIONS

A. Section 01 5713 - Erosion and Sediment Controls.

B. Section 31 0000 - Earthwork.

C. Section 31 1000 - Site Clearing.

1.3 REFERENCES

A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

C. Minnesota Department of Labor and Industry - Minnesota State Building Code.

1.4 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.

B. Conform to all applicable code for materials and installation of the Work of this Section.

C. Verify that survey benchmark and intended elevations for the Work are as indicated.

D. Demolition Firm: Company specializing in the type of work required.

1.5 SUBMITTALS

A. Submit under provisions of Division One Specifications.

B. Schedule: Indicate demolition and removal sequence and location of salvageable items, location and construction of barricades, fences and temporary work.

C. Site Plan: Showing:

1. Vegetation to be protected.
2. Areas for temporary construction and field offices.
3. Areas for temporary and permanent placement of removed materials.

D. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.

1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
2. Identify demolition firm and submit qualifications.
3. Include a summary of safety procedures.

E. Project Record Documents: Accurately record actual locations of capped and active utilities, subsurface construction and any other items relocated.

1.6 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.

B. Protection of Persons: The Owner's activities will continue about the site during construction. Install barricade fencing (snow fence), as necessary, to provide a safe environment between construction work and pedestrian circulation.

C. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, buildings/structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer's satisfaction and at no cost to the Owner.

D. Existing Utilities:

1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.
2. The approximate locations of certain underground lines and structures are shown on the plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.
3. Locate and mark these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.
4. Locate, excavate, and expose all existing underground lines in advance of trenching operations.
5. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.

E. Traffic Control:

1. Maintain vehicular and pedestrian traffic as required for construction activities.
2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of the Work.
3. When working in public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

1.7 REGULATORY REQUIREMENTS

A. Conform to State Building Code and all applicable codes for demolition of site structures, safety of adjacent structures, dust control, run-off control and disposal.

B. Notify affected utility companies before starting work and comply with their requirements, as outlined under the provisions of Division One Specifications.

C. Do not close or obstruct roadways, sidewalks, or hydrants without permits.

D. Test soils around buried tanks for contamination.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fill Material: As specified in Section 31 0000 - Earthwork.

2.2 EROSION CONTROL AND SILT FENCES

A. Reference to Section 01 5713 - Erosion and Sediment Control.

PART 3 EXECUTION

3.1 PREPARATION

A. Provide, erect and maintain temporary barriers, traffic control and security devices at locations as directed by the Engineer, City and Owner.
B. Protect existing landscape materials, appurtenances, and structures that are not to be demolished.
C. Prevent movement or settlement of adjacent structures. Provide bracing or shoring.
D. Mark location of utilities.
E. Once installed, all erosion control measures are to be approved by the City prior to start of construction.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
    1. Obtain required permits.
    2. Comply with applicable requirements of NFPA 241.
    3. Use of explosives is not permitted.
    4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
    5. Provide, erect, and maintain temporary barriers and security devices.
    6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
    7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
        a. Cease operations immediately if adjacent structures appear to be in danger. Notify the Engineer and do not resume operations until directed.
    8. Do not close or obstruct roadways or sidewalks without permit.
    9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
    10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
    11. Sprinkle work with water to minimize dust. Provide hoses and water connections for this purpose.
B. Do not begin removal until receipt of notification to proceed from Owner.
C. Do not begin removal until built elements to be salvaged or relocated have been removed.
D. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.
E. Protect existing structures and other elements that are not to be removed.
    1. Provide bracing and shoring.
    2. Prevent movement or settlement of adjacent structures.
    3. Stop work immediately if adjacent structures appear to be in danger.
F. If hazardous materials are discovered during removal operations, stop work and notify Engineer and Owner; hazardous materials include regulated asbestos containing materials, lead, PCBs, and mercury.
G. Perform demolition in a manner that maximizes salvage and recycling of materials.
    1. Dismantle existing construction and separate materials.

2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

H. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.3 EXISTING UTILITIES

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

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

F. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.4 CLEARING AND REMOVAL

A. General: Remove structures and facilities indicated on the Drawings. Remove and dispose of all structures, except for that which is permitted to remain upon determination being made by the Engineer that their existence does not interfere with, endanger or detract from the new construction in any way.

B. Removal Operations: Perform removal operations that may endanger new construction prior to construction of affected Work.

C. Compliance with Instructions, Ordinances and State Laws: Comply with all instructions and ordinances of the State of Minnesota, and all counties and municipalities regarding disposal, signs, advertising, traffic corners, danger signals, barricades, fire protection and all safety laws, ordinances and rulings.

D. Disposal of Materials and Debris: Dispose of debris resulting from the removal and demolition operations in accordance with specific regulations imposed by laws, ordinances, orders and decrees.

E. Removal of Existing Structures: Remove and dispose of all structures, except for those that are specified to be removed by others or which are permitted to remain upon determination being made by the Engineer that their existence does not interfere with, endanger or detract from the new construction in any way. Catch basins and manholes designated for removal shall be removed entirely and the pipe leads closed per City standards. Manholes designated to remain shall be clearly marked in the field and protected at all times.

F. Removal of Existing Pavements: Where a portion of an existing pavement is to be retained for use, that portion shall not be damaged during removal operations and/or construction activities. In removing concrete and bituminous pavements, sidewalks and similar structures, where the cut will be exposed in the finished Work, the structure shall, unless the removal is made to an existing joint and unless determined otherwise by the Engineer, be sawed along the removal lines with a concrete saw to a depth of not less than one-half (1/2) the thickness of the concrete or bituminous before breaking off the concrete or bituminous. In such cases, the use of wedges, driven into the saw cut to break off the portion to be removed, will not be permitted. Elsewhere, the structure shall be cut and chipped to true lines and vertical faces.

G. Removal of Trees, Stumps, Brush and Vegetation: The clearing operations shall consist of the cutting and removal of trees, shrubs, bushes, windfalls and other vegetation in the designated areas. Grubbing operations shall consist of removing and disposing of the stumps, roots and other remains in their entirety.

H. Disconnect, remove and/or cap designated utilities within demolition areas.

I. All materials removed under this section shall be removed from the site. The cost of legal disposal of the existing materials shall be included in the Bid Price, and no additional compensation will be allowed.

3.5 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on information provided on the topographic survey. The Contractor shall call Gopher State One Call for a field locate and field locate actual utility locations.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Engineer before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions.

B. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

C. Services (Including but not limited to Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification.

D. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.6 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, trash and unused materials from site.

B. Burning of debris is not permitted on the Owner's property.

C. Remove all waste materials and unsuitable or excess topsoil from the Owner's property.

D. The cost of disposal of waste materials is considered part of the Base Bid Contract.

E. Remove from site all materials not to be reused on site.

F. Leave site in clean condition, ready for subsequent work.

G. Clean up spills and wind-blown debris from public and private lands.

H. Keep all public roadways free of mud, soil and debris to the satisfaction of regulatory agencies.

END OF SECTION

SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 CONTRACT CONDITIONS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.
B. Openings for other work.
C. Form accessories.
D. Form stripping.

1.3 RELATED REQUIREMENTS

A. Section 01 45 33 - Structural Testing and Special Inspection.
B. Section 03 20 00 - Concrete Reinforcing.
C. Section 03 30 00 - Cast-in-Place Concrete.
D. Section 05 12 00 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.4 REFERENCE STANDARDS

A. ACI PRC-347 - Guide to Formwork for Concrete; 2014 (Reapproved 2021).
B. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
C. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
D. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

1.5 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.6 SUBMITTALS

A. See Division 1 for submittal procedures.
B. Submit product data for form release agents.

1.7 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI PRC-347, ACI SPEC-301, and ACI 318.

PART 2 PRODUCTS

2.1 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing to accomplish cast-in-place concrete work.
B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
C. Chamfer exposed outside corners of beams, joists, columns, and walls 3/4".
D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
E. Comply with relevant portions of ACI SPEC-301.

2.2 FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

2.3 FORMWORK ACCESSORIES

A. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

B. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 12 00.

PART 3 EXECUTION

3.1 EXAMINATION

A. Establish a bench mark in an accessible location and use as a reference point for various construction levels. Maintain in an undisturbed condition until final completion.

B. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Earth forms are not permitted.

3.3 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Lay out all work and check general building lines and levels established. Coordinate layout and measurements and if discrepancies arise, report them to the Architect.

D. Keep wood forms wet as necessary to prevent shrinkage.

E. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

F. Align joints and make watertight. Keep form joints to a minimum.

G. Obtain approval before framing openings in structural members that are not indicated on drawings.

H. Coordinate this section with other sections of work that require attachment of components to formwork.

I. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Engineer before proceeding.

J. Protect work at all times against the elements and other hazards. Cover and secure work.

3.4 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Place and secure anchor rods and structural steel embeds before concrete is placed. “Wet sticking” of these elements is not permitted.

E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

3.6 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI SPEC-117. See section 03 30 00 for additional requirements.

1. Provide Class B surface for exposed concrete.
2. Provide Class C or Class D surface for concealed concrete.

B. Tolerances given in ACI SPEC-117 are not cumulative. Maximum tolerance for any formed surface, except footings, shall be one inch.

3.8 FIELD QUALITY CONTROL

A. Structural Special Inspection

1. Structural Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provision of Section 01 45 33.
2. Formwork for slabs on grade, strip footings without transverse reinforcement, isolated spread footings, and topping slabs does not require inspection except at storm shelter(s). Additional exceptions may be noted on the structural drawings.
3. Personnel Qualifications: Special Inspector – Structural I: ICC certified concrete inspector or a graduate civil/structural engineer, or other personnel acceptable to the Structural Engineer of Record (SER), with the experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a licensed structural engineer, as defined in Section 01 45 33. The licensed engineer shall review and approve all inspection reports.
4. The Owner will provide the following inspections:
    a. Verify formwork for all concrete, except as noted above, will result in member size, location, and configuration as described on the contract documents, only as it affects the structural integrity of the concrete elements to be placed. Verify removal of shoring conforms to this section. Qualifications: Structural I.
    b. Verify placement of anchor rods and other embedments supporting structural steel for compliance with the construction documents. At a minimum, the diameter, grade, type and length of the anchor rod or embedded item, and the extent or depth of embedment into the concrete, shall be verified and documented prior to placement of concrete. Qualifications: Structural I.

3.9 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Forms for sides of beams, columns, and footings shall remain in place for a minimum of 24 hours.

C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

D. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03 15 10 - POST-INSTALLED ANCHORS

PART 1 GENERAL

1.1 CONTRACT CONDITIONS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Requirements pertaining to post-installed anchors for materials and equipment. This section pertains to Divisions 3, 4, and 5 of these specifications that require post-installed anchors, unless specified otherwise.

1.3 RELATED REQUIREMENTS

A. Division 1 – General Requirements
B. Division 3 – Concrete
C. Division 4 – Masonry
D. Division 5 – Metals

1.4 REFERENCES

A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
B. ACI 355.2 – Standard for Evaluating the Performance of Post-Installed Mechanical Anchors in Concrete; 2005
C. ASTM A 307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength; 2007b
D. ASTM A 615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007
E. ASTM A 706/A 706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement; 2006a.
F. ASTM B 633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2007
G. ASTM B 695 – Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel; 2004
H. ASTM C 881– Standard Specification Epoxy-Resin-Based Bonding Systems for Concrete; 2002
I. ASTM F 593 – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2002
J. ASTM F 1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2007a.
K. Federal Specifications A-A-1922A, A-A01923A and A-A-55614 for Expansion and Shield-Type Anchors
L. ICC-ES AC01 – Acceptance Criteria for Expansion Anchors in Masonry Elements; 2006
M. ICC-ES AC58 – Acceptance Criteria for Adhesive Anchors in Masonry Elements; 2006
N. ICC-ES AC106 – Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Concrete or Masonry Elements; 2006
O. ICC-ES AC193 – Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2008
P. ICC-ES AC308 – Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2008

1.5 QUALITY ASSURANCE

A. Post-Installed anchors and related materials shall be listed by one or more of the following agencies, as applicable:
    1. ICC Evaluation Service

2. Underwriters Laboratories (UL) and/or Factory Mutual (FM)
3. IAPMO Evaluation Service

1.6 SUBMITTALS

A. Product Data: Submit data for proprietary materials, manufacturer's specifications (including finishes and/or materials), Material Safety Data Sheets (MSDS) and installation procedures.
B. Test Reports: ICC-ES or IAPMO-UES listings.

1.7 SUBSTITUTIONS

A. Only manufacturers with an ICC-ES or IAPMO listing will be considered for substitution requests.
B. The contractor shall submit for Engineer-of-Record's review, calculations that are prepared & sealed by a registered Professional Engineer demonstrating that the substituted product is capable of achieving the pertinent equivalent performance values of the specified product using the appropriate design procedure and/or standard(s) as required by the Building Code. In addition, the calculations shall specify the diameter and embedment depth of the substituted product.
C. Any increase in material costs for such submittal shall be the responsibility of the contractor.

PART 2 PRODUCTS

2.1 MATERIALS

A. Expansion Anchors
   1. Concrete Wedge Anchors (expansion bolt):
      a. Carbon steel, ASTM B 633, Class SC1, Type I or III.
      b. Stainless steel anchors (where noted): ASTM F 593, Type 303, 304 or 316.
      c. Evaluation report issued by ICC-ES or IAPMO required.
      d. Tested and qualified for performance in cracked and uncracked concrete in accordance with ACI 355.2 and ICC-ES AC193 for all mandatory tests .
      e. Acceptable products include:
         1) Simpson Strong-Tie: Strong-Bolt 2 (ICC-ES ESR-3037)
         2) Hilti: Kwik Bolt TZ (ICC-ES ESR-1917).
         3) DeWalt/Powers Fasteners: Power-Stud+SD2 (ICC-ES ESR-2502).
   2. Masonry Wedge Anchors (expansion bolt): Federal Specification A-A-1923A, Type 4.
      a. Carbon steel, electroplated zinc finish unless otherwise noted.
      b. Mechanically galvanized (where noted): ASTM B 695, Class 55, Type 1.
      c. Stainless steel anchors (where noted): ASTM F 593, Type 303, 304 or 316.
      d. Evaluation report issued by ICC-ES or IAPMO required.
      e. Tested in accordance with ICC-ES AC01 for all mandatory tests :
      f. Acceptable Products Include:
         1) Simpson Strong-Tie: Strong Bolt 2 (IAPMO ER-240)
         2) Hilti: Kwik Bolt 3 (ICC-ES ESR-1385).
B. Adhesive Anchors
   1. Adhesive anchors consist of an insert and an adhesive.
   2. Inserts
      a. Threaded Rod Inserts: Provide preparation or configuration as recommended by manufacturer.
         1) Interior Exposure: ASTM F 1554.
      b. Reinforcing Bar Inserts: ASTM A 615 or ASTM A 706. Provide preparation or configuration as recommended by manufacturer.
      c. Proprietary Rod Inserts: Provide where shown.
         1) Hilti: HIT-TZ
         2) Simpson Strong-Tie: IXP
   3. Adhesives for Concrete:

a. Evaluation report issued by ICC-ES or IAPMO required.
b. Tested and qualified for use in cracked and uncracked concrete in accordance with ICC-ES AC308 for all mandatory and optional seismic tests including creep tests.
c. Epoxy: ASTM C 881 Type IV, Grade 3, Class B and C.
   1) Acceptable products include:
      (a) Simpson Strong-Tie: SET XP (ICC-ES ESR-2508).
      (b) Simpson Strong-Tie: ET-HP Epoxy (ICC-ES ESR-3372).
      (c) Hilti: RE-500-V3 (ICC-ES ESR-3814).
      (d) DeWalt/Powers Fasteners: PE1000+ (ICC-ES ESR-2583).
      (e) DeWalt/Powers Fasteners: PURE110+ (ICC-ES ESR-3298).
      (f) DeWalt/Powers Fasteners: PURE50+ (ICC-ES ESR-3576).
      (g) ITW Red Head: Red Head G5 (ICC-ES-ESR-1137).
      (h) ITW Red Head: Red Head C6+ (ICC-ES ESR-3577).
d. Acrylic: Cartridge type, two-component, acrylic based system dispensed and mixed through a static mixing nozzle supplied by the manufacturer. Minimum physical requirements of ASTM C 881 Type IV, Grade 3, Class A, B and C.
   1) Acceptable products include:
      (a) Hilti: HY-200 (ICC-ES ESR-3187).
      (b) DeWalt/Powers Fasteners: AC100+ (ICC-ES ESR-2582).
      (c) Simpson Strong-Tie: AT-XP (IAPMO ER-263).
      (d) ITW Red Head: Red Head A7+ (ICC-ES ESR-3903).

4. Adhesives for Solid Concrete Masonry:
   a. Evaluation report issued by ICC-ES or IAPMO required.
   b. Tested in accordance with ICC-ES AC58 for all mandatory tests and the following optional tests:
      1) Seismic tests
      2) Creep tests
      3) Dampness tests
      4) Freeze-thaw tests
   c. Epoxy: ASTM C 881 Type IV, Grade 3, Class B and C.
      1) Acceptable products include:
         (a) Simpson Strong-Tie: ET-HP Epoxy (ICC-ES ESR-3638).
   d. Acrylic: Cartridge type, two-component, acrylic based system dispensed and mixed through a static mixing nozzle supplied by the manufacturer. Minimum physical requirements of ASTM C 881 Type IV, Grade 3, Class A, B and C.
      1) Acceptable products include:
         (a) Simpson Strong-Tie: AT-XP (IAPMO ER-281).
         (b) Hilti: HY-200 (ICC-ES ER-3963)
         (c) Hilti: HY-70 (ICC-ES ER-2682)
         (d) ITW Red Head: Red Head A7+ (ICC-ES ESR-3951)

5. Adhesives for Hollow Concrete Masonry:
   a. Evaluation report issued by ICC-ES or IAPMO required.
   b. Tested in accordance with ICC-ES AC58 for all mandatory tests and the following optional tests:.
      1) Seismic tests
      2) Creep tests
      3) Dampness tests
      4) Freeze-thaw tests
   c. Epoxy: ASTM C881 Type IV, Grade 3, Class B and C.
      1) Acceptable products include:
         (a) Simpson Strong-Tie: SET Epoxy-Tie High-Strength Adhesive (ICC-ES ESR-1772).
         (b) Hilti: HY-70 (ICC-ES ESR-2682).

C. Concrete and Masonry Screw Anchors

1. Concrete Screw Anchors:
   a. Carbon steel heat-treated or hardened.
   b. Zinc-plated in accordance with ASTM B 633, Class SC1, Type I or equivalent coating.
   c. Mechanically galvanized (where noted): ASTM B 695, Class 55, Type 1.
   d. Evaluation report issued by ICC-ES or IAPMO required.
   e. Tested and qualified for use per ICC-ES AC193 for all mandatory tests .
   f. Acceptable products include:
      1) Simpson Strong-Tie: Titen HD (ICC-ES ESR-2713).
      2) Hilti: HUS-EZ (ICC-ES ESR 3027).
      3) Powers Fasteners: Wedge-Bolt+ (ICC-ES ESR-2526).
      4) ITW Red Head: Tapcon+/Sammy (ICC-ES ESR-3699).
2. Masonry Screw Anchors: (Grouted Masonry Only)
   a. Carbon steel heat-treated or hardened.
   b. Zinc-plated per ASTM B 633, Class SC1, Type I, or equivalent coating.
   c. Mechanically galvanized (where noted): ASTM B 695, Class 55, Type 1.
   d. Evaluation report issued by ICC-ES or IAPMO required.
   e. Tested per ICC-ES AC106 for all mandatory tests (and seismic tests):
   f. Acceptable products include:
      1) Simpson Strong-Tie: Titen HD (ICC-ES ESR-1056).
      2) Hilti: HUS-EZ (ICC-ES ESR-3056).
      3) Powers Fasteners: Wedge-Bolt+ (ICC-ES ESR-1678).
      4) ITW Red Head: Tapcon (ICC-ES ESR-1671).

PART 3 EXECUTION

3.1 INSTALLATION

A. Install anchors in strict accordance with manufacturer's printed instructions and, where required, requirements of ICC-ES evaluation reports.
B. Conform to manufacturer's requirements for, but not limited to, hole drilling methods, hole size, hole cleaning, substrate and adhesive temperatures, moisture presence in holes, and required edge distance and spacing. Unless noted otherwise, dry holes are required.
C. Use special tools when recommended by manufacturer for installation of anchors unless otherwise permitted specifically by the Engineer or Architect of Record.
D. Drill holes in concrete and masonry, in accordance with the manufacturer’s recommendations.

3.2 FIELD QUALITY CONTROL

A. Manufacturer shall, on request, provide the services of a field representative to demonstrate to and train installers in proper installation techniques.
B. Structural Testing and Special Inspection
   1. Structural Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provision of Section 01 45 33.
   2. Special Inspection, periodic or continuous, of post-installed anchors shall be provided as specified herein, but not less than as required by ICC-ES evaluation reports.
   3. Definitions: ASNT - American Society for Non-Destructive Testing
   4. Personnel Qualifications
      a. Special Inspector Technical I: ASNT Level I, employed by a testing agency and supervised by an ASNT Level III with a minimum of 10 years experience.
      b. Special Inspector Technical II: ASNT Level II, employed by a testing agency and supervised by an ASNT Level III with a minimum of 10 years experience.
      c. Special Inspector – Structural I: Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in design of structural systems of the project type. Inspections shall be performed under the direct supervision

of a licensed structural engineer, as defined in Section 01 45 33. The licensed engineer shall review and approve all inspection reports.

5. The Owner will provide the following tests and inspections:
   a. Continuous special inspection during installation to verify materials delivered to site comply with contract documents, bolt type and dimensions, concrete type and compressive strength, pre-drilled hole dimensions and cleaning, embedment, spacing, edge distances, slab thickness, tightening torque, and any other items requiring inspection by product's ICC approval report. Qualifications: Technical II or Structural I.

END OF SECTION

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 GENERAL

1.1 CONTRACT CONDITIONS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.
B. Reinforcing steel for masonry.
C. Supports and accessories for steel reinforcement.

1.3 RELATED REQUIREMENTS

A. Section 01 45 33 - Structural Testing and Special Inspection.
B. Section 03 10 00 - Concrete Forming and Accessories.
C. Section 03 15 10 - Post-Installed Anchors.
D. Section 03 30 00 - Cast-in-Place Concrete.

1.4 REFERENCE STANDARDS

A. ACI PRC-315 - Guide to Presenting Reinforcing Steel Design Details; 2018
B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
C. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
D. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
F. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; 2022a.
G. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2022.
H. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars; 2021.
I. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
J. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).
K. CRSI (DA4) - Manual of Standard Practice; 2018, with Errata (2019).
L. CRSI (P1) - Placing Reinforcing Bars, 10th Edition; 2019.

1.5 SUBMITTALS

A. See Division 1 for submittal procedures.
B. Shop Drawings: Follow recommended practices of ACI PRC-315. Include size, length, bar schedules, shapes of bent bars, spacing of bars, methods of supporting reinforcing, and location and length of splices. Provide details necessary to show final position of reinforcement in elements.
    1. Include shop drawings for masonry reinforcing
    2. If shop drawings are resubmitted after the original review, identify all changes made to the shop drawings after the original submittal with clouds or similar markings.
C. Welders' Qualification Statement: Submit to Special Inspector welders' qualifications in accordance with AWS B2.1/B2.1M.

1.6 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301 and ACI 318.

B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.4/D1.4M.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver all reinforcement to the Project site bundled, tagged, and marked.
B. Store all reinforcing steel bars, ties, wire fabric, etc., on the site in a manner that will permit access for proper inspection and identification.
C. Do not exceed design capacity of existing construction or formwork.
D. Store reinforcing to avoid contact with mud, grease, or other materials that would affect bond.
E. Special handling for epoxy coated reinforcing to include:
    1. Support epoxy-coated bars or bundles of bars to prevent damage to coating during transit.
    2. Store epoxy-coated bars on protective cribbing.
    3. Lift bundles of epoxy-coated bars at multiple pickup points to minimize bar-to-bar abrasion due to sags in the bundles.
    4. Do not drop or drag epoxy-coated bars or bundles of bars.
    5. Provide padded contact areas on equipment used for handling epoxy-coated bars.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
    1. Deformed billet-steel bars.
    2. Unfinished.
    3. Epoxy coated in accordance with ASTM A775/A775M where noted.
B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars. Required for welded reinforcing.
C. Reinforcement Accessories:
    1. Chairs, Bolsters, Bar Supports, Spacers: CRSI MSP-1 Chapter 3. Sized and shaped for adequate support of reinforcement during concrete placement.
        a. Class 1 for all surfaces exposed to weather.
        b. Class 1 or 2 for interior surfaces exposed to view.
        c. Class 3 for surfaces not exposed to view.
    2. Bar Supports and Accessories for epoxy coated bars: CRSI MSP-1 Chapter 3, Class 1A epoxy, vinyl, or plastic coated, all plastic supports, or precast supports with epoxy or plastic coated wire.
        a. Use epoxy-coated reinforcing bars as support bars.
        b. Fasten epoxy-coated reinforcing bars to bar supports, accessories, and each other with nylon, epoxy or plastic coated tie wire.
    3. Patching Materials for Epoxy Coated Bars: ASTM D3963/D3963M Annex A1, inert in concrete.
    4. Mechanical couplers: Develop 125% of yield strength, ICBO approved. Dayton/Richmond: Barlock Coupler System, Erico: Lenton Couplers, or approved equal .
    5. Post-installed reinforcing adhesive: See section 03 15 10.

2.2 DETAILING

A. Detail reinforcing steel in accordance with ACI PRC-315 and ACI 318.
B. Splice reinforcing where indicated on drawings. Specifically note proposed splices not shown on the drawings on the shop drawings and highlight for reviewer's acceptance.

C. Provide epoxy coated reinforcing for all concrete exposed to weather such as exterior walls, slabs, columns, piers, landings, stoop slabs, loading docks, and stairs. Additional locations may be noted on the drawings. Building foundation walls do not require epoxy coated reinforcing unless shown on the drawings.
D. Provide bar supports and other accessories sufficient to maintain reinforcing within specified placing tolerances. Consider requirements of CRSI MSP-1 to be a minimum.
E. Provide bar supports for all reinforcing, including footings, slabs on grade, grade beams, and slab temperature reinforcing.
F. Consider normal construction activities while detailing number and type of bar supports.
G. Detail reinforcing to accommodate forming, fabricating, and placing tolerances and maintain a minimum cover as specified.

2.3 FABRICATION

A. Fabricate concrete reinforcing in accordance with ACI 318 and ACI SPEC-301.
B. Fabricate within tolerances given in ACI SPEC-117.
C. Welding of reinforcement is permitted only with the specific approval of the SER. Perform welding in accordance with AWS D1.4/D1.4M.
D. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.

PART 3 EXECUTION

3.1 PREPARATION - PLAIN BARS

A. Clean all reinforcement before placing. Remove oil, mill scale, pitting, mud, loose rust, strong alkali or organic matter.
B. Remove all excessive rust with wire brush or by sandblasting.
C. Reinforcement with rust and/or mill scale shall be acceptable if a hand-brushed test specimen meets the applicable ASTM requirements for dimension, weight, and height of deformations.

3.2 PREPARATION - EPOXY COATED BARS

A. Repair coating damage larger than 0.1 square inch in accordance with patching material manufacturer's recommendations.
B. Remove oil, mud, strong alkali, or organic matter prior to placement in forms.

3.3 PLACEMENT

A. Place reinforcing in accordance with approved shop drawings, support and secure reinforcement against displacement. Do not deviate from required position. Place within maximum tolerances given in ACI SPEC-117. Bars must be placed and secured before concrete is placed.
B. Splice reinforcing where indicated on drawings.
C. Install mechanical connectors in accordance with connection manufacturer's recommendations.
D. Provide templates for all column dowels.
E. Do not bend bars embedded in hardened or partially hardened concrete without approval from the Architect/Engineer. If bending is permitted, conform to procedures of ACI SPEC-301.
F. Support footing and slab on grade reinforcing. Do not lift or "step in" during placement of concrete. Use precast concrete, block, brick, or wire supports with earth bearing bases.
G. Do not displace or damage vapor barrier.
H. Reinforcing shall have the minimum concrete cover as given on the drawings.

3.4 INSTALLATION - EPOXY COATED REINFORCING

A. Do not field cut epoxy-coated reinforcing bars unless shown on Drawings or permitted by Engineer.

B. Do not use welded splices of epoxy-coated reinforcing bars unless shown on Drawings or permitted by Engineer. When used, welded splices shall conform to AWS D1.4. Welding of crossing bars (tack welding) for assembly of epoxy-coated reinforcement is prohibited.

C. Provide suitable ventilation when welding of epoxy-coated bars is required or permitted.

D. Do not use mechanical connections for epoxy-coated reinforcing unless shown on drawings or permitted by Engineer.

E. Repair coating damage due to heating, bending, cutting, welding or installation of mechanical connections, in accordance with ASTM D3963/D3963M and patching material manufacturer's recommendations.

F. Do not use epoxy-coated bars with damage, repaired and unrepaired, exceeding 2 percent of the surface area of each bar.

3.5 POST-INSTALLED REINFORCING

A. See section 03 15 10 for installation requirements.

3.6 FIELD QUALITY CONTROL

A. Structural Special Inspection

1. Structural Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provision of Section 01 45 33.
2. Concrete reinforcing in slabs on grade, strip footings without transverse reinforcement, isolated spread footings, and topping slabs does not require inspection except at storm shelter(s). Additional exclusions may be noted on the structural drawings. Special Inspector need not be present during entire reinforcing installation, but must observe all required reinforcing prior to concrete placement.
3. Definitions:
4. Personnel Qualifications:
   a. Special Inspector - Structural I: ICC certified concrete inspector or a graduate civil/structural engineer, or other personnel acceptable to the structural Engineer of Record (SER), with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a licensed structural engineer, as defined in Section 01 45 33. The licensed engineer shall review and approve all inspection reports.
   b. Special Inspector Technical II: CAWI with minimum 3 years experience or ASNT Level II, employed by a testing agency and supervised by a CWI or ASNT Level III with a minimum of 10 years experience.
   c. Individuals performing welding inspection must be AWS certified.
5. The Owner will provide the following inspections:
   a. Inspect reinforcement in all cast in place concrete, except as noted above . Qualifications: Structural I. Verify the following:
      1) Reinforcing bar grade.
      2) Reinforcing bars are free of oil, dirt, excessive rust, and damage.
      3) Reinforcing bars are adequately tied, chaired, and supported to prevent displacement during concrete placement.
      4) Proper chair and tie wire materials are used.
      5) Proper clear distances between bars and to surfaces of concrete.
      6) Reinforcing bar size and placement.
      7) Bar laps for proper length and stagger.
      8) Bar bends for minimum diameter, slope and length.
      9) Mechanical splices are placed in accordance with the plans, specifications and reviewed shop drawings.

10) Epoxy coating is presented at locations noted in the plans and specifications. include tie wires, chairs, bolsters, etc. Verify coating damaged is repaired in accordance with the contract requirements.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 CONTRACT CONDITIONS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Section Includes: Providing all items, articles and materials listed, mentioned, or scheduled on the Drawings or herein, including all labor, materials, equipment, and incidentals necessary and required for the installation of all cast-in-place concrete indicated on the Drawings or specified herein.
B. Concrete footings.
C. Concrete building frame members.
D. Concrete for composite floor construction.
E. Floors and slabs on grade.
F. Concrete elevator shaft walls and foundation walls.
G. Concrete topping.
H. Concrete curing.

1.3 RELATED REQUIREMENTS

A. Section 01 45 33 - Structural Testing and Special Inspection
B. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.
C. Section 03 20 00 - Concrete Reinforcing.
D. Section 03 41 00 - Precast Structural Concrete
E. Section 05 12 00 - Structural Steel Framing: Embedded Structural Steel, Anchor Bolts
F. Section 07 92 00 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.4 REFERENCE STANDARDS

A. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.
B. ACI PRC-309 - Guide for Consolidation of Concrete, American Concrete Institute; 2005.
C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
D. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.
E. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
F. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.
G. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.
H. ACI PRC-308 - Guide to External Curing of Concrete; 2016.
I. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
J. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
L. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2024.
M. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2018.

N. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2023.
O. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2023.
P. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2024.
Q. ASTM C138/C138M - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete; 2023.
R. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.
S. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
T. ASTM C157/C157M - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete; 2017.
U. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2023.
V. ASTM C231/C231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method; 2017a.
W. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
X. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
Y. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019, with Editorial Revision (2022).
Z. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements; 2021.
AA. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2023, with Editorial Revision.
BB. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.
CC. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2021.
DD. ASTM C1064/1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete; 2017.
EE. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.
FF. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete; 2023.
GG. ASTM C1260 - Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method); 2021.
HH. ASTM C1399/C1399M - Standard Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete; 2010(2015).
II. ASTM C1579 - Standard Test Method for Evaluating Plastic Shrinkage Cracking of Restrained Fiber Reinforced Concrete (Using a Steel Form Insert); 2021.
JJ. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2018.
KK. ASTM C1609/C1609M - Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading); 2019a.
LL. ASTM C1812/C1812M - Standard Practice for Design of Journal Bearing Supports to be Used in Fiber Reinforced Concrete Beam Tests; 2015.
MM. ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction; 2012 (Reapproved 2022).
NN. ASTM D7508/D7508M - Standard Specification for Polyolefin Chopped Strands for Use in Concrete; 2020.

OO. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers; 2020.

PP. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.

QQ. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

RR. ICC Evaluation Service AC383 - Acceptance Criteria for Concrete with Synthetic Fibers; 2019

1.5 SUBMITTALS

A. See Division 1 for submittal procedures.

B. Concrete mix designs for each mix used. On request, include field test data used to determine required average strength (if that method was used) and field test or trial mix data used to document required average compressive strength.

C. Product data for the following products.
   1. Curing materials and compounds.
   2. Admixtures.
   3. Fiber reinforcing.
   4. Vapor retarders.
   5. Non-shrink grout.

D. Test Reports: Submit report for each test or series of tests specified.

E. Cold weather concreting procedures for information only.

F. Drawings showing construction and control joint locations and details for interior supported floor slabs and slabs on grade.

G. Certification of admixture conformance to chloride ion requirements.

1.6 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301, ACI SPEC-117, and ACI 318.

B. Follow recommendations of ACI PRC-305 when concreting during hot weather.

C. Follow recommendations of ACI PRC-306 when concreting during cold weather.

D. Fiber reinforcing supplier shall have no less than five (5) years of satisfactory product performance experience with the approved product.

E. Pre-Installation Conference: Prior to installation of any concrete, a conference shall be held at the Project Site. General Contractor, ready-mix supplier, concrete, formwork, and reinforcing subcontractors, Engineer, Structural Inspectors, Independent Testing Laboratory, and other subcontractors whose work requires coordination with this Work shall attend.
   1. Admixture supplier(s) shall be optional attendees unless their presence is required for any warranty.
   2. Specification requirements, submittals, materials, proposed mix designs, methods and procedures associated with this Work will be reviewed to assist in determining acceptable methods and procedures for achieving the specified concrete quality.
   3. Thermal control plan for mass concrete elements will be reviewed.

1.7 MATERIAL DELIVERY, HANDLING, AND STORAGE

A. Materials shall be delivered in the Manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the product name, manufacturer's name, batch number, component designation, and ratio of component mixtures.

B. Provide equipment and personnel to handle the materials by methods that prevent damage.

C. Promptly inspect shipments to assure that materials comply with requirements, quantities are correct, and materials are undamaged.

D. Store materials in accordance with the Manufacturer's instructions, with seals and label intact and legible. Maintain temperatures within the Manufacturer's recommended ranges.

E. Furnish delivery tickets with each load of concrete delivered to the Project. Information on each ticket shall meet requirements of ASTM C94/C94M and shall also include: type of concrete (mix number), weights of all ingredients, maximum aggregate size, allowable slump range at point of discharge, type, brand, and amount of admixture, total water in the batch, maximum amount of water that can be added at the site without exceeding design mix proportions, and amount of water added at site and initials of person adding water. Retain tickets until substantial completion unless directed otherwise.

1.8 NATIONAL VOLATILE ORGANIC COMPOUND (VOC) EMISSION STANDARDS

A. All products shall comply with the E.P.A. rulings establishing national V.O.C. emission standards for architectural coatings as listed in the Federal Register: September 11,1998 (Volume 63, Number 176), [Rules and Regulations] [Page 48848-48887].

PART 2 PRODUCTS

2.1 FORMWORK

A. Comply with requirements of Section 03 10 00.

2.2 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 03 20 00.

2.3 CONCRETE MATERIALS

A. Cement:
   1. Portland Cement: ASTM C150/C150M, Type I - Normal.
   2. Blended Hydraulic Cement: ASTM C595/C595M, Type IL - Portland-limestone.

B. Fine and Coarse Aggregates: ASTM C33/C33M.
   1. Maximum aggregate size as specified in mix design schedule.
   2. Alkali Silicate Reactivity: Expansion of fine aggregate tested per ASTM C1260 shall not exceed 0.15 percent. If fly ash or other pozzolans are used to reduce shrinkage to meet this requirement, expansion of fine aggregate tested per ASTM C1260 without fly ash or other pozzolans shall not exceed 0.25 percent.

C. Fly Ash: ASTM C618, Class C or F.

D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

E. Synthetic Micro Fiber Reinforcing: Fibrillated or Monofilament.
   1. Fibrillated Fibers: 100% virgin polyolefin (polypropylene or polyethylene), graded or minimum ¾" uniform length,, complying with ASTM D7508/D7508M for use in producing Type III Synthetic Fiber-Reinforced Concrete meeting the requirements of ASTM C1116/C1116M. Fibermesh 300: Propex Concrete Systems, Grace Fibers: W.R. Grace, Ultra-Net: Forta Fibers, or approved equal.
      a. Dosage: 1.5 lb per cubic yard.
   2. Monofilament Fibers: Complying with ASTM D7508/D7508M for use in producing Type III Synthetic Fiber-Reinforced Concrete meeting the requirements of ASTM C1116/C1116M.
      a. Minimum crack reduction ratio (CRR) of 80 percent when tested in accordance with ASTM C1579.
      b. Dosage: as recommended by manufacturer to meet CRR requirement.

F. Synthetic Macro Fiber Reinforcing: Polyolefin strands (polypropylene or polyethylene) complying with ASTM D7508/D7508M for use in producing Type III Synthetic Fiber-Reinforced Concrete meeting the requirements of ASTM C1116/C1116M. Fibermesh 650: Propex Concrete Systems, Strux 90/40: W.R. Grace, Tuf-Strand SF 2.00: Euclid Chemical Company, and approved equal.
   1. Minimum mean equivalent flexural residual strength (F_{e3}) per ASTM C1609/C1609M when using the roller support system described in ASTM C1812/C1812M:
      a. As indicated on drawings.

2. Blended synthetic macro fiber and micro fiber reinforcing with macro fibers meeting the above may be used. Novomesh 950: Propex Concrete Systems or Forta-Ferro: Forta Fibers.
3. Tested in concrete to meet requirements of ICC AC383. Tests for concrete over steel deck and fire-resistance only required for concrete used over steel deck.

2.4 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
B. Air Entrainment Admixture: ASTM C260/C260M.
C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
D. Accelerating Admixture: ASTM C494/C494M Type C.
E. Water Reducing Admixture: ASTM C494/C494M Type A.
F. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions.

2.5 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class A; maximum water vapor permeance 0.04 perm; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Include manufacturer's recommended joint sealing tape and mastic. Tape and mastic to have maximum permeance of 0.3 perm.
B. Granular fill under vapor retarder: Clean mixture of crushed aggregates and sand, ASTM D448, size 10, with 85-100% passing the No.4 sieve and 10-30% passing the No. 100 sieve. Meet requirements of ASTM C33/C33M for deleterious substance limits in fine aggregates.
C. Non-Shrink Grout: ASTM C1107/C1107M; Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Conformance to ASTM C1107/C1107M shall occur with a minimum temperature range of 45°F to 90°F, a fluid consistency, and a minimum 30 minute working time.

2.6 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
B. Epoxy Bonding System for non-composite (bonded) topping:
   1. Complying with ASTM C881/C881M and of Type required for specific application.
C. Slab Isolation Joint Filler: 1/4 inch thick, height equal to slab thickness, with removable top section forming 1/2 inch deep sealant pocket after removal.

2.7 CURING MATERIALS

A. All curing agents and sealers shall have no adverse effect on finishes, traffic topping, or other sealers. Coordinate with the appropriate finish manufacturer and receive written confirmation before applying.
B. Moisture-Retaining Cover: ASTM C171; regular curing paper, white curing paper, white polyethylene film at temperatures above 60 degrees F., black polyethylene film at temperatures below 80 degrees F., clear polyethylene, or white burlap-polyethylene sheet at temperatures above 60 degrees F.
C. Exterior Concrete Curing Compound: Wax base, membrane forming curing compound, ASTM C309, Type II, white pigmented.

2.8 CONCRETE MIX DESIGN REQUIREMENTS

A. Submit concrete mix design for each type of concrete at least 30 days prior to the proposed start of placement. Mix designs must be reviewed prior to pouring concrete. Review is for

conformance with specification requirements only. Contractor is responsible for performance.

B. Concrete shall conform to the requirements of ASTM C94/C94M (Option A) unless other requirements of this project specification are more stringent.

C. Provide concrete with workability such that it will fill the forms, without voids or honeycombs, when properly vibrated, without permitting materials to separate or excess water to collect on the surface.

D. Self-consolidating concrete may be used at Contractor's option where desired and shall be used where required for architectural finish or where necessary to achieve proper consolidation in locations of reinforcing congestion. Modify standard mixes as appropriate to achieve self-consolidating properties.

E. Slump at point of discharge: as specified by concrete supplier, 8"-11" for masonry grout. Include design slump in mix design submittal.
   1. Limit slump to 10”-11” for masonry grout to be used in lifts exceeding 5’-4” or use self-consolidating grout, coordinate with masonry contractor.

F. Flow for self-consolidating concrete: 20"-30".

G. Proportioning Normal Weight Concrete: ACI SPEC-301. Establish proportions based on the standard practices contained in ACI PRC-211.1.

H. Determine required average strength per ACI SPEC-301 .

I. Concrete Strength: Document that mixes produce required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301.
   1. For trial mixtures method, employ independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.

J. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.

K. Fiber Reinforcement: Add to mix where specified in the mix design schedule as recommended by manufacturer for specific project conditions but not less than the minimum rate show on drawings.

2.9 CONCRETE MIX DESIGN SCHEDULE

A. Normal Weight Concrete: Footings
   1. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,000 psi.
   2. Water-Cement Ratio: Maximum 0.62 by weight.
   3. Maximum Aggregate Size: 1 1/2" Class 1S.
   4. Maximum Chloride Ion Content: 0.30 percent by weight of cement.

B. Normal Weight Concrete: Walls not exposed to view, piers or columns integral with those walls, and isolated below grade piers
   1. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 psi.
   2. Water-Cement Ratio: Maximum 0.52 by weight.
   3. Maximum Aggregate Size: 3/4" Class 1S.
   4. Maximum Chloride Ion Content: 0.30 percent by weight of cement.

C. Normal Weight Concrete: Walls exposed to view and piers or columns integral with those walls
   1. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 psi.
   2. Water-Cement Ratio: Maximum 0.52 by weight.

3. Maximum Aggregate Size: 3/4" Class 1S, well graded to achieve shrinkage limits specified.
4. Maximum 28-day shrinkage per ASTM C157/C157M: 0.05 percent.
5. Maximum Chloride Ion Content: 0.30 percent by weight of cement.

D. Normal Weight Concrete: Freestanding columns
1. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 5,000 psi.
2. Water-Cement Ratio: Maximum 0.50 by weight.
3. Maximum Aggregate Size: 3/4" Class 1S.
4. Maximum Chloride Ion Content: 1.00 percent by weight of cement.

E. Normal Weight Concrete: Exterior Concrete
1. Exterior concrete includes: exterior aprons and stoop slabs, slabs at overhead doors and loading docks, exterior walls, piers, and columns, and other similar conditions.
2. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 5,000 psi.
3. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.
4. Synthetic Micro Fiber Reinforcement: Required at slabs only.
5. Water-Cement Ratio: Maximum 0.40 by weight.
6. Total Air Content: 3.5 percent to 6.5 percent.
7. Maximum Aggregate Size: 3/4" Class 5S.
8. Maximum Chloride Ion Content: 0.15 percent by weight of cement.

F. Normal Weight Concrete: Slabs on grade
1. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 psi.
2. Synthetic Micro Fiber Reinforcement.
3. Water-Cement Ratio: Maximum 0.45 by weight.
4. Maximum Aggregate Size: 3/4" Class 2S, well graded to achieve shrinkage limits specified.
5. Maximum 28-day shrinkage per ASTM C157/C157M: 0.05 percent.
6. Maximum Chloride Ion Content: 0.30 percent by weight of cement.

G. Normal Weight Concrete: Slabs on grade without joints
1. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 psi.
2. Synthetic Macro Fiber Reinforcement.
3. Water-Cement Ratio: Maximum 0.45 by weight.
4. Maximum Aggregate Size: 1 1/4" Class 2S, well graded to achieve shrinkage limits specified.
5. Maximum 28-day shrinkage per ASTM C157/C157M: 0.04 percent.
6. Maximum Chloride Ion Content: 0.30 percent by weight of cement.

H. Normal Weight Concrete: Concrete slab on steel deck
1. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,500 psi.
2. Fiber Reinforcing: Reinforce with one of the below. Provide minimum dosage as shown on drawings.
    a. Synthetic Macro Fiber Reinforcement.
3. Water-Cement Ratio: Maximum 0.45 by weight.
4. Maximum Aggregate Size: 3/4" Class 4S, well graded to achieve shrinkage limits specified.

5. Maximum 28-day shrinkage per ASTM C157/C157M: 0.05 percent.
6. Maximum Chloride Ion Content: 0.15 percent by weight of cement.

I. Normal Weight Concrete: Topping and Fill for Steel Pan Stairs
1. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,000 psi.
2. Synthetic Macro Fiber Reinforcement.
3. Water-Cement Ratio: Maximum 0.50 by weight.
4. Maximum Aggregate Size: 3/8" Class 2S, well graded to achieve shrinkage limits specified, not to exceed 1/3 of the minimum actual topping thickness.
5. Maximum 28-day shrinkage per ASTM C157/C157M: 0.05 percent, topping slabs only.
6. Maximum Chloride Ion Content: 0.15 percent by weight of cement.

J. Normal Weight Concrete: Topping at Storm Shelter
1. Minimum Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 psi.
2. Water-Cement Ratio: Maximum 0.45 by weight.
3. Maximum Aggregate Size: 3/4" Class 4S, well graded to achieve shrinkage limits specified.
4. Maximum 28-day shrinkage per ASTM C157/C157M: 0.05 percent.
5. Maximum Chloride Ion Content: 0.15 percent by weight of cement.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 PREPARATION

A. Verify that anchors, seats, plates, embeds, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement. “Wet sticking” of structural steel embeds and anchor rods is not permitted.

B. Do not embed pipes other than non-aluminum electrical conduit or snow melting pipes in any structural concrete.
1. Any pipes embedded in concrete, even those meeting the guidelines given herein, are subject to acceptance by Architect. Remove any unacceptable pipes.
2. Outside diameter of pipes placed in slabs and walls shall not exceed 25 percent of the thickness of the slab or wall and shall be placed in groups of not more than 3. Space pipes within a group at not less than 4 diameters clear. Space groups of pipes at not less than 48 diameters clear.
3. Maximum total dimension or area of pipes and their fittings embedded in concrete beams and columns shall not exceed, at any location, 15 percent of least section dimension or 4 percent of the gross cross sectional area.

C. Where new concrete is to be bonded to existing or previously placed concrete, clean existing surface to remove dust, dirt, grease, oil, curing compounds and other items that would be detrimental to bonding. Saturate existing surface with clean water (8 hours minimum), remove excess water, and slush with a neat cement grout immediately before placing new concrete.

D. Protect existing concrete work to be exposed to view and other finished materials from damage and staining resulting from concreting operations. Cover sills, ledges and other surfaces with protective coverings to protect the work.

E. Slabs on Grade:
1. Verify subgrade compaction tests have been performed and are accepted.

2. Verify subgrade is level and within acceptable tolerances.
3. Verify subgrade is substantially dry with no freestanding water, muddy spots, or soft spots and is free from snow or ice.
4. Verify completion of all underfloor mechanical and electrical work.
5. Provide 3 inch minimum cover bottom and 3 inch minimum cover sides at electrical conduits and other embedded items.
6. Lay vapor retarder directly below slab per ASTM E1643 and manufacturer's written instructions for interior slabs on grade. Lap joints 6" minimum and seal. Provide boots and seal at all penetrations. Adhere to perimeter walls. Repair damaged vapor barrier prior to placing slab on grade.

3.3 NON-COMPOSITE (BONDED) TOPPING

A. Clean existing surface to remove dust, dirt, grease, oil, curing compounds and other items that would be detrimental to bonding.
B. Provide one of the following:
   1. Saturate existing surface with clean water (8 hours minimum), remove excess water; OR
   2. Apply bonding agent in accordance with manufacturer's instructions.

3.4 COMPOSITE (BONDED) TOPPING

A. Prior to placing topping, roughen substrate concrete surface and remove deleterious material by sandblasting or shotblasting. Broom and vacuum clean. After cleaning, blow surface with oil-free compressed air.
B. Pre-wet surface to saturate the concrete and keep continuously wet for a minimum of 8 hours prior to topping slab placement. Remove any standing water.
C. Apply bonding agent to substrate in accordance with manufacturer's instructions.
D. Place concrete toppings to required lines and levels.
E. Screed toppings level and finish to tolerance specified for floor finish.

3.5 CONCRETE MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.
B. Use cooled or heated water in accordance with ACI PRC-306 and ACI PRC-305.
C. Air-entraining and chemical admixtures, if approved, shall be charged into mixer as a solution and dispensed by an automatic dispenser or similar metering device. Powdered admixtures shall be weighted or measured by volume as recommended by the manufacturer. Superplasticizer may be added at the job site to maintain slump.
D. Two or more admixtures may be used in same concrete, provided such admixtures are added separately during batching sequence. Admixtures used in combination shall retain full efficiency and have no deleterious effect on concrete or on properties of each other.
E. For fiber reinforced concrete, introduce fibers to mix when recommended by fiber supplier to maximize disbursement through the mix and to minimize balling of fibers.
F. Ready mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities. Schedule and dispatch trucks from the batching point so that they shall arrive at the site of the work just before the concrete is required to avoid excessive mixing of concrete while waiting.
G. Discharge at the site shall begin within one (1) hour after charging. Concrete may be used as long as it is of such slump that it can be placed and properly consolidated without the addition of water to the batch (other than water added prior to the start of discharge as given below). If elapsed time since batching exceeds 90 minutes, or if drum has revolved more than 300 revolutions since batching, test air content, slump, and temperature for conformance to this specification prior to placing. In no case shall the time between

batching and complete discharge exceed 120 minutes. Do not permit retempering of concrete. Discard concrete that has obtained its initial set.

H. Do not add water after the initial introduction of the mixing water for the batch, except at the start of discharge, subject to the conditions below. In this case, the producer may add water in an amount not exceeding that allowed to achieve the design water/cement ratio. The drum blades shall then be turned an additional 30 revolutions minimum at mixing speed. Water shall not be added to the batch at any later time. Reject concrete if water is added and these conditions are not met.
   1. The measured slump of the concrete is less than that specified in the mix design.
   2. No more than 60 minutes have elapsed from the time of batching.
   3. The ready-mix plant is notified and approves.
   4. Truck tickets indicate maximum amount of water to be added.
   5. Water is added in a manner to control volume.
   6. Special Inspector is notified, if concrete placement requires inspection.

I. Maximum concrete temperature delivered to Project site shall be 85°F.

J. To use materials other than those accepted originally, or if the materials from the source originally accepted change in characteristics, make additional tests with proposed new materials that will verify production of concrete meeting with the stated requirements without causing objectionable change in the color or appearance of the structure. Pay the testing agency for these additional tests. Do not use concrete made from such different materials until the Architect has given his approval.

K. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished by the Vendor, the Architect may order such changes in the proportions or materials, or both, to secure the desired properties, subject to the stated requirements. Make any changes so ordered without extra compensation.

3.6 PLACING CONCRETE

A. Place concrete in accordance with ACI SPEC-301. Follow recommended practice of ACI PRC-304.

B. Place concrete for floor slabs following recommended practices of ACI PRC-302.1.

C. Do not place in rain, sleet or snow unless exposed concrete surface is protected from moisture.

D. Ensure reinforcement, inserts, and embedded parts will not be disturbed during concrete placement.

E. If, for any reason, the concrete pour is delayed for more than 45 minutes, bulkhead pour at last acceptable construction joint. Immediately remove excess concrete and clean all forms and in situ concrete surfaces.

F. Do not permit concrete to drop more than 4 feet from its point of release to mixers, hoppers, or conveyances. Use tremmies, chutes, or pumps to limit drop when placing columns and walls.

G. Deposit concrete in wall forms in layers not greater than 24 inches in depth. Consolidate each layer before the succeeding layer is placed.

H. Place concrete as near as possible to its final position to prevent segregation. Do not use vibrators to transport concrete.

I. Do not interrupt successive placement; do not permit cold joints to occur.

J. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

K. Immediately remove concrete spilled on existing surfaces.

L. Concrete at tops of forms: Strike concrete at top of wall, footing, and pier forms. Smooth and float to texture comparable to adjacent formed surfaces.

M. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.7 JOINTS

A. Vertical construction joints in walls shall be a maximum of 80 feet on center and shall be located as shown on structural drawings. Vertical control joints in wall shall be a maximum of 20 feet on center between construction joints and shall be located as shown on the structural drawings. If locations are not shown, locate joints at edges of piers integral with wall and near corners and in concealed locations where possible.

B. Locate construction joints for beams, slabs, joists and girders in the middle 1/3 of the span. Place so they do not compromise the strength of the structure. Offset joints in a girder at least twice the beam width from a beam-girder intersection.

C. Horizontal joints in walls and columns shall be at underside of slabs, beams and girders and at top of footings. At least 24 hours shall elapse between placing concrete in a wall or column and placing concrete in an area supported by the wall or column.

D. Reinforcing shall be continuous across construction joints. Provide dowels where detailed or requested. Joints in walls shall be keyed with longitudinal keys at least 1-1/2 inches deep unless detailed otherwise.

3.8 SLAB JOINTING

A. Locate slab on grade construction and control joints as given on Drawings and submit drawings showing proposed locations. Cut joints as soon as concrete has hardened sufficiently to prevent aggregate dislodgement. Use a "Soff Cut" saw to cut to a depth of 1 1/4" immediately after final finishing. Use a conventional saw to cut to a depth of one-fourth the slab thickness or as shown on the drawings. Complete sawing within 12 hours of placement.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

3.9 CONSOLIDATION

A. Consolidation of concrete shall conform to ACI SPEC-301, unless modified herein.

B. Follow recommended practices of ACI PRC-309, unless modified herein.

C. Consolidate concrete using internal vibrators.

D. Maintain a spare vibrator at the Project Site during all placing operations.

3.10 CONCRETE FINISHING

A. Concrete Finish Schedule

1. Concealed walls, columns, beams, and slabs: Surface finish - 1.0 (SF-1.0).
2. Exposed walls, columns, beams, and wall caps: Surface finish - 2.0 (SF-2.0).
3. Exposed interior concrete floors and floors to receive carpeting: Troweled finish.
4. Exterior platforms, aprons, ramps, loading docks, and garage slabs: Broom finish.

B. Formed Surfaces

1. Repair surface defects, immediately after removing formwork.
2. Provide finishes per ACI SPEC-301 as scheduled and to the following tolerances.
3. SF-1.0: Surface finish 1.0 per ACI SPEC-301. Rub down or chip off fins or other raised areas 1 inch or more in height. Class C surface tolerance per ACI SPEC-117.

4. SF-2.0: Surface finish 2.0 per ACI SPEC-301. Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Class B surface tolerance per ACI SPEC-117.

C. Unformed Surfaces
1. Provide finishes per ACI SPEC-301 as scheduled herein or noted on Drawings and to the following tolerances.
a. Troweled Finish: Moderately flat tolerance per ACI SPEC-117. Slope slab to floor drains.
b. Broom Finish: Moderately flat tolerance per ACI SPEC-117.
2. Clean exposed concrete to remove laitance, efflorescence and stains.

3.11 CURING AND PROTECTION

A. Comply with requirements of ACI PRC-308 as amended by this section. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature above 55° F for the period necessary for hydration of cement and hardening of concrete as follows:
1. Normal concrete: Not less than seven days.

C. Curing may be terminated earlier than the minimum time above if at least one of the following conditions is met:
1. At least (4) 6x12-inch or (5) 4x8-inch field cylinders for each pour, prepared and cured according to ASTM C31/C31M alongside the concrete they represent, reach 70% of the specified 28-day strength.
2. The concrete temperature is maintained above 50°F and laboratory cylinders reach 85% of the specified 28-day strength.

D. Formed Surfaces: Cure by moist curing with forms in place for full curing period. If forms are removed during the curing period, cure by one of the methods specified for unformed surfaces.
1. Keep steel forms heated by the sun and all wood forms wet during the curing period.

E. Unformed Surfaces: Apply curing materials as soon as finishing operations are complete and the concrete's sufficiently hard to be undamaged by the curing process.
1. Waterproof paper or polyethylene film: Use appropriate color of film based on ambient temperature. Sprinkle concrete with water as necessary during application of covering. Lap edges and ends at least 6 inches, and seal laps. Weight down covering to prevent movement. Patch holes and tears that occur during the curing period.
2. Curing Compounds: Apply strictly according to the manufacturer's instructions using low pressure spray equipment.
3. Use the following methods:
a. Interior surfaces receiving adhesive applied finishes: Cure using wet curing methods or by covering with waterproof paper or polyethylene film.
b. Exterior concrete: Cure using exterior concrete curing compound.
c. Composite (bonded) topping: Cure with moisture cover curing material. Maintain curing for full seven days. Early termination is not permitted.
d. All other unformed surfaces: Cure using a strippable curing compound, by wet curing methods, or by covering with waterproof paper or polyethylene film.
4. Protect concrete from excessive changes in temperature during the curing period and at the termination of the curing process. Changes in the temperature of the concrete shall be as uniform as possible and shall not exceed 5° F in any one hour or 50° F in any 24 hour period.

3.12 HOT WEATHER CONCRETING

A. Apply recommended practices of ACI PRC-305 when wind, temperature and humidity conditions cause evaporation rates (using Figure 2.1.5 of ACI PRC-305) exceeding the following:
   1. 0.2 lb/sq ft/hr for concrete with Portland cement only.
   2. 0.1 lb/sq ft/hr for concrete with Portland cement and fly ash.
   3. 0.05 lb/sq ft/hr for concrete with Portland cement and silica fume.

B. Determine and document expected evaporation rate for the duration of concrete pour.

C. Wet or fog forms and reinforcing immediately prior to placement to bring temperature to ambient conditions.

D. Maintain surface moisture during the period immediately after placement and before final finishing by using wind breaks, fog sprayers, evaporation retarders, or shade (individually or in combination) to prevent plastic shrinkage cracking.
   1. Use evaporation retarders according to manufacturer's instructions. Do not use as a finishing aid.

3.13 COLD WEATHER CONCRETING

A. Concrete placed during cold weather shall conform to the requirements of ACI PRC-306.

B. Cold weather is defined as 3 or more successive days when the average daily outdoor temperature is less than 40°F.

C. All surfaces, including subgrade and reinforcing larger than a #8 bar shall be above 35°F prior to placing concrete. All reinforcing bars #8 and smaller shall be above 10°F prior to placing concrete. Surfaces shall not be more than 10° warmer than the minimum concrete temperatures required by ACI PRC-306.

D. Maintain cold weather protection for the following duration but not less than the duration specified in "Curing and Protection" above:
   1. Maintain protection for a minimum of 48 hours after placement of concrete.
   2. Maintain protection for columns and supported slabs until at least 4 field cylinders, prepared and cured in accordance with ASTM C31/C31M, reach 85 percent of the specified 28-day strength, or, laboratory cured cylinders reach the specified 28-day strength.

E. Submit detailed procedures for cold weather concreting for engineer's information only.

F. Follow recommended practices of ACI PRC-306. Subject to other requirements of this section, a non-chloride accelerator may be used to normalize initial set and for early strength gain.

3.14 FIELD QUALITY CONTROL

A. Provide free access to concrete operations at project site and cooperate with appointed firm.

B. Structural Testing and Special Inspection
   1. Structural Testing and Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provisions of Section 01 45 33.
   2. Personnel Qualifications
      a. Testing Technician: Technical I - ACI Certified Concrete Field Testing Technician, Grade I, employed by a testing laboratory with C.C.R.L. certification at the National Bureau of Standards, under the direct supervision of a licensed civil/structural engineer. The licensed engineer shall review and approve all reports.
      b. Special Inspector – Structural I: ICC Certified Concrete Inspector, ACI Concrete Construction Inspector, or a graduate civil/structural engineer, or other personnel acceptable to the Structural Engineer of Record (SER), with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a licensed structural engineer, as

defined in Section 01 45 33. The licensed engineer shall review and approve all inspection reports.

3. The Owner will provide the following tests and inspections:
   a. Tests for cast in place concrete. Qualifications: Technical I.
      1) Compression test specimens: ASTM C31/C31M. One set of four 6x12-inch standard cylinders or five 4x8-inch cylinders of concrete for each compressive strength test. Mold and store cylinders for laboratory cured specimens.
      2) Compressive strength tests: ASTM C39/C39M . Minimum one strength test for each day's pour, or one strength test for each 150 cubic yards placed. For slabs and walls, no less than one strength test for every 5,000 square feet. A strength test shall be defined as one set of five cylinders, subdivided as follows: One specimen tested at 7 days for information, three at 28 days for acceptance, and one specimen retained in reserve for later testing if required. When frequency of testing will provide less than five strength tests for a given class of concrete, conduct at least five strength tests from randomly selected batches. If fewer than five batches are used, conduct one test from each batch. A class of concrete is defined as an individual concrete mix design. A batch of concrete is defined as an individual proportion of concrete used in construction (e.g., a single truck load).
      3) Slump: ASTM C143/C143M. One test at point of discharge for each set of compression test specimens; additional tests when concrete consistency appears to have changed.
      4) Air entrainment: ASTM C231/C231M, or ASTM C173/C173M where C231 cannot be used. Test the first batch of air entrained concrete and one additional test for each set of compression test specimens.
      5) Concrete temperature: ASTM C1064/1064M. Test hourly when air temperature is below 40°F or above 80°F and each time a set of compression test specimens is made.
   b. Concrete mix verification. Qualifications: Technical I. Verify the following:
      1) Mixer truck trip ticket conforms to approved mix design.
      2) Total water added to mix on site does not exceed that allowed by concrete mix design.
      3) Concrete quality is indicative of adequate mixing time, consistency, and relevant time limits.
   c. Observe preparation for and placement of all concrete, excluding slabs on grade, strip footings without transverse reinforcement, isolated spread footings, and unbonded topping slabs. No exclusions apply at storm shelter(s). Additional exclusions may be noted on the structural drawings. Special Inspector must be present during entire concrete pour. Qualifications: Structural I. Verify the following:
      1) Acceptable general condition of concrete base prior to placement.
      2) Proper surface preparation at bonded topping slabs.
      3) Concrete conveyance and depositing avoids segregation and contamination.
      4) Concrete is properly consolidated.
      5) Reinforcement remains at proper location.
   d. Observe protection and curing methods for all concrete, excluding slabs on grade, strip footings without transverse reinforcement, isolated spread footings, and unbonded topping slabs. No exclusions apply at storm shelter(s). Additional exclusions may be noted on the structural drawings. Observations to be made periodically during the curing period. Qualifications: Structural I. Verify the following:
      1) Specified curing procedures are followed.
      2) Specified hot and cold weather procedures are followed.

e. Observe all bolts, rods and structural steel embeds installed in concrete. Qualifications: Structural I. Verify the following:
   1) Specified size, type, spacing, configuration, embedment, and quantity.
   2) Proper concrete placement and consolidation around all bolts, rods and structural steel embeds.

C. Contractor Requirements:
   1. Provide services of an independent laboratory to perform the following:
      a. Make and test additional cylinders to determine time for form removal.
      b. Make and test additional cylinders to determine termination of curing procedures.
      c. Make and test additional cylinders to determine termination of cold weather practices.
   2. Provide the services of a qualified technical representative to instruct the construction team in proper batching, mixing, placement, and finishing of fiber reinforced concrete.

3.15 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Engineer and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Acceptance criteria for concrete strength tests shall be as outlined in section 26.12 of ACI 318. If concrete does not meet acceptance criteria, investigation generally following the provisions of section 26.12.4 of ACI 318 will be used at the discretion of the Structural Engineer of Record. Contractor shall reimburse Owner for all costs associated with this investigation. If, in the judgment of the Structural Engineer of Record, the structural adequacy cannot be shown by this investigation, the Contractor shall remove and replace the concrete in question.

3.16 CLEAN-UP

A. Perform concrete washout only in designated area as indicated by either Division 31 section Erosion Control or the project NPDES permit.

END OF SECTION

SECTION 03 41 00 - PRECAST STRUCTURAL CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Wall panels
B. Roof double tees.
C. Wall panels with integral insulation.
D. Grout packing.

1.3 RELATED SECTIONS

A. Section 01 45 33 - Structural Testing and Special Inspection
B. Section 03 20 00 - Concrete Reinforcing
C. Section 03 15 10 - Post-Installed Anchors
D. Section 03 41 13 - Precast Concrete Planks

1.4 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
B. AASHTO - Standard Specifications for Highway Bridges, Sixteenth Edition, 1996, including 1997-2000 revisions.
C. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; 2010 (Errata 2012).
D. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
F. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 2002
G. ASTM A416/A416M - Standard Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete; 2018.
H. ASTM A496 - Steel Welded Wire Reinforcement, Deformed, for Concrete; 2002
I. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
J. ASTM 706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement; 2014
K. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
L. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
M. ASTM B766 - Electrodeposited Coatings of Cadmium; 2003.
N. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
O. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements; 2021.
P. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2023, with Editorial Revision.
Q. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.
R. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
S. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.

T. ASTM C881 - Epoxy-Resin-Base Bonding Systems for Concrete; 2002
U. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023.
V. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
W. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).
X. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.
Y. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
Z. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters; 2020.
AA. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products; 2021.
BB. PCI MNL-120 - PCI Design Handbook; 2017, with Errata (2021).
CC. PCI MNL-123 - Connections Manual: Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988.
DD. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.
EE. Minnesota State Building Code (MSBC) - 2020
FF. International Building Code (IBC) - 2018

1.5 DESIGN REQUIREMENTS

A. Conform to ACI 318 and MSBC for design load and construction requirements applicable to work of this section.
B. Design components to withstand dead loads and design loads in the configuration indicated on the drawings and as follows:
    1. Maximum Allowable Deflection of Roof Assemblies:
        a. Live Load Deflection: 1/240 span.
        b. Total Load Deflection: 1/180 span.
    2. Calculate structural properties of framing members in accordance with ACI 318.
C. Design system to accommodate construction tolerances, deflection of other building structural members and clearances of intended openings.

1.6 SUBMITTALS

A. See Division 1 for submittal procedures.
B. Shop Drawings
    1. Erection drawings: Include member piece marks with size and shape of each member; plans/elevations showing all products furnished by supplier; sections/details showing connections and cast in items; joints and openings between members and structure; description of all loose cast-in field hardware; locations of field installed anchors, fire ratings of all members; and all dead, live and other applicable design loads.
    2. Include anticipated camber and deflection of precast members where camber or deflection exceeds L/360 or 1/2", and where camber and deflection vary more than 1/4" between adjacent units.
    3. Production drawings on request. Include elevation view of each member, sections/details to show quantity and position of reinforcing, anchors, and inserts, handling devices, dimensions and finished, strand prestress, concrete strength, and estimated camber.
    4. If shop drawings are resubmitted after the original review, identify all changes made to the shop drawings after the original submittal with clouds or similar markings.

C. Design Data: Submit design data reports indicating calculations for loadings and stresses of fabricated, designed framing.

D. Integrally Insulated Panel System Manufacturer's Installation Instructions: Submit manufacturer's current installation instructions for system specified. Certify that copies are available at fabrication site prior to start of precast fabrication

E. Welders' Qualification Statement: Submit to Special Inspector welders' qualifications in accordance with AWS B2.1/B2.1M.

F. Calculations
   1. Submit calculations for headers and connections.
   2. Submit calculations for storm shelter.
   3. Review of calculations shall be for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor remains responsible for correctness and completeness of submitted calculations.
   4. Calculations to be certified by a professional engineer licensed in the State in which the Project is located.

G. Provide minimum 1' x 1' sample of wall panel in each finish specified. Provide two samples per color for review. Continue submittals until accepted by the Architect.

H. Provide samples for each brick unit required, shoring the full range of color and texture expected. Supply sketch of each corner or special shape with dimensions. Supply sample showing color and texture of joint treatment.

I. Precast plant certification on request.

1.7 QUALITY ASSURANCE

A. Designer Qualifications: Design precast concrete members under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State in which the Project is located.

B. The precast concrete manufacturing plant shall be certified by the Precast/Prestressed Concrete Institute, Plant Certification Program, in categories C3A and C4A, at the time of bidding.

C. Perform work of this section in accordance with requirements of PCI MNL-116, PCI MNL-120, PCI MNL-123, and PCI MNL-135.

D. Fabricator Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of experience.

E. Erector Qualifications: Company specializing in erecting products of this section with not less than 5 years experience.

F. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.4/D1.4M.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Handle precast members in position consistent with their shape and design. Lift and support only from support points.

B. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.

C. Protect members to prevent staining, chipping, or spalling of concrete.

D. Mark each member with date of production and final position in structure.

E. Storage:
   1. Store all units off ground. Place stored units so the identification marks are discernible.
   2. Separate stacked members by battens across full width of each bearing points.

3. Stack so that lifting devices are accessible and undamaged. Do not use upper member of stacked tier as storage area for shorter member or heavy equipment.

1.9 PROJECT CONDITIONS

A. Coordinate the work of framing components not pre-tensioned but associated with the work of this section.

PART 2 PRODUCTS

2.1 PRECAST UNITS

A. Precast Structural Concrete Units: Comply with PCI MNL-116, PCI MNL-120, PCI MNL-123, PCI MNL-135, ACI 318 and applicable codes.
   1. Precast walls used for storm shelter walls shall have a maximum gap between panels of 3/8" or less. Joints shall be sealed with joint material complying with ASTM C920. The precast supplier may provide joints greater than 3/8" if protection of joints is provided with products/installation techniques complying with Section 305 of ICC 500. Testing and documentation shall be submitted to the architect, EOR, and code official at the expense of the precast supplier.
   2. Precast supplier shall coordinate design, location, and detailing of embeds in wall panels to facilitate doors, windows, MEP openings, and associated protection/baffling of openings at storm shelters.

2.2 MATERIALS

A. Cement: Gray, Portland type complying with ASTM C150/C150M, Type I, or Blended Hydraulic type complying with ASTM C595/C595M, Type IL.

B. Aggregate, Sand, Water, Admixtures: Determined by precast fabricator as appropriate to design requirements and PCI MNL-116.

C. Fly ash: ASTM C618, type C or F. Use only on precast members not exposed to view with Architect/Engineer's approval.

2.3 REINFORCEMENT

A. Tensioning Steel Tendons: ASTM A416/A416M, Grade 250 (1725); seven-wire stranded steel cable; low-relaxation type; full length without splices; uncoated.

B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Deformed billet-steel bars.

C. Steel Welded Wire Reinforcement: ASTM A1064/A1064M plain type or deformed type; in flat sheets; unfinished.

2.4 INSULATION

A. Integral Insulation: As recommended by manufacturer to have a continuous insulation R-Value of 5.4/inch or greater in 3" thickness.

2.5 FABRICATION

A. Comply with fabrication procedures specified in PCI MNL-116.

B. Maintain plant records and quality control program during production of precast members. Make records available upon request.

C. Ensure reinforcing steel, strands, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on Drawings. Keep strands or wires clean of substances harmful to bonding of strand to concrete.

D. Tension reinforcement tendons as required to achieve design load criteria.

E. Provide required openings with a dimension larger than 8 inches and embed accessories provided under other sections of the specifications, at indicated locations.

F. Exposed Ends at Stressing Tendons: Fill recess with non-shrink grout, trowel flush.

G. Integrally Insulated Panel System: Comply with manufacturer's written installation instructions.
H. Provide AWS certified welders for all shop welding.
I. Wall Panels:
   1. Exterior: Provide reveal recesses and joints as shown on the Drawings. See Drawings for color and texture.
   2. When openings in precast panels are shown on drawings, provide color and finish throughout depth of panel at all sides of opening as indicated.
   3. It is required that the wall panel manufacturer coordinate electrical device location rough-in with Electrical Contractor to be recessed in the wall panel.
   4. Review all architectural, mechanical and electrical plans for required penetrations of the wall panels. Coordinate with the electrical and mechanical contractor as required.
J. Panel Identification:
   1. Mark each precast panel to correspond to identification mark on shop drawings for panel location.
   2. Mark each precast panel with date cast.

2.6 FABRICATION TOLERANCES

A. Comply with fabrication tolerances specified in PCI MNL-135.

2.7 FINISHES

A. Ensure exposed-to-view finish surfaces of precast concrete members are uniform in color and appearance.
B. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
C. Finish members to PCI MNL-116 Standard grade.
   1. On the exterior face, provide acid etched, sandblast, or thin brick finishes as noted and detailed on Architectural Drawings. Provide reveals in locations and sizes as shown.
D. Wall Panel Finish Color Mix:
   1. Sandblasted Precast
      a. Texture: Sandblasted
      b. Color: Buff/Tan
      c. Concrete Color: White
      d. Exposure: Medium/Deep
      e. Fine Aggregate: White Silica Sand
      f. Course Aggregate: 1/2 to 1/4 gray limestone
      g. Pigment: Buff
   2. Acid Etch Precast
      a. Texture: Acid Etch
      b. Color: Buff/Tan
      c. Concrete Color: White
      d. Exposure: Light
      e. Fine Aggregate: White Silica Sand
      f. Course Aggregate: 1/2 to 1/4 gray limestone
      g. Pigment: Buff
   3. Thin Brick
      a. Manufacturer: Hebron
      b. Color: Onyx Ironspot
      c. Texture: Velour
      d. Size: Modular

2.8 ACCESSORIES

A. Connecting and Supporting Devices; Anchors and Inserts: Plates, angles, items cast into concrete, and inserts complying with PCI MNL-123 and as follows:
   1. Material: Carbon steel complying with ASTM A36/A36M.
   2. Finish: Prime painted, except where device surfaces will be in contact with concrete or will require field welding.
   3. Anchor Bolts: ASTM F1554
   4. Welded headed studs: AWS D1.1/D1.1M - Type B
   5. Deformed bar anchors: ASTM A496
   6. Welding electrodes: E70XX

B. Grout:
   1. Non-shrink, non-metallic, minimum compressive strength of 5,000 psi at 28 days.
   2. Epoxy-Resin Grout: Two components mineral-filled epoxy-resin: ASTM C881/C881M.

C. Bearing Pads
   1. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. Surface hardness of 70 to 90 Shore A durometer. Capable of supporting a compressive stress of 3000 psi (20.7 MPa) with no cracking, splitting or delaminating in the internal portions of the pad. Masticord: JVI (www.jvi-inc.com) or approved equal.
   2. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, 50 to 70 Shore A durometer per ASTM D2240, minimum tensile strength 2250 psi per ASTM D412 .

D. Bolts, Nuts and Washers: High strength steel type recommended for structural steel joints.

E. Post-installed anchors and reinforcing: See Section 03 15 10 - Post-Installed Anchors.

F. Prime Paint: Zinc rich alkyd type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that site conditions are ready to receive work and field measurements are as indicated on shop drawings.

B. Verify that supporting structure is ready to receive work, including all bearing surfaces, location and alignment of inserts and anchorage items cast in the structure.

C. Notify the General Contractor in writing of required corrections, if unsatisfactory conditions or deficiencies are observed. Do not begin work until corrections are made

3.2 ERECTION

A. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.

B. Align and maintain uniform horizontal and vertical joints, as erection progresses.

C. Maintain temporary bracing in place until final support is provided. Protect members from staining.

D. Provide temporary lateral support to prevent bowing, twisting, or warping of members.

E. Adjust differential camber between precast members to tolerance before final attachment.

F. Install bearing pads.

G. Level differential elevation of adjoining horizontal members with grout to maximum slope of 1:12.

H. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers.

I. Grout underside of column bearing plates.

J. Secure units in place. Perform welding in accordance with AWS D1.1/D1.1M and AWS D1.4/D1.4M.

K. Cooperate with other trades in permitting insertion of anchors, hangers, electrical outlets, etc.

L. Remove erection devices or cut off flush with the surface of the member.

3.3 TOLERANCES

A. Erect members level and plumb within allowable tolerances.

B. Comply with PCI MNL-135 for erection tolerances.

C. When members cannot be adjusted to comply with design or tolerance criteria, cease work and advise Engineer. Execute modifications as directed.

3.4 FIELD OPENINGS AND ANCHORS BY OTHER TRADES

A. Field cut openings smaller than 8" in all directions using power saws or core drills. Receive written approval of opening locations by the precast prestressed manufacturer and Architect before cutting. Repair all unsightly spalls or chips caused by cutting.

B. Receive approval of type and location of field installed fasteners from precast prestressed manufacturer and Architect. Anchors shall not contact prestressing steel.

3.5 FIELD QUALITY CONTROL

A. Structural Testing and Special Inspection

1. Structural Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provision of Section 01 45 33 - Structural Testing and Special Inspection. Comply with the requirements of Section 05 12 00 - Structural Steel Framing.
2. Personnel Qualifications
    a. Special Inspector – Structural I: Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in design of structural systems of the project type. Inspections shall be performed under the direct supervision of a licensed structural engineer, as defined in Section 01 45 33 - Structural Testing and Special Inspection. The licensed engineer shall review and approve all inspection reports.
    b. Individuals performing welding inspection must be AWS certified.
3. The Owner will employ a Special Inspector for the following:
    a. Visually inspect welds connecting embeds to structural steel supporting members. Comply with the requirements of Section 05 12 00 - Structural Steel Framing.
    b. Visually inspect welds at all connections between precast members. Comply with the requirements of Section 05 12 00 - Structural Steel Framing.
    c. Detail Compatibility: On a periodic basis, inspect the following to verify member orientation, configuration, type, and size comply with details indicated on the contract documents and shop drawings. Qualifications: Structural I.
        1) Proper applications of joint details and conditions. Observations need not exceed 25% at standard connections.
        2) Other work critical to the integrity of the building structure.

3.6 PROTECTION

A. Protect members from damage caused by field welding or erection operations.

3.7 CLEANING

A. Clean weld marks, dirt, or blemishes from surface of exposed members.

B. Clean and prime exposed steel and welds immediately after erection.

END OF SECTION

SECTION 03 41 13 - PRECAST CONCRETE PLANKS

PART 1 GENERAL

1.1 CONTRACT CONDITIONS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Precast floor and roof planks.
B. Connection plates with brackets and hangers, steel headers.
C. Grouting plank joint keys.

1.3 RELATED REQUIREMENTS

A. Section 01 45 33 - Structural Testing and Special Inspection
B. Section 03 20 00 - Concrete Reinforcing
C. Section 03 30 00 - Cast-in-Place Concrete

1.4 REFERENCE STANDARDS

A. ACI 301 - Specifications for Concrete Construction; 2020.
B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
D. ASTM A416/A416M - Standard Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete; 2018.
E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
F. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.
G. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2002
H. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
J. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).
K. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products; 2021.
L. PCI MNL-120 - PCI Design Handbook; 2017, with Errata (2021).
M. PCI MNL-123 - Connections Manual: Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988.
N. PCI MNL-126 - PCI Manual for the Design of Hollow Core Slabs and Walls; 2015.
O. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.
P. Minnesota State Building Code (MSBC) - 2020
Q. International Building Code (IBC) - 2018

1.5 DESIGN REQUIREMENTS

A. Design planks in accordance with the requirements of MSBC, PCI MNL-120, PCI MNL-126, ACI 318, and ACI 301.
B. Design connections in accordance with PCI MNL-123.
C. Design components to withstand dead loads and design loads in the configuration indicated on the drawings and as follows:
    1. Maximum Allowable Deflection of Roof Planks:
        a. Live Load Deflection: 1/240 span.

b. Total Load Deflection: 1/180 span.

2. Design components to accommodate construction tolerances, deflection of other building structural members and clearances of intended openings.
3. Design loadings shall include initial handling and erection conditions and all dead and live loads specified on the contract documents including partition weights given on the drawings. Precast supplier shall review architectural and structural drawings to verify adequacy of precast members supporting partitions and other non-structural elements near openings, at edges, etc.
4. Grouted Keys: Capable of transmitting horizontal shear force of 2,000 lb/ft.

1.6 SUBMITTALS

A. See Division 1 for submittal procedures.

B. Shop Drawings: Indicate plank locations, unit identification marks, connection details, edge conditions, bearing requirements, support conditions, dimensions, openings, openings intended to be field cut, and relationship to adjacent materials.
1. Erection drawings: Include member piece marks with size and shape of each member; plans/elevations showing all products furnished by supplier; sections/details showing connections and cast in items; joints and openings between members and structure; description of all loose cast-in field hardware; locations of field installed anchors, fire ratings of all members; and all dead, live and other applicable design loads. Include anticipated camber and deflection of precast members where camber or deflection exceeds L/360 or 1/2", and where camber and deflection vary more than 1/4" between adjacent units.
2. Production drawings on request. Include elevation view of each member, sections/details to show quantity and position of reinforcing, anchors, and inserts, handling devices, dimensions and finishes, strand prestress, concrete strength, and estimated camber.
3. If shop drawings are resubmitted after the original review, identify all changes made to the shop drawings after the original submittal with clouds or similar markings.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

D. Welders' Qualification Statement: Submit to Special Inspector welders' qualifications in accordance with AWS B2.1/B2.1M.

E. Calculations
1. Submit calculations for headers and connections.
2. Submit calculations for storm shelter.
3. Review of calculations will be for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor remains responsible for correctness and completeness of submitted calculations.
4. Calculations to be certified by a professional engineer licensed in the State in which the Project is located.

F. Precast plant certification on request.

1.7 QUALITY ASSURANCE

A. The precast concrete manufacturing plant shall be certified by the Precast/Prestressed Concrete Institute, Plant Certification Program, in categories C2 or C2A at the time of bidding.

B. Designer Qualifications: Under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
D. Erector Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of experience.
E. Welding Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.4/D1.4M.

1.8 PRE-INSTALLATION MEETING
A. Convene at least one week before starting work of this section.
B. Discuss anchor and weld plate locations, sleeve locations, and cautions regarding cutting or core drilling.

1.9 DELIVERY, STORAGE, AND HANDLING
A. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.
B. Storage:
1. Store all units off ground. Place stored units so that identification marks are discernible.
2. Separate stacked members by battens across full width of each bearing point.
3. Stack so that lifting devices are accessible and undamaged. Do not use upper member of stacked tier as storage area for shorter member or heavy equipment.

1.10 PROJECT CONDITIONS
A. Coordinate with framing components directly associated with the work of this section.
B. Coordinate field cut openings with affected section.
C. Coordinate location of hanger tabs and devices for mechanical and electrical work.

PART 2 PRODUCTS

2.1 MATERIALS
A. Concrete Materials: As specified in Section 03 30 00.
B. Tensioning Steel Tendons: ASTM A416/A416M, Grade 250 or Grade 270; seven-wire stranded steel cable; stress relieved or low-relaxation type; full length without splices; uncoated.
C. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) deformed steel bars.
D. Cement Grout: Minimum compressive strength of 3,000 psi at 28 days.
E. Epoxy-Resin Grout: Two components mineral-filled epoxy-resin: ASTM C881/C881M.

2.2 ACCESSORIES
A. Connecting and Supporting Devices: Plates, angles, items cast into concrete, items connected to steel framing members, and inserts: ASTM A36/A36M carbon steel; prime painted.
B. Bearing Pads: High density plastic, 1/8 inch thick, smooth on both sides. Korolath or approved equal.

2.3 FABRICATION
A. Planks: Plant cast, prestressed, hollow core or solid.
1. Dimensions as indicated on drawings.
B. Manufacture in general compliance with PCI MNL-116.
C. Weld reinforcing in accordance with AWS D1.4/D1.4M. Provide AWS certified welders for all shop welding.
D. Embed anchors, inserts, plates, angles, and other items at locations indicated.
E. Provide openings required by other sections, at locations indicated. Provide openings larger than 8" square or 8" round.
F. Cut exposed ends flush.

G. Plant Finish: PCI MNL-116.
   1. Roof Members: Standard Grade.
H. Connecting and Supporting Steel Devices: Do not paint surfaces in contact with concrete or surfaces requiring field welding.
I. Accurately place prestressing strands and reinforcing steel. Keep strands or wires clean of substances harmful to bonding of strand to concrete.
J. Provide an intentionally roughened top surface for composite members and members to receive structural topping to an amplitude of 1/4".
K. Provide and fabricate structural steel headers as needed for plank openings

2.4 FABRICATION TOLERANCES

A. Comply with PCI MNL-116 and PCI MNL-135.

2.5 SOURCE QUALITY CONTROL

A. See Section 03 30 00 - Cast-in-Place Concrete for testing of concrete and grout, materials, and mix designs.
B. Produce planks in accordance with requirements of PCI MNL-116. Maintain plant records and quality control program during production of precast planks. Make records available upon request.
C. Inspect stressing tendons before delivery for compliance with specified standards.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify supporting structure is ready to receive work including all bearing surfaces and location and alignment of inserts and anchorage items cast in the structure.
B. Notify the General Contractor in writing of required corrections, if unsatisfactory conditions or deficiencies are observed. Do not begin work until corrections are made.

3.2 PREPARATION

A. Prepare support devices for the erection procedure and temporary bracing.

3.3 ERECTION

A. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.
B. Install bearing pads and sill seal at bearing ends of planks as indicated.
C. Align and maintain uniform horizontal and end joints, as erection progresses.
D. Maintain temporary bracing in place until final connection is made. Protect members from staining.
E. Adjust differential camber between precast members to tolerance before final attachment and grouting.
F. Adjust differential elevation between precast members to tolerance before final attachment, as work progresses.
G. Secure units in place as work progresses. Perform welding in accordance with AWS D1.1/D1.1M.
H. Cooperate with other trades in permitting insertion of anchors, hangers, electrical outlets, etc.
I. Install steel headers as indicated on the Contract Drawings or required for openings.
J. Prior to placing non-structural topping, thoroughly clean surface removing all dirt and excess laitance, saturate the precast surfaces, remove excess water, and slush with a neat cement grout immediately before placing new concrete.
K. See Section 03 30 00 - Cast-in-Place Concrete (Separate Floor Toppings) for surface preparation prior to placing structural topping.

3.4 GROUT

A. Grout all keyways full and strike off flush with top surface. Before it hardens, remove any grout that seeps to bottom of plank.

B. Make plank-to-plank joints smooth using grout, troweled smooth. Transition differential elevation of adjoining planks with grout to a maximum slope of 1:12.

C. Grout cores of plank as required for anchorage of structural steel, elevator supports and miscellaneous metal items as shown on drawings.

D. Grout precast ends as needed for installation of waterproofing or other finishes.

E. Place grout at temperatures above 32 degrees Fahrenheit (and rising). Maintain grout above freezing until it reaches its design strength.

F. Grout may be placed at temperatures below 32 degrees Fahrenheit if special precautions are taken to prevent grout from freezing prior to its initial set, to limit grout to a single freeze thaw cycle, and to maintain heat, once applied, until the grout reaches its design strength. Do not load plank under these conditions until grout reaches its design strength. Provide outline of procedures to be used and obtain approval of Architect/Engineer prior to placing grout at temperatures below 32 degrees Fahrenheit.

3.5 TOLERANCES

A. Erect members level and plumb within allowable tolerances. Conform to non-cumulative tolerances of PCI MNL-135 .

3.6 FIELD OPENINGS AND ANCHORS BY OTHER TRADES

A. Field cut openings smaller than 8" in all directions using power saws or core drills. Receive written approval of opening locations by the precast prestressed manufacturer and Architect before cutting. Repair all unsightly spalls or chips caused by cutting.

B. Receive approval of type and location of field installed fasteners from precast prestressed manufacturer and Architect. Anchors shall not contact prestressing steel.

3.7 PROTECTION

A. Protect members from damage caused by field welding or erection operations.

B. Provide non-combustible shields during welding operations.

C. Protect cores of plank from collection of water during construction, and drain any moisture that accumulates.

3.8 CLEANING

A. Clean weld marks, dirt, and blemishes from surface of exposed members.

B. Clean and prime exposed steel and welds immediately after erection.

3.9 FIELD QUALITY CONTROL

A. Structural Testing and Special Inspection

1. Comply with the requirements of Section 05 12 00 - Structural Steel Framing.
2. The Owner will employ a Special Inspector for the following:
    a. Visually inspect welds connecting embeds to structural steel supporting members.
    b. Visually inspect welds at all connections between precast members.

END OF SECTION

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 CONTRACT CONDITIONS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Structural steel framing members.
   1. Steel will not be fireproofed.
B. Architecturally Exposed Structural Steel (AESS).
C. Base plates, headed studs, and deformed bar anchors.

1.3 RELATED REQUIREMENTS

A. Section 01 45 33 - Structural Testing and Special Inspection.
B. Section 03 15 10 - Post-Installed Anchors.
C. Section 05 21 00 - Steel Joist Framing.
D. Section 05 31 00 - Steel Decking.
E. Section 05 40 00 - Cold-Formed Steel Framing. Cold formed framing affecting structural steel work.
F. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.4 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2017.
B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022.
C. AISC 360 - Specification for Structural Steel Buildings; 2022.
D. AISC S348 - Specification for Structural Joints Using High-Strength Bolts; 2020.
E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
F. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2018.
G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
H. ASTM A496 - Steel Wire, Deformed, for Concrete Reinforcement; 2002.
I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021a.
J. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.
K. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.
L. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.
M. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.
N. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series; 2017a.
O. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.
P. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners; 2013.
Q. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.
R. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum

Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2022.

S. ASTM F1852 - Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2002.

T. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

U. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.

V. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).

1.5 SUBMITTALS

A. See Division 1 for submittal procedures.

B. Shop Drawings:

1. Review the Contract Documents prior to preparing shop drawings to determine if the structure is in conflict with OSHA requirements or any other safety regulation. Notify the Architect if any conflicts are noted. Do not prepare shop drawings affected by the conflict until the conflict is resolved.
2. Prepare complete shop and setting drawings based on referenced AISC Specifications.
3. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
4. Indicate type and location of shop and field connections. Detail all required field welds.
5. Indicate cambers.
6. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
7. Clearly indicate members considered to be Architecturally Exposed Structural Steel (AESS) and detail members and connections consistent with AESS criteria included in this specification section.
8. Contractor's engineer designing connections shall provide the following certification on all shop drawings depicting such connections. Adjacent to the engineer's signature, the following statement shall be included: "I, John F. Doe, hereby certify that the connection design shown on this document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota and I accept responsibility for the adequacy of the connections shown on this document to meet the criteria stipulated in the Contract Documents."
9. If shop drawings are resubmitted after the original review, identify all changes made to the shop drawings after the original submittal with clouds or similar markings.

C. Submit AISC Quality Certification Program certificates (for reduction in shop special inspections only if the fabricator is so certified) and welder qualifications to the Special Inspector-Technical.

D. Welders' Qualification Statement: Submit to Special Inspector welders' qualifications in accordance with AWS B2.1/B2.1M.

1.6 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC "Manual of Steel Construction".

B. Implement the quality control and quality assurance provisions of Chapter N of AISC 360. Document is available at www.aisc.org/publications/steel-standards/.

C. Fabrication plant shall be certified in Buildings according to the requirements of the AISC Quality Certification Program and shall be acceptable to the structural engineer, Architect, and building official.

1. A fabricator without AISC certification may be acceptable subject to the following.

a. The fabrication plant shall be acceptable to the Structural Engineer, Architect, and Building Official.
b. The fabrication plant shall maintain written, detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and for the fabricator's ability to conform to the construction documents.
c. The Contractor shall reimburse Owner for required quality assurance inspections during steel fabrication. This inspection shall be conducted by the Owner's inspection company at the fabrication plant.

D. Comply with Section 10 of AISC "Code of Standard Practice for Steel Buildings and Bridges", as amended herein, for AESS.
E. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
F. Codes and Standards:
1. AISC - Manual of Steel Construction.
2. AISC 360 - Specification for Structural Steel Buildings
3. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges
4. AWS D1.1/D1.1M.
5. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts
6. SSPC - SSPC Painting Manual - Volume 2
G. Provide personnel qualified according to AWS D1.1/D1.1M for all shop and field welding.

1.7 PROJECT/SITE CONDITIONS

A. Verify all dimensions given on the Drawings and make such field measurements as are necessary to lay out the work properly and assure proper elevations. Be fully responsible for accuracy of all measurements and laying out of the work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Angles, Plates, and Channels: ASTM A36/A36M.
B. Steel W Shapes and Tees: ASTM A992/A992M.
C. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade C.
1. The longitudinal butt joint of welded tubing shall be welded across its full thickness.
D. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars per AWS D1.1/D1.1M.
E. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, medium carbon, plain.
1. Tension control bolts meeting ASTM F1852 are also acceptable.
F. Unheaded Anchor Rods: ASTM F1554, Grade 55, with Supplement S1, plain, with matching ASTM A563/A563M nuts and ASTM F436/F436M Type 1 washers. Hot dip galvanize where noted.
G. Load Indicator Washers: Provide washers complying with ASTM F959/F959M at all connections requiring high-strength bolts. Not required if tension control bolts are used.
H. Welding Materials: AISC Specification A35 and referenced AWS specifications, type required for materials being welded, E70 electrodes.
I. Shop and Touch-Up Primer: Fabricator's standard, compatible with finish coatings, complying with VOC limitations of authorities having jurisdiction.
J. Post-installed anchors: See Section 03 15 10.
K. Deformed Bar Anchors: ASTM A496, AWS D1.1, Chapter 7, arc stud welded.

2.2 FABRICATION

A. Fabricate according to referenced AISC publications.

B. Shop fabricate to greatest extent possible.
   1. For AESS members, locate field joints in AESS assemblies at concealed locations or as approved by the Architect. Detail AESS assemblies to minimize field handling and expedite erection.

C. Do not substitute sections or modify details without written approval of the Structural Engineer. Provide full-length pieces between connections or splices indicated on the drawings. Do not permit built-up lengths. Do not use warped or damaged sections.

D. Design shop and field connections unless detailed on the Drawings. Use standard connections as shown in Part 9 of the AISC Manual where possible. Bolt field connections, unless otherwise indicated on the Drawings.

E. Perform bracing, blocking, cutting, fitting, drilling, tapping, welding, punching, etc., as required to complete work and to join work of others. Weld clip angles and plates to beams and punch holes for fastening work of other trades as shown on the Drawings.

F. Furnish anchor bolts of size and type shown on the drawings for all field connections to be permanently bolted to concrete or masonry.

G. Fabricate AESS with exposed surfaces smooth and square. Use special care in handling and shipping of AESS both before and after shop painting.

H. In addition to special care used to handle and fabricate AESS, employ the fabrication techniques noted on the Drawings.

2.3 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP 3 unless otherwise indicated.

B. Shop prime structural steel members to a DFT of 2.0 - 3.5 mils. Do not prime surfaces that will be fireproofed or field welded.

C. Galvanize structural steel exposed to weather, lintels in exterior masonry walls, and shelf angles and plates in exterior masonry walls to comply with ASTM A123/A123M
   1. Prepare items to be galvanized in accordance with ASTM A385.
   2. Close and seal weld vent holes in pipes, tubes, and other closed members. Touch up damaged areas using procedures and products from ASTM A780/A780M .

2.4 SOURCE QUALITY CONTROL

A. Perform quality control procedures and inspections as outlined in Chapter N of AISC 360.

B. Implement quality assurance provisions as outlined in Chapter N of AISC 360.
   1. If Fabricator holds an AISC Building certification, quality assurance procedures and inspections may be performed by the Fabricator. If Fabricator does not hold an AISC Building certification, Owner will provide quality assurance procedures and inspections as outlined in Part 1.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

B. Check all AESS members upon delivery for twist, kinks, gouges, or other imperfections which might result in rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel.

3.2 ERECTION

A. Erect structural steel in compliance with AISC 303.
   1. At AESS members, provide connections for temporary shoring, bracing, and supports only where noted on the approved shop drawings. Temporary connections not shown

shall be made at locations not exposed to view of the final structure or as approved by the Architect. Handle, lift, and align pieces using padding slings and/or other protection required to maintain the appearance of the AESS through the process of erection.

B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Exercise care in handling structural steel during unloading, storage, and erection to prevent bends, twists, or other damage.

D. Place structural steel stored at the site on substantial shores or blocking. Provide shores or blocking of sufficient size and strength to prevent any part of the steel from touching the ground.

E. Remove dirt, oil, loose scale, burrs, pits, paint and other defects that would prevent solid seating of parts.

F. Field weld components indicated on shop drawings.

G. Where A307 bolts are used, tighten to a snug tight fit as obtained with the full effort of a man using an ordinary spud wrench. Verify that all parts are in contact. Use self-locking nuts or upset bolt threads to prevent nuts from bracing off.

H. Where A325 bolts are used, tighten bolts and provide washers in accordance with "Specification for Structural Joints Using High Strength Bolts". Use tension control bolts or direct tension indicators for slip-critical (SC) and fully tensioned bolts (FT).

I. Pre-heat material to be welded and maintain interpass temperatures as required. Do not weld below 0 degrees F.

J. Remove all ceramic welding ferrules from shear studs.

K. Do not cut steel or enlarge holes without written approval of the Structural Engineer.

L. Do not field cut or alter structural members without approval of Engineer and Structural Engineer.

M. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete or specified to be unprimed.

N. Repair or replace structural steel damaged during shipment, unloading, or erection at no cost to the Owner.

O. Install expansion and adhesive anchors in strict accordance with manufacturer’s recommendations.

P. In addition to the special care used to handle and erect AESS, employ the erection techniques noted on the Drawings.

3.3 CLEANING AND REPAIR

A. After erection and welding of steel, remove clay, mud or other foreign materials from all members.

B. Apply a field touch-up coat of paint on all welded connections and damaged areas using the same color and type of paint used on the shop coat.

C. Repair damaged galvanized members with procedures and products from ASTM A780/A780M .

3.4 FIELD QUALITY CONTROL

A. Perform erection quality control procedures and inspections as outlined in AISC 360 Chapter N.

B. Owner will provide erection quality assurance provisions as outlined in AISC 360 Chapter N.

C. AESS acceptance: The Architect will observe the AESS in place and determine acceptability.

END OF SECTION

SECTION 05 21 00 - STEEL JOIST FRAMING

PART 1 GENERAL

1.1 CONTRACT CONDITIONS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Open web steel joists, with bridging, attached seats and anchors.
   1. Steel will not be fireproofed.
B. Supplementary framing for joist chord extensions.

1.3 RELATED REQUIREMENTS

A. Section 01 45 33 - Structural Testing and Special Inspection
B. Section 05 12 00 - Structural Steel Framing: Superstructure framing.
C. Section 05 31 00 - Steel Decking: Deck attachments to joists.

1.4 REFERENCE STANDARDS

A. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022.
B. AISC 360 - Specification for Structural Steel Buildings; 2022.
C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
D. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
E. SJI 100 - Standard Specifications for K-Series, LH-Series, and DLH-Series Open Web Steel Joists, and for Joist Girders; 2020.
F. SJI (SPEC) - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.
G. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; 2008.
H. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
I. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.5 SUBMITTALS

A. See Division 1 for submittal procedures.
B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, attachments, loadings for design of "special" joists, and chord splices and splice details, if any.
   1. If shop drawings are resubmitted after the original review, identify all changes made to the shop drawings after the original submittal with clouds or similar markings.
C. Design calculations: Submit design calculations for composite joists, "special" joists, joist girders, and connections prepared and certified by a Professional Engineer licensed in the State in which the Project is located.
   1. Review of calculations will be for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor/Fabricator remains responsible for correctness and completeness of submitted calculations.

1.6 QUALITY ASSURANCE

A. Perform Work, including that for headers and other supplementary framing, in accordance with SJI 100 Standard Specifications Load Tables and SJI Technical Digest No. 9.
B. Codes and Standards: Comply with the provisions of the following, except as otherwise indicated:
   1. AISC 360 "Specification for the Structural Steel Buildings".
   2. AWS D1.1/D1.1M, "Structural Welding Code-Steel".

3. SJI 100, "Standard Specifications for K-Series, LH-Series, and DLH-Series Open Web Steel Joists, and for Joist Girders"
4. SJI COSP, "Code of Standard Practice for Steel Joists and Joist Girders"

C. Fabricator shall be a member of SJI.

D. Fabricator shall inspect material and welding prior to painting. Fabricator shall verify materials and workmanship conform to the project requirements prior to shipping to the site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect products to SJI requirements.

B. Exercise care in handling joists during unloading, storage, and erection to prevent bends, twists or other damage.

C. Place joists stored at the site on substantial shores or blocking. Provide shores or blocking of sufficient size and strength to prevent any part of the joist from touching the ground.

D. Replace joists damaged during shipment, unloading, or erection at no cost to Owner.

1.8 PROJECT/SITE CONDITIONS

A. Verify all dimensions given on the Drawings and make such field measurements as are necessary to lay out the work properly and assure proper fit and proper elevations. Be fully responsible for accuracy of all measurements and laying out of the work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Minimum thickness of material for joist chords shall be 1/8 inch.

B. Open Web Joists: SJI Type K Joists:
1. Minimum End Bearing on Steel Supports: 2-1/2 inches.
2. Minimum End Bearing on Concrete or Masonry Supports: 4 inches.
3. Finish: Shop primed.
4. Extend chords of joists where required for support of roof deck and for attachment of ceiling hangers or furring.

C. Structural Steel for joist leg extensions: ASTM A 36/A 36M.

D. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A 36/A 36M.

E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

A. Fabricate in accordance with the requirements of SJI and AISC.

B. Where steel joists are sloped, fabricate with beveled ends or sloped shoes to provide a level, full bearing surface when erected.

C. After fabrication, thoroughly clean joists and accessories.

D. Extend chords of joists where necessary for support of roof deck and for attachment of ceiling hangers or furring.

E. See Drawings for joists bolted to supports. Provide oversized bearing plates where required.

F. Provide bridging and bridging anchors to conform to SJI specifications.

2.3 FINISH

A. Shop prime joists as specified.

B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.2 ERECTION

A. Erect joists with correct bearing on supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.

C. Brace joists during erection, and install bridging immediately as joists are set. Fasten bridging to top and bottom chords in a manner that will not damage joist members. Anchor ends of bridging lines to walls and beams at both top and bottom chords.

D. After joist alignment and installation of framing, field weld, bolt joist seats to bearing plates per SJI requirements and AWS D1.1/D1.1M.

E. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.

F. Do not field cut or alter structural members without approval of joist manufacturer.

G. After erection, prime welds, damaged shop primer, damaged galvanizing, and surfaces not shop primed , except surfaces specified not to be primed.

H. Avoid excessive concentrated loads to the joists and insure that construction loads do not exceed the load carrying capacity of the joists.

3.3 FIELD QUALITY CONTROL

A. Structural Testing and Special Inspection

1. Structural Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provision of Section 01 45 33 - Structural Testing and Special Inspection.
2. Definitions:
   a. ASNT - American Society for Non-Destructive Testing
   b. CAWI - American Welding Society Certified Associate Weld Inspector
   c. CWI - American Welding Society Certified Weld Inspector
3. Personnel Qualifications
   a. Special Inspector Technical II: CAWI with minimum 3 years experience or ASNT Level II, employed by a testing agency and supervised by a CWI or ASNT Level III with a minimum of 10 years experience.
   b. Individuals performing welding inspection must be AWS certified.
4. The Owner will provide the following tests and inspections:
   a. Visually inspect all field welds for size, length, and quality per AWS D1.1/D1.1M. Qualifications: Technical II.
   b. Visually inspect all installed joists for bent or damaged members and for adequate bearing length. Qualifications: Technical II.
   c. Joist Bridging: On a periodic basis, inspect bridging to verify member size, location, and connections comply with the contract documents and shop drawings. Qualifications: Technical II.

END OF SECTION

SECTION 05 31 00 - STEEL DECKING

PART 1 GENERAL

1.1 CONTRACT CONDITIONS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Roof deck.
B. Composite deck.
C. Acoustical insulation in roof deck flutes.

1.3 RELATED REQUIREMENTS

A. Section 01 45 33 - Structural Testing and Special Inspection
B. Section 03 30 00 - Cast-in-Place Concrete: Concrete topping over metal deck.
C. Section 05 12 00 - Structural Steel Framing: Support framing for openings larger the 6 inches.
D. Section 05 21 00 - Steel Joist Framing

1.4 REFERENCE STANDARDS

A. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2018.
B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
C. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.
D. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
E. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, with Errata (2022).
F. SDI (RD) - Specifications and Commentary for Steel Roof Deck; 2017
G. SDI (C) - Specifications and Commentaries for Composite Steel Floor Deck; 2017
H. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
I. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.5 SUBMITTALS

A. See Division 1 for submittals procedures.
B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
    1. If shop drawings are resubmitted after the original review, identify all changes made to the shop drawings after the original submittal with clouds or similar markings.
D. Welders' Qualification Statement: Submit to Special Inspector welders' qualifications in accordance with AWS B2.1/B2.1M.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this Section with minimum 3 years of experience.
B. Codes and Standards: Comply with the provisions of the following, except as otherwise indicated:
    1. SDI, "Specifications and Commentary for Steel Roof Deck"
    2. Steel Deck Institute (SDI), "Specifications and Commentaries for Composite Steel Floor Deck"
    3. AWS D1.3, "Structural Welding Code - Sheet Steel"

C. Provide personnel qualified according to AWS D1.3 for all shop and field welding.
D. Manufacturer shall be a member of the Steel Deck Institute.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.
B. Store deck on dry wood sleepers; slope for positive drainage. Protect with a waterproof covering ventilated to avoid condensation.
C. Deliver, unload, store and erect deck in a manner to completely protect the deck from damage.

1.8 PROJECT SITE CONDITIONS

A. Verify all dimensions given on the Drawings and make such field measurements as are necessary to lay out the work properly and assure proper fit and proper elevations. Be fully responsible for accuracy of all measurements and laying out of the work.

PART 2 PRODUCTS

2.1 STEEL DECK

A. Roof Deck: Non-composite type, fluted steel sheet:
   1. Ungalvanized Steel Sheet: ASTM A1008/A1008M, Designation SS, Grade 40, Type 1.
   2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
   3. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch.
   4. Nominal Height: 1-1/2 inch.
      a. Profile: Fluted; SDI WR.
      b. Formed Sheet Width: 36 inch.
      c. Structural Properties: Meet or exceed Vulcraft type Vulcraft Type 1.5B
         1) Span Design: Multiple.
   5. Side Joints: Fastened per drawings.
   6. End Joints: Fastened per drawings.
B. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 40/275, with G90/Z275 galvanized coating.
   2. Structural Properties: Meet or exceed Vulcraft VLJ series
   3. Span Design: Multiple.
   4. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch.
   5. Nominal Height: 1-1/2 inches.
      a. Profile: Fluted.
   6. Side Joints: Fastened per drawings.
   7. End Joints: Fastened per drawings.

2.2 ACCESSORY MATERIALS

A. Stud Shear Connectors: Made from ASTM A108 Grade 1015 bars.
B. Welding Materials: AWS D1.1 and D1.3, E70xx electrodes.
C. Power Driven Fasteners: Hilti X-HSN24 for bar joists 1/8" to 3/8" thick, X-ENP for structural steel greater than 1/4" thick.
D. Screw Fasteners: Galvanized hardened steel, self tapping, TEKS.
E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
G. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.

2.3 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gage, 0.0359 inch thick sheet steel; of profile and size as indicated; finished same as deck.

2.4 FABRICATION

A. Fabricate in accordance with SDI Specifications.

B. Fabricate deck to span over a minimum of 3 supports wherever possible.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

A. Erect metal deck in accordance with SDI Specifications and manufacturer's instructions. Align and level.

B. Fasten deck in accordance with deck fastening detail shown on drawings or manufacturer's standard requirements, whichever is greater.

C. Weld deck in accordance with AWS D1.3. Do not weld when temperature is below 0 degrees F. Protect metal being welded from rain and snow.

D. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.

E. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

F. Weld stud shear connectors through steel deck to structural members below.

G. Immediately after welding deck and other metal components in position, clean welds and coat welds, burned areas, and damaged surface coating, with touch-up primer after inspections are completed.

H. Install deck with major flat surface on top (normal position).

I. Protect the completed deck from construction loads in excess of 30 psf. Move all loads across the deck on wood planking (or similar means) to distribute loads.

3.3 FIELD QUALITY CONTROL

A. Structural Testing and Special Inspection

1. Structural Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provision of Section 01 45 33.
2. Definitions:
   a. ASNT - American Society for Non-Destructive Testing
   b. CAWI - American Welding Society Certified Associate Weld Inspector
   c. CWI - American Welding Society Certified Weld Inspector
3. Personnel Qualifications
   a. Special Inspector Technical II: CAWI with minimum 3 years experience or ASNT Level II, employed by a testing agency and supervised by a CWI or ASNT Level III with a minimum of 10 years experience.
   b. Individuals performing welding inspection must be AWS certified.
4. The Owner will provide the following tests and inspections. Qualifications: Technical II
   a. Verify qualifications of welders prior to the start of welding.
   b. Observe welding procedures at the start of welding. Verify that appropriate welds are being obtained.
   c. Verify quality, size, location, and spacing of all welds and mechanical fasteners.

END OF SECTION

SECTION 05 40 00 - COLD-FORMED STEEL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Formed steel stud exterior wall and interior wall framing.
B. Non-load bearing exterior cold-formed metal wall framing.

1.3 RELATED REQUIREMENTS

A. Section 01 45 33 - Structural Testing and Special Inspection: Veneer masonry supported by wall stud metal framing.
B. Section 03 15 10 - Post-Installed Anchors
C. Section 05 12 00 - Structural Steel Framing
D. Section 06 10 00 - Rough Carpentry: Wood blocking and miscellaneous framing.
E. Section 07 21 00 - Thermal Insulation: Insulation within framing members.
F. Section 09 23 00 - Gypsum Plastering.

1.4 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).
B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
D. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members; 2018, with Editorial Revision.
E. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.
F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
G. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, with Errata (2022).
H. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.5 SYSTEM DESCRIPTION

A. Design Requirements:
    1. Use member size and thickness nomenclature from Steel Framing Alliance.
    2. Design system components to comply with AISI Specification.
    3. Follow the provisions of AISI General standards.
    4. Size components to withstand design loads as follows:
        a. Vertical Assembly: Design for wind loads as outlined in the International Building Code. Ultimate design wind speed: 118 mph; Exposure C; Risk Category III.
        b. Horizontal Assembly: Dead load: 20 psf; Live load: as required by the International Building Code.
    5. Vertical Assembly Requirements
        a. Vertical assemblies include headers, sills, jamb studs, and their connections as necessary.
        b. Horizontal Deflection: Design to permit maximum deflection of 1/360 of span. Determine deflections based on stud properties only.
        c. Vertical Deflection: Design non-axial loadbearing framing to accommodate primary structure deflection of not less than 3/4 in.

d. Design wall system, including connections to primary structure, to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
e. Follow the provisions of AISI standards.
f. Provide bridging to meet design requirements. Do not use gypsum sheathing or gypsum wallboard as lateral bracing.

6. Horizontal Assembly Requirements:
   a. Follow the provisions of AISI standards.
   b. Include web stiffeners, bracing, blocking, and bridging as needed to meet specification requirements.
   c. For exterior walls, include wind loads and design criteria as specified above for vertical assemblies.
   d. Design connections and details, including connections to primary structure, as needed to provide a complete installation.
   e. Vertical Deflection: Design to permit maximum deflection of 1/360 of span. Determine deflections based on joist/beam properties only.

1.6 SUBMITTALS

A. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.

B. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements. Provide fastener data including load capacities based ICC Evaluation Reports.

C. Shop Drawings: Indicate loading, typical and special component details, framed openings, welds, type and location of fasteners, connection of system to primary structure, anchorage, and accessories or items required for related work.
   1. Indicate stud layout.
   2. Describe method for securing studs to tracks and for all framing connections.
   3. Provide calculations certified by an engineer licensed in the State in which the Project is located for all framing, connections between cold-formed members, and connections to primary structure.
   4. If shop drawings are resubmitted after the original review, identify all changes made to the shop drawings after the original submittal with clouds or similar markings.

D. Design calculations: Submit design calculations prepared and certified by an engineer in the State in which the Project is located.
   1. Review of calculations will be for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor/Fabricator remains responsible for correctness and completeness of submitted calculations.
   2. Submit a letter certifying that the engineer designing connections has reviewed the shop drawings and that the drawings reflect design calculation information.

E. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention .

F. Certifications:
   1. Provide certification that the framing members, including galvanizing, conform to ASTM A653/A653M.
   2. Submit welder qualification certificates to the Special Inspector.

1.7 PROJECT CONDITIONS

A. Verify that field measurements are as indicated on shop drawings and correspond to those indicated on the drawings.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, unload, store and erect components in a manner to protect them from damage, including the galvanized surface.

B. Deliver material to be fabricated on site in manufacturer's unopened containers or bundles. Identify each container or bundle with the brand, type, and grade of material

C. Store in a dry ventilated space or protect with suitable waterproof covering. Keep all materials off of the ground.

PART 2 PRODUCTS

2.1 FRAMING SYSTEM

A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

2.2 FRAMING MATERIALS

A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height. Headers and horizontal framing within wall to be unpunched.

1. Galvanized in accordance with ASTM A653/A653M, G60/Z180 coating.

B. Framing Connectors: Factory-made, formed steel sheet.

1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gauge, 0.1345 inch, and factory punched holes and slots.
2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100.
3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
    a. Where continuous studs bypass elevated structural floor or roof, connect stud to structure in manner allowing vertical movement of floor or roof without affecting studs; allow for minimum movement of 3/4 inch.
    b. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical movement of flooslab without affecting studs; allow for minimum movement of 3/4 inch.
4. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.

2.3 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

B. Use cadmium plated screws with neoprene washers for anchoring brick veneer anchors to cold formed steel backup.

C. Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

D. Post-installed anchors and power driven fasteners: See Section 03 15 10.

E. Anchorage Devices: Powder actuated and Drilled expansion bolts.

F. Welding: In conformance with AWS D1.1/D1.1M and AWS D1.3/D1.3M.

2.4 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.
C. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.5 SHOP FABRICATED ASSEMBLIES

A. Shop fabricate metal framing as desired.
B. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.
C. Fit and assemble in largest practical sections for delivery to site, ready for installation. Brace against racking.
D. Lift prefabricated panels in such a manner to prevent local distortion in any member.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION OF STUDS

A. Install components in accordance with ASTM C1007 requirements and ASTM C1007 requirements.
B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center not more than 6" from end. Coordinate installation of sealant with floor and ceiling tracks.. Attach abutting pieces at track butt joints to a common structural element.
C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.
D. Construct corners using minimum of three studs. Install a minimum of double studs at wall openings, door and window jambs. Provide additional studs as required by design.
E. Do not splice horizontal members at the heads or sills of openings.
F. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.
G. Position studs plumb, square, and true to line and seat in track with the studs positioned against the inside web of the track prior to attachment of stud to track.
H. Frame both sides of expansion joints with separate studs. Do not bridge joints with components of the stud system.
I. Install load-bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
J. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
K. Install intermediate studs above and below openings to align with wall stud spacing.
L. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
M. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
N. Remove dirt and other foreign members from all members.

3.3 FIELD QUALITY CONTROL

A. Structural Testing and Special Inspection
    1. Structural Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provision of Section 01 45 33.
    2. Definitions:
        a. ASNT - American Society for Non-Destructive Testing
        b. CAWI - American Welding Society Certified Associate Weld Inspector

c. CWI - American Welding Society Certified Weld Inspector

3. Personnel Qualifications
   a. Special Inspector Technical I: CAWI or ASNT Level I, employed by a testing agency and supervised by a CWI or ASNT Level III with a minimum of 10 years experience.
   b. Special Inspector Technical II: CAWI with minimum 3 years experience or ASNT Level II, employed by a testing agency and supervised by a CWI or ASNT Level III with a minimum of 10 years experience.
   c. Individuals performing welding inspection must be AWS certified.
4. The Owner will provide the following tests and inspections:
   a. Welding Procedures and Preparation: Qualifications: Technical II. Verify the following:
      1) Verify materials delivered to site comply with contract documents and approved shop drawings.
      2) Qualifications of all welders as AWS certified.
      3) Proposed welding procedures and materials.
      4) At the beginning of field erection, perform daily observation of welding procedures until satisfied that proper procedures are being used and adequate welds are obtained.
   b. Welding: Visually inspect 100% of all fillet and flare bevel welds, for size, length, and quality, per AWS D1.1/D1.1M and AWS D1.3/D1.3M. Qualifications: Technical II.

END OF SECTION

SECTION 31 00 00 - EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Site preparation, protection and special precautions.
C. Earthwork operations and construction for:
    1. Buildings including:
        a. Building pads.
        b. Building foundations.
        c. Building foundation wall backfill.
        d. Granular layer below building floor slabs.
    2. Pavement areas including:
        a. Exterior sidewalks.
        b. Pavement areas (parking lots, roadways, aprons, etc.).
    3. Landscape areas.
    4. Stormwater management basins.
    5. Drain tile aggregate.
D. Acquisition of materials and material balancing, including:
    1. Stripping operations and stockpiling of soils to be re-used.
    2. Relocation of existing soils on-site for specific uses including:
        a. Topsoil.
        b. Structural fill under building areas.
        c. Parking Lots and Roads.
    3. Removal (off-site) of soils not to be re-used.
    4. Importing approved soils for fill.
E. Excavations.
F. Filling, backfilling, and compaction procedures.
G. Grading.

1.2 RELATED SECTIONS

A. Geotechnical report; bore hole locations and findings of subsurface materials.
B. Section 01 5713 - Erosion and Sediment Controls.
C. Section 02 4113 - Selective Site Demolition.
D. Section 31 1000 - Site Clearing.
E. Section 31 2333 - Trenching and Backfilling
F. Section 32 1122 - Aggregate Bases.
G. Section 32 1216 - Asphalt Concrete Paving.
H. Section 32 1313 - Exterior Concrete Paving.
I. Section 33 3000 - Sanitary Sewerage Utilities.
J. Section 33 4000 - Storm Drainage Utilities.

1.3 REFERENCES

A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
B. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016(2016).
C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.
D. ASTM D75/D75M - Standard Practice for Sampling Aggregates; 2014(2014).
E. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2023.

F. ASTM D1586 - Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils; 2011.
G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017, with Editorial Revision (2020).
H. ASTM D2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure); 2009.
I. ASTM D3385 - Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer; 2009.
J. ASTM D5268 - Standard Specification for Topsoil Used for Landscaping and Construction Purposes; 2023.
K. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils; 1963 (Reapproved 2007).
L. ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction; 2012 (Reapproved 2022).
M. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2023.
N. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).
O. Minnesota Department of Transportation 2020 Edition "Standard Specifications for Construction". Only applicable portions of construction methods and materials apply. References to methods of measurement or payment are not applicable.
    1. MN/DOT 3149 Granular Material
    2. MNDOT 3890 Compost
P. Minnesota Department of Labor and Industry - Minnesota State Building Code.

1.4 DEFINITIONS

A. Backfill - Placing of approved site soil or borrow material in accordance with specified procedures and compaction to establish elevations shown for site improvements and general rough grading.
B. Borrow Material - Approved soil materials for fill, backfill, or rough grading required, from sources other than those made available by stripping of excavation of site.
C. Building Area - The area of the site within a line five feet outside of the proposed building perimeter and extending at a slope of 1:1 (horizontal to vertical) to the bottom of the excavation.
D. Compacted Subgrade - The upper part of subgrade that is compacted to a greater density than the lower portion of subgrade or subsoil.
E. Engineered Fill - Placing of approved site material or borrow material in accordance with specified procedures and compaction to achieve an assumed soil bearing capacity specified herein.
F. Excavation - Cutting, digging, and removing soil materials of every classification and of whatever substance encountered to dimensions, limits, elevation and contours shown on the drawings.
G. Existing Site Material - Stripped and excavated material from work, of approved classification. Material must be approved by testing agency prior to placement.
H. Rock - Rock excavation is defined to include all hard, solid rock in ledge formation, bedded deposits and un-stratified masses; all natural conglomerate deposits so firmly cemented as to present all the characteristics of solid rock; and any boulder stone, masonry or concrete fragments exceeding one cubic yard in volume. Materials such as shale, hard pan, soft or disintegrated rock which can be dislodged with a power operated excavator will not be classified as rock excavation.

I. Soil Classification - Classification of soils for engineering purposes, ASTM D2487 Unified Soils Classification System (USCS) with divisions group symbols, typical names and criteria referenced herein.
J. Stripping - Excavation and removal of topsoil, fill and any other upper layers of soils.
K. Sub-base - Compacted fill upon which stabilized base course is placed.
L. Subgrade - Subsoil in place, backfill or fill material upon which sub-base, stabilized base course, footings, sand cushions or sand bases are placed.
M. Subsoil - Natural soil in place on the site.
N. Unsuitable Materials - Rock, loam, mud, muck, silt, organic silty clay, swamp deposited soils, peat, boulders, debris, rubbish, old foundations, contaminated soils, pavements, slabs, vegetation, or highly organic soils.
O. Unstable Materials - Materials which are not classified as unsuitable materials, but due to their condition of being too wet, too dry, over-compacted, or frozen, are unacceptable.

1.5 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.
B. Conform to all applicable code for materials and installation of the Work of this Section.
C. Verify that survey benchmark and intended elevations for the Work are as indicated.
D. Codes and Standards: Perform excavation work and disposal of debris in accordance with applicable requirements of governing authorities having jurisdiction.
E. All excavations and trenches shall comply with the requirements of 29 CFR 1926, Sub-Part P, “Excavations.”
F. The Owner will provide an Independent Testing Laboratory to perform testing and inspection services for quality control testing of the earthwork operations.
G. The Contractor is responsible for coordinating construction schedule and required testing with testing agency prior to start of construction. Contractor shall provide adequate notice and time for geotechnical engineer to perform required tests. No time delays will be allowed for uncoordinated work.
H. Grade Verification:
    1. Refer to "Submittals" and "Field Quality Control" of this Section.
I. Refer to "Field Quality Control" of this Section.

1.6 SUBMITTALS

A. Submit under the provisions of Division One Specifications.
B. Independent Testing Laboratory Test Reports: Submit Independent Testing Laboratory reports which pertain to testing and inspection services performed at the site including but not limited to:
    1. Inspections of all building areas prior to any filling to ensure that unsuitable and unstable soils have been completely removed.
    2. Inspections of all areas to be paved prior to any filling to ensure that unsuitable and unstable soils have been completely removed.
    3. Observation of proof roll tests and recommendations if proof roll does not pass.
    4. Monitoring of settlement of soils and recommendations to the Contractor when construction can resume after primary consolidation of soils has occurred for:
        a. Building areas.
        b. Paved areas.

C. Contractor shall provide the following to aid the Independent Testing Laboratory in performing the required testing:
   1. Submit ten (10) pound (4.5 kg) sample of each type of fill to Independent Testing Laboratory, in airtight containers.
   2. Provide fully loaded tandem axle dump truck for proof rolling operations. Contractor shall provide truck as many times as necessary, as determined by Geotechnical Engineer, to the satisfaction of the Geotechnical Engineer.
   3. Any material samples deemed necessary by the Geotechnical Engineer to verify conformance with the Contract Documents.

D. The Contractor is to employ the services of a Registered Land Surveyor to perform the specified layout work and to prepare a grade verification survey. The grade verification shall be submitted prior to placement of aggregate base and/or paving.

E. Submit test reports for the following products and materials under the provisions of the Division One Specifications:
   1. Sieve analysis of each type of fill material prior to delivery on site.

1.7 PROJECT CONDITIONS

A. Historically, the site has had a series of environmental work completed by the previous owner. The previous site owner stabilized and consolidated lead and chromium impacted soils into a relatively thin layer at an elevation of approximately 774 feet on top of the limestone bedrock. The layer is covered with a marker of geotextile fabric. Clean mixed fill was placed over this layer to bring the site elevation up to the current elevation of approximately 786 to 788 feet.

B. The entire building pad and oversizing area should be excavated to a depth of four feet below the bottom of frost-depth footings, surface compacted. The existing fill is suitable to be reused as backfill.

C. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.

D. Additional test borings and other exploratory operations may be conducted by a Bidder (at no cost to the Owner), provided the methods and operations are acceptable to the Owner.

E. Protection of Persons: The Owner's activities will continue about the site during construction. Install barricade fencing (snow fence), as necessary, to provide a safe environment between construction work and pedestrian circulation.

F. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, existing structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer's satisfaction and at no cost to the Owner.

G. Existing Utilities:
   1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.
   2. The approximate locations of certain underground lines and structures are shown on the plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.
   3. Locate and mark these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.

4. Locate, excavate, and expose all existing underground lines in advance of trenching operations.
5. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.

H. Traffic Control:
1. Maintain vehicular and pedestrian traffic as required for construction activities.
2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of the Work.
3. When working in public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

I. Cold Weather Protection: See Special Precautions of this section.

PART 2 PRODUCTS

2.1 MATERIALS

A. Building Pads (Engineered Fill):
1. Sub-grade material under building pads shall be granular material SP, SP-SM, SM soils. The granular material shall have 100 percent passing the 2-inch sieve with less than 2 percent organic content.

B. Building Pads (Engineered Fill):
1. Backfill shall be debris free, non-organic, mineral soil and free of gravel larger than three (3") inches. The on-site soils, except the topsoil, and soils containing organics and debris are judged to be suitable for reuse as engineered fill. However, some of the on-site soils could be wet or dry, depending on the weather conditions and the time of year that construction takes place. The soils will likely require moisture conditioning before they can be used.

C. Building Foundation Wall Backfill:
1. Basement foundation backfill material and backfill in or near water shall be coarse granular material. The granular material shall have less than 50 percent passing the No. 40 sieve and less than 5 percent passing the No. 200 sieve and less than 2 percent organic content.

D. Granular Layer Below Building Floor Slab:
1. A six (6”) inch granular layer shall be placed beneath building floor slabs. The material shall be clean sand (SP) containing less than 5 percent passing the No. 200 sieve.

E. Under exterior sidewalks:
1. Refer to Specification Section 32 1122 Aggregate Bases for aggregate base material.
2. Subgrade material shall be debris free, non-organic, mineral soil and free of gravel larger than three (3") inches. The on-site soils, except the topsoil and soils containing organics and debris, are judged to be suitable for reuse as engineered fill. Some of the on-site soils could be wet or dry, depending on the weather conditions and the time of year that construction takes place. The soils may require moisture conditioning before they can be used.

F. Pavement Areas:
1. Subgrade material shall be debris free, non-organic, mineral soil and free of gravel larger than three (3") inches. The on-site soils, except the topsoil and soils containing organics and debris, are judged to be suitable for reuse as engineered fill. Some of the on-site soils could be wet or dry, depending on the weather conditions and the time of

year that construction takes place. The soils may require moisture conditioning before they can be used.

2. Refer to Specification Section 321122, Aggregate Bases, for aggregate base material.

G. Fill under Landscaped Areas:
   1. Fill under landscaped areas shall consist of existing or imported material, free of gravel larger than six (6") inches in size, free of debris and with an organic content less than 10 percent.

H. Topsoil:
   1. Topsoil shall be the dark brown to black sandy material, if available, stripped from the site. If stripped topsoil is not suitable or sufficient material is not available on the site, provide topsoil from an approved off-site source.
   2. Use topsoil consisting of material removed from the top three (3") inches to six (6") inches of soils.
      a. Imported topsoil shall conform to ASTM D5268, have a pH range of 5.5 to 7.2, and have a minimum of twenty (20%) percent organic material content.
   3. The topsoil shall be free of rocks larger than one and one half (1-1/2 ") inches in diameter. Use topsoil containing no roots, weed clumps or large clods of soil and free of foreign matter.
   4. Stockpile topsoil separate from other excavated material.
   5. Hold elevation of topsoil 1" below adjacent sidewalks and curbs where turf sod is required. Sod laid higher than adjacent top of pavement will be rejected.

I. Stormwater Management Basin Bioretention Soil Mix:
   1. Bioretention soil mix placed within the Stormwater Management Basin areas shall be a manufactured topsoil that consists of the following (by volume):
      a. 85-88% sand meeting ASTM C33/C33M Concrete Sand.
      b. 8-12% fines with a maximum clay content of 5%.
      c. 3-5% MNDOT 3890 grade 2 compost.

J. Drain Tile Aggregate: The aggregate shall meet the requirements MN/DOT 3149.2.H Coarse Filter Aggregate:

2.2 ACQUISITION OF MATERIALS

A. Insufficient Materials: Provide necessary material from off the site, as approved by the Architect/Engineer and Geotechnical Engineer to complete the Work. The cost of these materials shall be considered part of Base Bid Contract.

B. Exterior Backfill: Clean, on-site materials obtained from the required stripping, contour cutting and excavation may be used for backfilling and grading.

C. Subsoil for Site Grading: Clean, on-site materials obtained from the earthwork operations.

D. Under-slab Fill: Obtain from on or off the site as approved by the Laboratory Inspector.

E. Fill: Obtain from on or off the site as approved by the Laboratory Inspector.

F. Borrow pits: Borrow pits will not be permitted on this project.

G. Disposition of Materials
   1. Surplus Earth: Unless designated elsewhere for use or disposal on the Owner's property, surplus earth becomes the property of the Contractor and shall be removed from the Owner's site. The cost of off-site disposal shall be considered part of the Base Bid Contract.
   2. The Contractor shall not be allowed to take advantage of the stated tolerances by maintaining a consistently high or low elevation.

2.3 MATERIAL BALANCE

A. The Contractor is responsible for determining the quantities of material necessary for completing the Work under this Section. This includes the cost of importing approved fill or exporting excess or unsuitable materials.

PART 3 EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum locations. Verify that survey benchmarks and intended elevations for the Work are as indicated on the Drawings.
B. Identify known underground, above ground and aerial utilities. Stake and flag utility locations. Protect above and below-grade utilities which are to remain.
C. Verify that erosion control devices are in place.
D. Verify limits of construction and accurately locate:
   1. Building perimeter.
   2. Paved areas.

3.2 PROTECTION

A. Protect utilities that remain from damage.
B. Protect trees, plant growth, and features designated to remain as final landscaping.
C. Protect benchmarks, existing structures, signs, sidewalks, paving, curbs, and other items indicated on the Drawings to remain.
   1. Contractor shall provide shoring, bracing, or other means of support as needed to protect the existing items indicated on the Drawings to remain throughout construction. The cost of shoring, bracing, or other means of support shall be included as part of the base bid contract.
D. Protect proposed building(s), including footings and foundation walls. Contractor shall provide shoring, bracing, or other means of support as needed to protect the proposed building(s) during construction. The cost of shoring, bracing, or other means of support shall be included as part of the base bid contract.

3.3 SPECIAL PRECAUTIONS

A. Dewatering:
   1. Prevent surface water and subsurface (ground) water from flowing into excavations and from flooding the site and surrounding area.
   2. Do not allow water to accumulate in excavations. Remove water to prevent soil changes detrimental to stability of subgrades. Provide and maintain pumps, well points, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
   3. Convey water removed from excavations and rainwater to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.
   4. Do not place fill or compacted fill in standing water or over softened soils.
   5. The cost of dewatering shall be considered part of the Base Bid Contract.
B. Stability of Excavations:
   1. Sidewalls of all excavations shall comply with the most current OSHA regulations and applicable local building codes and ordinances. Shore and brace where adequate sloping is not feasible because of space restrictions or stability of material being excavated.
   2. Maintain slopes of excavations in safe condition until completion of backfilling.

3. Soils on site may be sensitive to moisture and may be easily disturbed by construction traffic. Measures to protect subgrade from becoming unstable and maintaining stability of subgrade soils shall be provided. Subgrade stabilization will be incidental to the Contractor. Subgrade stabilization shall be the responsibility of the Contractor.

C. Site Disturbance:
1. The on-site, silty and clayey soils are highly susceptible to disturbance due to repeated construction traffic. Disturbance of these soils may cause areas that were previously prepared, or that were suitable for pavement support or structure support, to become unstable and require moisture conditioning and compaction. The Contractor shall use means and methods to limit disturbance of the soils. No additional compensation will be allowed for reworking previously completed areas.

D. Cold Weather Protection:
1. Protect excavation bottoms and bearing surfaces against freezing when atmospheric temperature is less than 35 degrees Fahrenheit (2 degrees C).
2. Do not allow frost and snow to occur within materials beneath footings and slabs. Protect the soils to prevent freezing until after footings have been poured and until fill has been placed and compacted. Completely remove frost and snow, if present, before the footings are poured and the under-slab fill is placed.
3. Onsite moisture conditioning of wet soils will not be an acceptable practice between November 1 and April 1. If earthwork operations are to be performed during these months, contractor shall assume unsuitable soils will need to be exported and new suitable soils will need to be imported for the necessary work. .

3.4 REMOVALS, CLEARING, AND GRUBBING

A. Refer to Specification Section 02 4113 - Selective Site Demolition.
B. Refer to Specification Section 31 1000 - Site Clearing.

3.5 EXCAVATIONS

A. The Contractor shall be solely responsible for determining quantities of fill and waste materials to be handled and for amount of grading to be done in order to completely perform all work indicated on the Drawings. The costs of importing fill and/or exporting excess materials from the site shall be considered part of the Base Bid Contract.
B. Excavate to the lines, grades and slopes as indicated on the Drawings.
1. The soil corrections shall conform to the recommendations of the soils report and the on-site observations of actual conditions made by the Independent Testing Agency.
2. The Contractor shall thoroughly review the Geotechnical Report, Grading Plans, Structural Plans, and Specifications to determine depth of excavation and any soils correction required. No additional compensation will be given for work that could have been anticipated by reviewing the above documents.
C. Provide temporary drainage where construction interferes with existing drainage.
D. Stabilizing Sides of Excavation: Slope the sides of excavations to a safe angle of repose for materials being excavated. Shore and brace where sloping is not possible because of space restrictions or the stability of the materials being excavated. Maintain the sides of the excavations in a safe condition until the completion of backfilling.
E. Excavation for proposed building(s):
1. Excavate and remove all soils with organic content, soft soils, or soils otherwise deemed unsuitable by the Geotechnical Engineer within Zone of Influence of the proposed building. No proposed building footings or slabs-on-grade shall bear on soil with questionable bearing capacity.

a. The zone of influence is defined as the area below a line commencing three (3') feet outside the footing at footing elevation and extending down at a slope of one (1') foot vertical for each foot horizontal. The Contractor shall stop and consult the Geotechnical Engineer and Structural Engineer if it appears that soil correction is required within the zone of influence of the existing footings.

b. At a minimum the contractor shall oversize excavations at least two (2') feet from the outside of the footing at the footing elevation.

2. The exposed subgrade soils shall be tested by the Independent Testing Agency. Remove and replace unsuitable soils as directed by the Geotechnical Engineer. No additional compensation will be allowed for exporting or importing of soils.

3. Unauthorized Excavation: The Contractor shall not be permitted to fill the under footings with any other material other than concrete in cases where materials are removed beyond the indicated subgrade elevations without the specific directions of the Architect/Engineer. If excavation is made too deep, it shall be filled with foundation strength concrete to the proper footing elevation at the Contractor's expense.

F. Excavation for proposed paving areas:

1. Excavate and remove all soils with organic content, soft soils, or soils otherwise deemed unsuitable by the Geotechnical Engineer under the proposed pavement areas. No proposed pavements shall bear on soil with questionable bearing capacity.

2. In cut areas subcut to a point equal to the proposed pavement cross section, including base material, below finished grade elevations.

3.6 FILLING, BACKFILLING, AND COMPACTION PROCEDURES

A. Coordination: The General and Mechanical Contractors shall cooperate in the digging, backfilling and compacting operations.

B. The Contractor shall be solely responsible for determining quantities of fill and waste materials to be handled and for amount of grading to be done in order to completely perform all work indicated on the Drawings. The costs of importing fill and/or exporting excess materials from the site shall be considered part of the Base Bid Contract.

C. Prior to the placement of fill, the Geotechnical Engineer must inspect and approve the bottom or bearing surface of each excavation.

D. Fill shall not be placed on frozen ground, nor shall filling operations continue when the temperature is such as to permit the layer under placement to freeze.

E. Before placing fill on a slope greater than five (5) horizontally to one (1) vertically (5:1), the Contractor shall, at their option: (a) flatten the existing slope to the extent that it will not be steeper than 5:1; or (b) construct steps in the slope, with the back surface being as nearly vertical as practicable and with the horizontal cuts being made as close together as the slope permits, but with no step being less than ten (10') feet in width.

F. General:

1. Deposit approved fill in uniform layers not exceeding twelve (12") inches (loose) thickness. Compact each layer with approved methods and equipment to the minimum specified density.

a. The fill material, when being compacted, shall contain the moisture content necessary for the required compaction as designated by the Geotechnical Engineer. The soil shall be moisture conditioned to within 2 percent of optimum moisture content. The moisture shall be uniform throughout each layer.

2. Scarify, remove, recompact or otherwise rectify all soft or yielding areas resulting from construction operations, rain or other sources at no additional cost to the Owner.

G. Filling, backfilling and compaction for buildings:
   1. The Geotechnical Engineer shall inspect footing excavation bottoms. The contractor shall comply with the required corrective procedures to obtain satisfactory footing excavation bottoms prior to placing footings or backfilling.
   2. Employ a placement method that does not disturb or damage foundation perimeter drainage, foundation dampproofing and protective cover.
   3. The compacted building pad area shall be brought to true even plane to the base of the sand cushion elevation.

H. Filling, backfilling and compaction for proposed paving areas:
   1. Prior to placing fill materials, proof roll subgrade using a loaded truck or similar equipment to detect soft or loose zones where additional excavation depths may be required.
   2. In fill areas, bring grade up to underside of granular subbase for pavements.
   3. Compact and shape the subgrade for its entirety as may be necessary to produce, at the time base is placed, the specified density and stability in the top twelve (12") inches of the subgrade and the grades indicated on the Drawings.
   4. Pre-compact entire area to be paved to the specified density just prior to placing stabilized aggregate base for pavements.
   5. If test rolling shows any area to be unstable, the Contractor shall, at their expense, scarify the area and aerate or add moisture to the soil as necessary, and recompact the soil to the extent it will be stable when retested by rolling.
   6. For roadways and parking areas, refer to Section 32 1122 for stabilized aggregate base.

I. Filling, backfilling and compaction for landscape areas:
   1. Place a minimum of six (6") inches of topsoil at the surface of all landscape areas unless noted otherwise.
   2. Compact topsoil as necessary to prevent settlement without inhibiting vertical drainage and subsequent turf establishment. If over-compaction occurs, the Contractor may be required to scarify soil and re-blade. The depth of the topsoil shall be measured after compaction.

J. Compaction of Trenches for Underground Piping:
   1. General Requirements: Place the fill and compact in connection with the installation of the underground plumbing pipe in the Mechanical Contract as follows:
      a. Exterior: Refer to Section 31 2333 - Trench Excavation and Backfill for Utilities.
      b. Interior: Refer to Mechanical Specifications.

3.7 GRADING

A. General:
   1. The grades shown on the Drawings are proposed finish grades.
   2. Provide surfaces free of debris and building materials. Complete rough grading by blading to reasonably smooth contours with neat, uniform transitions and slopes. Remove stones over one and one half (1-1/2 ") inches in diameter, branches and other vegetation. Ease new grades into surrounding existing grades without awkward or abrupt transitions.

B. Buildings Areas:
   1. The Contractor shall grade to the prescribed subgrade elevations.
   2. All surfaces shall be finished to such contour that they will not impound surface water.
      a. Rough grade tolerances are as follows:
         1) Surfaces shall not vary by more than five one-hundredths (0.05') foot above or one-tenth (0.10') foot below the subgrade elevations referenced to herein.

C. Paved Areas:
   1. The Contractor shall grade to the prescribed subgrade elevations.
   2. All surfaces shall be finished to such contour that they will not impound surface water.
      a. Rough grade tolerances are as follows:
         1) Surfaces shall not vary by more than five one-hundredths (0.05') foot above or one-tenth (0.10') foot below the subgrade elevations referenced to herein.

D. Landscape Areas:
   1. Rough Grading: Grade subsoil to a minimum elevation six (6") inches below finish grade. Soil most suitable for lawns shall be spread as top layer. Rough grading shall include spreading the material on the site smoothly and evenly with a dozer or equal equipment, leaving it similar to back dragging with a dozer.
      a. Rough grade tolerances are as follows:
         1) Not more than two-tenths (0.20') feet above or below finish grade elevations shown on the drawings.
   2. Finish Grading: Spread topsoil to a minimum depth of six (6") inches and stabilize as indicated on the plans.
   3. Backfill in landscape areas placed against curbing shall be graded flush with the top of curb. Backfill in landscape areas placed against walks or pavements shall be graded flush with the walk or pavement surface on the up gradient side and held down one inch below the walk or pavement on the down gradient side.

3.8 STORMWATER MANAGEMENT BASIN AREAS

A. The stormwater management basin areas shall be fenced off to prevent construction traffic from entering the area that would compact the surrounding soils.

B. The basin shall have a 30 mil PCV liner placed on the bottom and sides of the basin to prevent infiltration of water into the contaminated soils below.

C. The stormwater management basin area above tis intended to infiltrate the storm water. The Contractor will be asked to reconstruct the stormwater management basin or correct deficiencies, if the stormwater management basin area holds storm water for more than 48 hours after a rainstorm event.

D. Refer to plan detail for stormwater management basin cross section.

3.9 COMPACTION DENSITY REQUIREMENTS

A. Compaction of all fill and backfill shall meet or exceed the following percentages of Standard Proctor Density ASTM D698:
   1. 98 percent below footings.
   2. 98 percent below building floor slabs.
   3. 95 percent below steps and exterior sidewalks.
   4. 95 percent for backfill placed more than three (3') feet below final pavement subgrades.
   5. 100 percent for backfill within upper three (3') feet of final pavement subgrades.
   6. 90 percent below landscape areas .

B. Tests falling below the specified density shall be cause for rejection and will require further compacting or removal and recompacting at the Contractor's expense until the Specification requirements are met. Each lift must be approved before commencing with the next succeeding lift.

3.10 FIELD QUALITY CONTROL

A. Refer to Division One Specifications for general requirements for field inspection and testing.

B. Field-testing and inspection shall be performed by qualified parties as specified herein and in accordance with the provisions of Division One Specifications.

C. Conventional testing and inspection services herein describe those items not specifically required by Minnesota State Building Code but are considered essential to the proper performance of the building systems.

D. Verify that footing bearing surfaces comply with frost depth requirements and report variances in a timely manner.

E. Classification of materials used and encountered during construction will be performed in accordance with ASTM D2488 and ASTM D2487.
   1. Inspect each footing and slab subgrade to determine if subgrade materials are acceptable. Perform hand auger borings, soil classifications and dynamic cone penetrometer tests to verify if design-bearing capacity is achieved.
   2. Inspect, test and approve excavated soils to be used as backfill materials.
   3. Inspect and test backfill operations to ensure acceptability of materials being placed, method of placement, thickness of layers and compaction of backfill.
   4. Inspect and test backfill operations along foundation walls to ensure acceptability of materials being placed and compacted so that settlement will not occur.

F. The geotechnical testing laboratory shall advise the Owner, Contractor and Engineer of any materials or operation that in their professional opinion will not produce the specified results. The geotechnical testing laboratory shall perform the following:
   1. Observe and evaluate the soil conditions at the bottom of all excavations, determine limits of excavation where applicable and evaluate and document depth and width.
   2. Perform analysis for on-site and borrow soils for suitability as backfill.
   3. Observe, evaluate and report contractor's operations within context of soil limitations and project requirements.
   4. Perform density tests on compacted backfill materials.
   5. Compaction testing shall be performed in accordance with ASTM D698.
   6. Observe all subgrades and excavation bases below footings and slabs before further construction is performed.
   7. All proposed pavement subgrades shall be test rolled in accordance with MN/DOT 2111 immediately prior to placement of aggregate base course.
      a. All pavement areas shall be test rolled in the presence of the Geotechnical Engineer.
      b. The required subgrade stability shall be such that during placement of the base, rutting and displacement does not occur. Maximum yield: One (1") inch (measured from the top of the constructed subgrade to the bottom of the rut).
   8. Document presence of ground water within excavations. Verify cut and fill slopes as specified in the Contract Documents.
   9. Perform double ring infiltrometer test on all stormwater management basin areas and verify design infiltration rate in accordance with ASTM D3385.
      a. Perform a minimum of one infiltration test per stormwater management basin.
      b. Perform one infiltration test per every 2,500 square feet of stormwater management basin surface area, rounding up to the nearest 2,500. I.E. a 6,500 square foot basin (7,500 SF Rounded) would require 3 infiltration tests

G. If tests indicate that the Work does not meet the specified requirements, remove the Work, replace and retest at no cost to the Owner.

H. Frequency of Tests:
   1. Footing Subgrade: For each stratum of soil on which footings will be placed, conduct at least one (1) test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison

of each subgrade with related tested strata, when acceptable to the Architect/Engineer.

2. Compaction tests of subgrade shall be made at maximum horizontal intervals of fifty (50') feet in each direction, or as directed by Architect/Engineer.
3. Compaction tests of in-place backfill materials shall be made at a maximum vertical interval of twelve (12") inches, and maximum horizontal intervals of fifty (50') feet in each direction, or as directed by the Architect/Engineer.

END OF SECTION

SECTION 31 10 00 - SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Remove trees, underbrush, undesirable growths, stumps, roots, etc. from the area to the limits indicated on the Drawings, specified herein, and as required to meet the contract documents.

C. Site clearing operations:

1. Selective site clearing and grubbing of trees and brush.
2. Stripping topsoil.
3. Stockpiling of topsoil.

D. Clearing and protection of vegetation.

E. Removal of existing debris.

1.2 RELATED SECTIONS

A. Section 01 57 13 - Erosion and Sediment Controls.

B. Section 02 41 13 - Selective Site Demolition.

C. Section 31 00 00 - Earthwork.

D. Section 31 23 33 - Trenching and Backfilling.

1.3 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.

B. Conform to all applicable code for materials and installation of the Work of this Section.

C. Verify that survey benchmark and intended elevations for the Work are as indicated.

D. Codes and Standards: Perform excavation work and disposal of debris in accordance with applicable requirements of governing authorities having jurisdiction.

E. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this section.

F. Use equipment adequate in size, capacity and number to accomplish the Work in a timely manner.

G. Comply with requirements of governmental agencies having jurisdiction.

1.4 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.

B. Protection of Persons: The Owner's activities will continue about the site during construction. Install barricade fencing, as necessary, to provide a safe environment between construction work and pedestrian circulation.

C. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace

existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer's satisfaction and at no cost to the Owner.

D. Existing Utilities:
   1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.
   2. The approximate locations of certain underground lines and structures are shown on the plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.
   3. Locate and mark these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.
   4. Locate, excavate, and expose all existing underground lines in advance of trenching operations.
   5. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.

E. Traffic Control:
   1. Maintain vehicular and pedestrian traffic as required for construction activities.
   2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of the Work.
   3. When working in public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours and datum. Verify that survey benchmark and intended elevations for the Work are as indicated on the Drawings.

3.2 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
B. Protect existing utilities to remain from damage.
C. Do not disrupt public utilities without permit from authority having jurisdiction.
D. Protect existing structures and other elements that are not to be removed.
   1. Protect benchmarks, existing structures, fences, sidewalks, paving, curbs and other items indicated on the Drawings to remain.
E. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated on the Drawings or as necessary to facilitate new construction.

3.3 PROTECTION

A. Protect trees, plant growth and features designated to remain as final landscaping.
B. Protection of trees: It may become desirable to save certain trees in areas where cut or fill is eighteen (18") inches or less and in parking areas. Consequently, the Contractor shall obtain approval from the Engineer prior to removal of significant trees from such areas. The Contractor shall protect existing trees to remain during construction by constructing barricades around such trees as directed.

3.4 CLEARING AND GRUBBING

A. Selective clearing shall be done in areas designated by the Engineer. Selective clearing shall consist of removing vegetation, brush, stumps, etc. from the area. Selected trees shall be left standing and care shall be taken to protect trees designated to remain. All debris from this operation shall be disposed of off the Owner's property. Grubbing will not be required in areas designated for selective clearing.

B. Cutting and removing trees, shrubs, bushes, windfall and other vegetation: Cut brush within six (6") inches of the ground surface. Remove, as directed, any low hanging, unsound or unsightly branches on the trees and shrubs designated to remain.

C. Remove and dispose of stumps, roots and other remains. Remove stumps completely. Backfill depressions resulting from the grubbing operations with suitable material and compact to the specified requirements except in areas to be excavated.

D. Remove timber, stumps, roots and other debris or by-products resulting from the clearing and grubbing operations from the site. If any wood is run through a chipping machine, the wood chips shall be immediately recovered and disposed of off the site.

E. Grubbing operations shall consist of removing and disposing of the stumps, roots and other remains in the construction area in their entirety.

3.5 VEGETATION

A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, and planting beds.

B. Do not begin clearing until vegetation to be relocated has been removed.

C. Do not remove or damage vegetation beyond the following limits:
   1. 40 feet outside the building perimeter.
   2. 10 feet each side of surface walkways, patios, surface parking, and utility lines less than 12 inches in diameter.
   3. 15 feet each side of roadway curbs and main utility trenches.
   4. 25 feet outside perimeter of pervious paving areas that must not be compacted by construction traffic.

D. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. At vegetation removal limits.
   2. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.

E. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.

F. Vegetation Removed: Do not burn, bury, landfill, or leave on site.
   1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
   2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots in their entirety .
   3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots in their entirety.
   4. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.

G. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.

H. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace and maintain until established at no cost to Owner.

3.6 DEBRIS

A. Remove debris, junk, and trash from site.
B. Burning of debris is not permitted on the Owner's property.
C. Remove all waste materials and unsuitable or excess topsoil from the Owner's property.
D. The cost of disposal of waste materials is considered part of the Base Bid Contract.
E. Leave site in clean condition, ready for subsequent work.
F. Clean up spills and wind-blown debris from public and private lands.

END OF SECTION

SECTION 31 23 33 - TRENCHING AND BACKFILLING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Trench Excavation, Backfilling and Compaction as indicated on the Drawings, specified herein; and as needed for installation of underground utilities associated with the Work.

1.2 RELATED SECTIONS

A. Section 01 57 13 - Erosion and Sediment Controls.

B. Section 02 41 13 - Selective Site Demolition.

C. Section 31 00 00 - Earthwork.

D. Section 32 11 22 - Aggregate Bases.

E. Section 32 12 16 - Asphalt Concrete Paving.

F. Section 32 13 13 - Exterior Concrete Paving.

G. Section 33 10 00 - Water Distribution.

H. Section 33 30 00 - Sanitary Sewerage Utilities.

I. Section 33 40 00 - Storm Drainage Utilities.

1.3 REFERENCES

A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.

C. ASTM D75/D75M - Standard Practice for Sampling Aggregates; 2014(2014).

D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

F. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2020.

G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017, with Editorial Revision (2020).

H. ASTM D2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure); 2009.

I. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017, with Editorial Revision (2018).

J. ASTM D6913/D6913M - Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis; 2017.

K. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2023.

L. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).

M. Minnesota Department of Transportation 2020 Edition "Standard Specifications for Construction". Only applicable portions of construction methods and materials apply. References to methods of measurement or payment are not applicable.

1. MN/DOT 2575 - Establishing Turf and Controlling Erosion

N. Minnesota Department of Labor and Industry - Minnesota State Building Code.

1.4 SUBMITTALS

A. Submit under provisions of Division One Specifications.
B. Samples: 10 Lb. sample of each type of fill; submit in air-tight containers to testing laboratory.
C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
D. Compaction Density Test Reports.

1.5 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.
B. Conform to all applicable code for materials and installation of the Work of this Section.
C. Verify that survey benchmark and intended elevations for the Work are as indicated.
D. The Contractor is responsible for coordinating construction schedule and required testing with testing agency prior to start of construction.
E. Codes and Standards: Perform excavation work and disposal of debris in accordance with applicable requirements of governing authorities having jurisdiction.
F. All excavations and trenches shall comply with the requirements of 29 CFR 1926, Sub-Part P, “Excavations and Trenches.”
G. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this section.
H. Use equipment adequate in size, capacity and number to accomplish the Work in a timely manner.

1.6 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding.
B. The Contractor shall carefully review plans and identify utilities that are to be verified prior to construction.
C. Existing Utilities:
    1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.
    2. The approximate location of certain underground lines and structures are shown on the Plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.
    3. Locate these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.
    4. Locate, excavate, and expose all existing underground lines in advance of trenching operations.
    5. The Contractor shall carefully review the plans and identify utilities that are to be verified prior to construction.
    6. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.
    7. The Contractor shall become familiarized with the existing conditions and be prepared to adequately care for and safeguard themselves and the Owner from damage.

D. Protection of Persons: The Owner's activities will continue in and about the site during construction. Install barricade fencing, as necessary, to provide a safe environment between construction work and owner's activities.

E. Benchmarks and Monuments: Maintain and protect benchmarks and monuments that exist on the site.

F. Protection of Existing Property to Remain: Protect existing equipment and structures which are in the area where the Work will be performed and which are to remain. Repair or replace existing property which is to remain that is damaged by the Work, to the Engineer's or jurisdictional authority's satisfaction and at no cost to the Owner and the Owner's Representatives.

G. Protecting Trees, Shrubbery and Lawns:
   1. Trees, plants and shrubbery in developed areas and along the trench line shall not be disturbed unless absolutely necessary, and subject to the approval of the Engineer.
      a. Any such trees, plants and shrubbery necessary to be removed shall be heeled in and replanted.
   2. Where trenches cross private property through established lawns, sod shall be cut, removed, stacked and maintained in a suitable condition until the Engineer approves replacement.
      a. Topsoil underlying lawn areas shall be removed and kept separate from general excavated materials.

H. Clearing:
   1. Perform all clearing necessary for installation of the complete Work.
   2. Clearing shall consist of removing all trees, stumps, roots, brush and debris in the right-of-way obtained for the Work.
   3. All other material, including trimmings from above, shall be completely disposed of off the site in a satisfactory manner.

I. Restoration of Disturbed Areas:
   1. The Contractor shall restore to a condition equal to or better than existing, all other structures not specifically mentioned above which are disturbed because of this construction including fences, clothesline posts, mailboxes, yard lights, entrance markers, etc. There will be no additional compensation for this miscellaneous restoration.
   2. All work in public right-of-way is to meet City standards. The Contractor is to contact the City to fully understand the scope of work. No additional compensation will be given for unanticipated work in City right-of-way.
   3. All surplus waste materials remaining after completion of the backfilling operations shall be disposed of in an acceptable manner within 24 hours after completing the backfill work on each particular pipeline section. Disposal at any location within the project limits shall be as specified, or as approved by the Engineer; otherwise, disposal shall be accomplished outside the project limits at the Contractor's discretion. The backfilling and surplus or waste disposal operations shall be a part of the Work required under the pipeline installation items, not as work that may be delayed until final cleanup.
   4. Surface improvements such as pavement, curbing, pedestrian walks, fencing or turf disturbed by this Contractor outside of the general demolition area shall be repaired or replaced to the satisfaction of the responsible party, i.e., the Owner, Engineer, City or other governmental body. The improvement shall be restored to the pre-existing condition. Each item of restoration work shall be done as soon as practicable after the completion of installation and backfilling operations on each section of pipeline.

5. The restoration work shall be compensated as part of the Work required under those contract items which necessitated the destruction and/or replacement and repair, and there will be no separate payment for restoration. Any improvements removed or damaged unnecessarily or undermined shall be replaced or repaired at the Contractor's expense.
6. Turf restoration shall be accomplished by sod placement except where seeding is specifically allowed or required.
   a. Topsoil shall be placed to a minimum depth of six (6") inches under all sod and in all areas to be seeded. Topsoil shall be salvaged from the demolition areas and shall be light, friable loam, free of heavy clay, coarse sand, stones, sticks and other foreign matter.
   b. All turf establishment work shall be done in substantial compliance with MN/DOT 2575.
7. Pavement Restoration (except in City right-of-way).
   a. The in-place pavement structure (including base aggregates) shall be restored in kind and depth as previously existed, with new materials being provided for reconstruction of the concrete or bituminous surface courses, including base aggregates.
   b. Reconstruction of aggregate base courses and concrete or bituminous surface courses shall be in substantial compliance with all applicable MN/DOT Specifications pertaining to the item being restored. The material used shall be comparable to those used in the in-place structure and the workmanship and finished quality shall be equal to that of new construction to the fullest extent obtainable in consideration of operational restrictions.
   c. Existing concrete and bituminous surfaces at the trench wall shall be sawed or cut with a cutting wheel to form a neat edge in a straight line before surfaces are to be restored. Sawing or cutting may be accomplished as a part of the removal or prior to restoration at the option of the Contractor. However, all surface edges will be inspected prior to restoration.

J. Minimizing Silting and Bank Erosion During Construction:
1. During construction, protective measures shall be taken and maintained to minimize silting and bank erosion of creeks and rivers adjacent to the Work being performed during construction.
2. Sack breakers, silt fence, biologs or slope stabilizer mats are to be used on steep slopes along creek banks and fill slopes to prevent washing of ditch. The above-mentioned items are to be used at the direction of the Engineer, local government body or the Watershed District. All costs are part of the Base Bid Contract.
3. The Contractor is to refer to Section 01 57 13 - Erosion and Sediment Controls.

K. Blasting will not be permitted on this job.

L. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS

2.1 EXCAVATED MATERIALS

A. Perform all excavations of every description and of whatever substances encountered to depths indicated on the Drawings or as specified.

B. Pile materials for backfilling in an orderly manner at a safe distance from banks or trenches to avoid overloading and to prevent slides or cave-ins.

C. Remove and deposit unsuitable or excess materials in a legal manner off-site. This is considered part of the Base Bid Contract.

2.2 GRANULAR MATERIALS

A. Granular materials furnished for foundation, bedding, encasement, backfill, or other purposes as may be specified shall consist of any natural or synthetic mineral aggregate such as sand, gravel, crushed rock, crushed stone or slag, which shall be so graded as to meet the gradation requirements specified herein for each particular use.

2.3 GRANULAR MATERIAL GRADATION CLASSIFICATIONS

A. Granular materials furnished for use in foundation bedding in areas where the geotechnical engineer indicates that foundation bedding is required shall conform to MN/DOT 3149.2.H Coarse Filter Aggregate.

B. Granular materials required for use as backfill in wet or submerged conditions shall be coarse sand with less than 50 percent of the particles by weight passing the #40 sieve and less than 5 percent of the particles by weight passing the #200 sieve.

C. Granular bedding provided for plastic pipe and fittings where a foundation bedding or coarse sand is not required, as specified above, shall meet the requirements of MN/DOT 3149.2.B.2 Select Granular Material. The pipe shall be installed and bedded in accordance with ASTM D2321. The granular materials shall be placed 6-inches below the bottom of the pipe to a point 12-inches above the top of pipe.

2.4 GRANULAR MATERIAL DESIGNATIONS

A. Granular materials provided for foundation, bedding, encasement or backfill use as required by the Plans, Specifications and Special Provisions, either as part of the pipe item work unit or as a separate Contract Item, shall be classified as to use in accordance with the following:

B.

Material use Designation	Zone Designation
Granular Foundation	Placed below the bottom of pipe grade as replacement for unsuitable or unstable soils or to achieve better foundation support.
Granular Bedding	Placed below the pipe prior to pipe installation and around the pipe to a depth of 12-inches over the pipe to facilitate proper shaping and to achieve uniform pipe support.
Backfill	Placed below the surface base course, if any, as the second stage of backfill, to minimize trench settlement and provide support for surface improvements.

2.5 PIPE STABILIZATION MATERIALS

A. The materials for base stabilization shall be sand-gravel material or binder stone as described in these Specifications. The type of material to be used is as specified herein.

1. Sand-Gravel Material:
   a. This material shall be used for pipe bedding and/or trench backfill wherever peat, clay or other unsuitable bearing material is encountered as determined by the Engineer. It shall be clean, granular material with gravel larger than one (1") inch (where used as pipe bedding) and not more than 50 percent passing the No. 40 sieve. The material shall be composed such that proper compaction under the “Specified Density Method” (ASTM D698) is achieved.
   b. The material shall be placed to a depth as determined by the Engineer, with a minimum depth of six (6") inches below the bottom of the pipe and extending at least one (1') foot beyond the sides of the pipe and one (1') foot above the pipe.
2. Binder Stone:

a. Binder stone shall consist of durable crushed stone or graded aggregate. All materials shall pass a one and one-half (1½") inch sieve and shall be retained on a three-fourth (3/4") inch sieve. This material shall be used for pipe bedding and/or roadway restoration as directed by the Engineer.

2.6 OTHER MATERIALS

A. Provide and install other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer . This includes City right-of-way work.

2.7 SOURCE QUALITY CONTROL

A. Refer to Division One specifications for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided .

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

C. Notify utility company to remove and relocate utilities.

D. Examine the areas and conditions under which the Work of this section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 COLD WEATHER OPERATION

A. No pipe shall be placed when the temperatures fall below 30° Fahrenheit, without approval of the Engineer.

3.3 OFF SITE DISPOSAL

A. The Contractor will be required to dispose of all bituminous, concrete and other undesirable debris to an approved landfill located outside the project limits with no direct compensation made therefore.

3.4 CLASSIFICATION AND DISPOSITION OF MATERIALS

A. Excavated materials will be classified for payment only to the extent that the removal of materials as classified as rock, by the Engineer, will be paid for separately from other unclassified materials as an Extra Work Item. All other materials encountered in the excavations will be considered as Unclassified Excavation and no additional compensation will be provided for removal of wood, debris, boulders, stone, masonry, concrete or rock fragments less than one (1) cubic yard in volume, together with other miscellaneous matter that can be removed effectively with power-operated excavators without resorting to drilling and blasting.

B. Rock excavation is defined to include all hard, solid rock in ledge formation, bedded deposits and unstratified masses; all natural conglomerate deposits so firmly cemented as to present all the characteristics of solid rock; and any boulder stone, masonry or concrete fragments exceeding one (1) cubic yard in volume. Materials such as shale, hard pan, soft or disintegrated rock which can be dislodged with a hand pick or removed with a power-operated excavator will not be classified as rock excavation.

C. Excavated materials will be classified by the Independent Testing Lab for re-use as being either suitable or unsuitable for backfill or other specified use, subject to selective

controls. All suitable materials shall be reserved for backfill to the extent needed and any surplus remaining shall be utilized for other construction of the project as may be specified or ordered by the Engineer. To the extent practicable, granular materials and topsoil shall be segregated from other materials during the excavating and stockpiling operations so as to permit best use of the available materials at the time of backfilling. Material handling as described above shall be considered part of the Base Bid Contract with no additional compensation provided.

D. All excavated materials reserved for backfill or other use on the project shall be stored at locations approved by the Engineer that will cause a minimum of inconvenience to public travel, adjacent properties and other special interests. The material shall not be deposited so close to the edges of the excavations creating hazardous conditions, nor shall any material be placed so as to block the access to emergency services. All materials considered unsuitable by the Laboratory Inspector or Engineer, for use on the project, shall be immediately removed from the project and be disposed of as arranged for by the Contractor at no extra cost to the contract.

3.5 SHEETING AND BRACING

A. Sheet and brace trenches in accordance with Chapter 66, Trench Bracing, of the Minnesota Regulations relating to Industrial Safety, to a safe angle of repose. The angle of repose shall be no less than the repose required by the Accident Prevention Division of the Minnesota State Industrial Commission or the requirements of the Occupational Safety and Health Act (OSHA), whichever is more restrictive.

B. The Contractor, to prevent the disturbance or settlement of adjacent road surfaces, structures or other improvements, shall furnish and install all sheeting and bracing necessary to provide good working conditions and prevent damage and delay to the Work. The Contractor shall be responsible for the strength and sufficiency of all sheeting and bracing.

C. Bracing shall be so arranged as to provide ample working space and so as not to interfere with the Work and so as not to place any strain on the structures being constructed until such structures are of ample strength to withstand such strain. All sheeting and bracing, unless otherwise specified or ordered to be left in place by the Engineer, shall be removed from the Work at no additional compensation.

D. Any damage to Work under this Contract or to adjacent structures or property caused by settlement, water or earth pressures, slides, cave-ins or other causes due to failure or lack of sheeting and bracing or improper bracing, through negligence or fault of the Contractor in any manner, shall be repaired by the Contractor without delay.

E. The Contractor shall be solely responsible for the safety of the excavation relating to angle of repose and/or bracing.

3.6 TRENCH EXCAVATION

A. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Work shall be done by open trench excavation except jacked or augered pipe designated on the plans or as directed by the Engineer, City.

C. Topsoil shall be stripped from the trench and stockpiled for reuse over all disturbed areas to be seeded or sodded. Stripping, stockpiling and respreading topsoil will be considered part of the Base Bid Contract.

D. Trench excavation shall be dug to the alignment and depth shown on the plans and only one hundred (100') feet in advance of the pipe laying. The trench shall be braced and drained so that workmen may work safely and efficiently therein.

E. Trench water shall be drained from the trench into natural drainage channels or storm sewers, if acceptable, and shall be considered part of the Base Bid Contract. Draining trench water into sanitary sewers will not be permitted. Prior to draining trench water directly into any natural drainage channel or storm sewer, the Contractor is to contact the proper City, County and State agencies to obtain permission. Dewatering operations shall be monitored for sedimentation and treated prior to discharge to public storm water conveyance systems.

F. Braced and sheeted trenches shall be put in place and maintained as may be required to support the side of the excavation and to prevent any movement which may in any way endanger personnel or injure or delay the Work or endanger adjacent buildings or other structures. Where sheeting and bracing are used, the trench width shall be increased accordingly. Trench sheeting shall remain in place until the pipe has been laid, tested for defects and repaired if necessary, and the earth around it compacted to a depth of one (1') foot over the top of the pipe. It shall be the Contractor's responsibility for compliance therein.

G. Excavated material shall be piled in a manner that will not endanger the Work and that will avoid obstructing sidewalks, driveways and drainage. Gutters shall be kept clear or other satisfactory provisions made for street drainage.

H. The maximum width of the trench at the top of the pipe shall be thirty six (36") inches or two times the pipe diameter plus eighteen (18") inches, whichever is greater.

I. Unless otherwise specified on the plans, all pipes shall be placed in a flat bottom trench with tamped backfill. The sides of the trench shall slope back to provide a stable slope for the particular type of soil in the trench.

J. If the trench is excavated to a greater width than authorized, the Engineer may direct the Contractor to provide a higher class of bedding, a higher strength pipe or both, than that required by the Contract, without additional compensation therefore, as the Engineer may deem necessary to satisfy the design requirements.

K. Faulty grade of the trench below grade lines shall be corrected with approved material thoroughly compacted without additional compensation to the Contractor.

L. When excavation is encountered that is unsuitable for backfill, it shall be removed as directed by the Geotechnical Engineer.

M. The Contractor shall be solely responsible for the safety of the excavation relating to angle of repose and/or bracing.

3.7 PREPARATION OF SOIL DURING PIPE LAYING

A. At the time of pipe placement, the bedding conditions shall be such as to provide uniform and continuous support for the pipe between bell holes. Bell holes shall be excavated as necessary to make the joint connections, but they shall be no larger than would be adequate. No pipe material shall be laid in water or when the trench or bedding conditions are otherwise unsuitable or improper.

B. If trench bottom conditions are encountered which appear to require stabilization, the Engineer shall be informed. The trench conditions shall be examined by the Independent Testing Lab to determine the nature of such instability. If it is determined that the trench bottom cannot support the pipe, a further depth and/or width shall be excavated and refilled to the pipe foundation grade with granular foundation material and thoroughly compacted.

C. If the examination by the Engineer reveals that the above described conditions are caused by the Contractor's manipulation of the soils in the presence of excessive moisture or lack of proper dewatering, the Contractor shall take such steps as are necessary to stabilize the trench bottom including the use of pipe support material and improved dewatering methods. In such case, the cost of necessary measures shall be borne by the Contractor.

D. When the bottom of the trench consists of material suitable to properly support the pipe, the following methods of bedding shall apply:
   1. Granular bedding material shall be placed below the midpoint of the pipe, prior to the pipe installation, to facilitate proper shaping and achieve uniform pipe support, using hand compaction methods.
   2. Granular backfill material at the pipe zone shall be free from rock, boulders or other unsuitable substances and shall be deposited into the trench simultaneously on both sides of pipe for the full width of the trench in six (6") inch lifts thoroughly compacted to a minimum elevation of one (1') foot above the top of the pipe. Compaction shall be accomplished by mechanical tamping.
   3. The backfill material shall be placed to the top of the trench of subgrade elevation in level, successive layers, having a thickness of not greater than twelve (12") inches. Each successive layer shall be thoroughly compacted as specified prior to the placement of additional layers. If the specified compaction is not being attained utilizing the equipment and materials available, the thickness of the layers shall be reduced. The addition of water to the backfill materials should be limited to achieving satisfactory moisture content for compaction control, if necessary. Compaction of the backfill should be attained using vibratory, non-vibratory or mechanical rammer-type compactors. The type of compactor is dependent on the type of backfill material used. Precautionary measures should be taken to assure that the compaction equipment will not damage the underlying pipe.
   4. Backfilling shall not take place at any time unless approved compaction equipment is available at the site.

E. Ledge rock, boulders and large stones shall be removed to provide a clearance of at least six (6") inches below the outside barrel of the pipe or fittings, and to a clear width of six (6") inches on each side of the pipe and appurtenances for pipes sixteen (16") inches or less in diameter; for pipes larger than sixteen (16") inches, a clearance of nine (9") inches below and a clear width of nine (9") inches on each side of outside diameter of pipe shall be provided. Adequate clearance for properly jointing pipe laid in rock trenches shall be provided at bell holes. All costs associated with removing and disposing of ledge rock, boulders and large stones are considered part of the Base Bid Contract.

F. Excavations below subgrade in rock or in boulders shall be refilled to subgrade with material approved by the Independent Testing Lab and thoroughly compacted.

G. Where trench excavation is encountered which is unsuitable for backfill, such material shall be replaced with granular backfill to be supplied by the Contractor at the direction of the Independent Testing Lab. All costs of importing granular backfill are part of the Base Bid Contract.

H. Where pipes are of sufficient size to create an excess of backfill material, the excess shall be hauled off the site. Hauling and grading of the excess backfill will be considered part of the Base Bid Contract.

I. Any deficiency in the quantity of material for backfilling the trenches or for filling depressions caused by settlement shall be supplied by the Contractor with no extra compensation allowed.

J. Backfill in trenches in areas to be paved shall be placed to an elevation that will permit the placement of base and surfacing materials.

K. Trench backfill in pavement areas shall be placed in lifts no greater than eight (8") inches thick, at a moisture content within two (2) percentage points of optimum, to a compacted

relative density of at least 95 percent of Standard Proctor Density ASTM D698 at depth, with the upper three (3') feet compacted to 100 percent of Standard Proctor Density.

L. Trench backfill in unpaved areas shall be placed in lifts no greater than twelve (12") inches thick, at moisture content within two (2) percentage points of optimum and compacted to a relative density of at least 90 percent of Standard Proctor Density.

M. Trench backfill compaction around all utility structures shall be accomplished as follows:

1. Within five (5') feet of all utility structures, backfill compaction by mechanical roller vibrators will not be allowed, but shall be accomplished by using whatever mechanical means the Laboratory Inspector deems appropriate and shall be compacted in layers with material not to exceed eight (8") inches in depth.

3.8 FIELD QUALITY CONTROL

A. Refer to Division One specifications for general requirements for field inspection and testing.

B. Field-testing and inspection shall be performed by qualified parties as specified herein and in accordance with the provisions of Division One Specifications.

C. Conventional testing and inspection services herein describe those items not specifically required by State Building Code but are considered essential to the proper performance of the building systems.

D. Classification of materials used and encountered during construction will be performed in accordance with ASTM D2487 and ASTM D2488.

E. Perform compaction density testing on compacted fill in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.

F. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 (Standard Proctor).

G. Document presence of ground water within excavations. Verify cut and fill slopes if specified in the Contract Documents.

H. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner or the Owner's Representative.

I. Frequency of Tests:

1. Compaction tests shall be performed at the rate of one (1) test per one hundred (100') feet of trench or portion thereof and two (2) tests at each structure with one (1) test below the upper three (3') feet of backfill and one (1) test in the upper three (3') feet of backfill. The majority of the trench backfill tests shall be below the upper three (3') feet.

J. Proof roll compacted fill surfaces within trenches.

K. The Contractor shall make, or provide for, all repairs and replacements to improvements affected by settlement of backfill within 30 days after notice from the Engineer or the Owner.

3.9 CLEAN-UP

A. Remove unused stockpiled materials; leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 11 22 - AGGREGATE BASES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Sub-grade preparation.
C. Testing rolling equipment and procedures.
D. Aggregate base course.
E. Coordination with earthwork specification.
F. All installations related to the above materials.

1.2 RELATED SECTIONS

A. Section 02 41 13 - Selective Site Demolition.
B. Section 31 0000 - Earthwork.
C. Section 31 10 00 - Site Clearing.
D. Section 32 12 16 - Asphalt Concrete Paving.
E. Section 32 13 13 - Exterior Concrete Paving.

1.3 REFERENCES

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.
B. ASTM D75/D75M - Standard Practice for Sampling Aggregates; 2014(2014).
C. ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction; 2012 (Reapproved 2022).
D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).
E. ASTM D2726/D2726M - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures; 2019.
F. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2023.
G. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).
H. Minnesota Department of Transportation 2020 Edition "Standard Specifications for Construction". Only applicable portions of construction methods and materials apply. References to methods of measurement or payment are not applicable.
    1. MN/DOT 3138 - Aggregate for Surface and Base Courses
I. All materials and products used shall comply with Minnesota Department of Transportation 2020 Edition "Standard Specifications for Construction".

1.4 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.
B. Conform to all applicable code for materials and installation of the Work of this Section.
C. Verify that survey benchmark and intended elevations for the Work are as indicated.
D. The Contractor is responsible for coordinating construction schedule and required testing with testing agency prior to start of construction.

E. General: In addition to other specified conditions, comply with the following minimum requirements:
   1. Subcontractor's Qualifications: The construction of the stabilized aggregate base shall be done by a responsible Subcontractor having the necessary equipment and experience to perform the work.

F. Governing Codes: The Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations and orders of any public authority having jurisdiction. All work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.

G. Grade Verification:
   1. Refer to "Submittals" and "Field Quality Control" of this Section.

1.5 SUBMITTALS

A. Submit under the provisions of Division One Specifications.
   1. Samples: Submit ten (10) pound (4.5 kg) sample of aggregate base course material to the Independent Testing Laboratory.
   2. Certificates: The Contractor shall jointly provide certificates certifying that materials comply with the specification requirements.

1.6 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.

B. Protection of Persons: The Owner's activities will continue about the site during construction. Install barricade fencing (snow fence), as necessary, to provide a safe environment between construction work and pedestrian circulation.

C. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, existing structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer's satisfaction and at no cost to the Owner.

D. Existing Utilities:
   1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.
   2. The approximate locations of certain underground lines and structures are shown on the plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.
   3. Locate and mark these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.
   4. Locate, excavate, and expose all existing underground lines in advance of trenching operations.
   5. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.

E. Traffic Control:
   1. Maintain vehicular and pedestrian traffic as required for construction activities.
   2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of the Work.

3. When working in public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

F. Grade Control: Establish and maintain the required lines and grades, including crown and cross slope, for each course during construction operations.

1.7 WARRANTY

A. Provide one (1) year warranty. Warranty shall be in addition to, and run concurrent with, other warranties required by the Contract Documents, including the Division One Specifications. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under the requirements of the Contract Documents.

B. Warranty: All materials and workmanship provided are guaranteed against defects after completion and final acceptance of the Work. Defects due to faulty materials or workmanship developed during the guarantee period shall be satisfactorily repaired or replaced by the Contractor at their expense.

PART 2 PRODUCTS

2.1 AGGREGATE BASE MATERIALS

A. Stabilized Aggregate Base: Aggregate shall meet the requirements of MN/DOT Specification 3138, gradation Class 5, containing up to 100% recycled aggregate, minimum 10 percent crushed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which the Work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Verify substrate has been inspected, gradients and elevations are correct, and at suitable moisture content.

1. Do not proceed until unsatisfactory conditions have been corrected.

C. Coordinate with the related specification 31 00 00 Earthwork to confirm that the sub-grade is at the proper elevation, densities, and material types. Proceeding with work indicates acceptance of the conditions constructed by the related specification section.

3.2 SUBGRADE PREPARATION

A. Correct irregularities in the substrate gradient and elevation by scarifying, reshaping, and recompacting.

B. Do not fill on soft, muddy, or frozen surfaces.

C. Remove loose and foreign material from compacted subbase surfaces immediately before paving application. Do not disturb subbase material.

3.3 TEST ROLLING SUBGRADE

A. Test rolling shall be used when verifying stability and uniformity of subgrade. This procedure shall be performed in presence of testing laboratory inspector.

B. Use test rolling equipment conforming to the following description:

1. Tandem axle, dual wheel dump truck.
2. Tire width maximum of 17 inches for the front axle tires.
3. Tire width maximum of 11 inches for the rear axle tires.
4. Tire pressure shall be no less than 2 psi of tire or vehicle manufacturer's maximum psi rating. The minimum psi rating must be 80 psi.
5. Minimum legal capacity of 52,000 pounds.

6. Minimum front axle capacity of 20,000 pounds.
7. Front axle is loaded to a minimum of 16,000 pounds.
8. Minimum gross weight is a minimum of 50,000 pounds.
9. Provide weigh slip to testing laboratory inspector.

C. Test Rolling Procedures shall be performed as follows:
1. Operate equipment at a rate not to exceed 2.5 to 5 mph or a comfortable walking pace.
2. Adjust speed to allow testing laboratory inspector to measure any deflections and areas of rutting.
3. Operate proof roller equipment in a pattern so that affected areas are loaded with at least one pass.
4. After proof rolling, check subgrade for conformance to drawings, and correct all surface irregularities. Re-shape subgrade within tolerances specified.

D. Limited access areas
1. The above description is typical for road and walk construction. Some areas use of a roller may be impractical, use largest compaction equipment that is practical under the observation of the soils testing representative.

E. Test Rolling Evaluation:
1. Rutting up to 1-inch is acceptable. Rutting in excess of 1-inch but not more than 6-inches shall be considered a failure and will require that soil be reworked and compacted to required density.
2. Deflection (Pumping):
   a. For granular & non-granular materials, deflection is acceptable to a maximum of six-tenths (0.6 in) inches.
   b. For aggregate surfacing, full-depth reclamation, aggregate base, and shoulder aggregate base, deflection is acceptable to a maximum of four-tenths (0.4 in) inches.
   c. For stabilized full depth reclamation, deflection is acceptable to a maximum of three-tenths (0.3 in) inches.
3. Rutting and deflection in excess of 6-inches will require review and recommendation for corrective action by an approved Geotechnical Engineer.
4. Any failing test creates a hold point, where no additional material may be placed until Corrective action and passing retest(s) have occurred or accepted by the Engineer. Any additional material placed before corrective action and passing retest(s) occur constitutes as unauthorized work per MN/DOT 1512.2.
5. After remedial work is performed, a final test roll shall be performed the day following the completion of compaction per MN/DOT 2215. If remedial work is performed as directed, a second test roll may be required at discretion of testing laboratory inspector.

3.4 AGGREGATE BASE PLACEMENT

A. Subgrade: The area to be paved shall be graded to the elevation of the underside of the stabilized base. Pre-compact soils beneath the stabilized base to 100 percent of Standard Proctor Density ASTM D698. Recompact as necessary to provide the specified density for the subgrade.

B. Remove all castings set by others that are within the paving area and replace with metal covers. The castings shall be reset as outlined in 321216 Asphalt Concrete Paving and 321313 Exterior Concrete Paving.

C. Spread aggregate base over prepared base to a total compacted thickness as indicated on the Drawings.

D. Place aggregate base in maximum three (3") inch layers and roller compact.
E. Level and contour surfaces to elevations and gradients indicated on the Drawings.
F. Compact placed aggregate materials to achieve compaction to 100 percent of its Standard Proctor Density ASTM D698.
G. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
H. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
I. Use mechanical vibrating tamping in areas inaccessible to compaction equipment.
J. Aggregate base shall be placed under the concrete curb and gutter by the Paving Contractor. Coordinate all work with the Exterior Concrete Pavement Contractor.

3.5 TOLERANCES

A. Flatness: Maximum variation of one-fourth (1/4") inch measured with a ten (10') foot straight edge.
B. Scheduled Compacted Thickness: Within one-fourth (1/4") inch.
C. Variation from True Elevation: Within one-fourth (1/4") inch.

3.6 FIELD QUALITY CONTROL

A. Field testing and inspection shall be performed by qualified parties as specified herein and in accordance with the provisions of Division One Specifications.
B. An Owner hired testing laboratory shall perform tests as indicated below.
    1. Perform one sieve analysis on the aggregate base in accordance with ASTM C136/C136M for every 1000 tons of aggregate base or a minimum of one test.
    2. Visually field verify by test rolling and take two field density tests in accordance with ASTM D1556/D1556M or ASTM D6938 for every 250 tons of aggregate base placed or a minimum of four tests.
C. If tests indicate that the Work does not meet the specified requirements, remove the Work, replace and retest at no additional cost to the Owner.

END OF SECTION

SECTION 32 12 16 - ASPHALT CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Asphalt concrete paving above aggregate base course; as indicated on the drawings, specified herein, and complete with all accessories.
C. Bituminous tack coat
D. Asphalt concrete paving; wear course and non-wearing course surfaces.
   1. Parking lot pavement.
   2. Driveway pavement.

1.2 RELATED SECTIONS

A. Section 02 41 13 - Selective Site Demolition.
B. Section 31 00 00 - Earthwork.
C. Section 32 11 22 - Aggregate Bases.
D. Section 32 13 13 - Exterior Concrete Paving.

1.3 REFERENCES

A. AI MS-2 - Asphalt Mix Design Methods; 2015.
B. ASTM C117 - Standard Test Method for Materials Finer than 75-nm (No. 200) Sieve in Mineral Aggregates by Washing; 2017.
C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.
D. ASTM D2172/D2172M - Standard Test Methods for Quantitative Extraction of Asphalt Binder from Asphalt Mixtures; 2017e1.
E. ASTM D2726/D2726M - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures; 2019.
F. ASTM D3549/D3549M - Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens; 2018.
G. Minnesota Department of Transportation 2020 Edition "Standard Specifications for Construction". Only applicable portions of construction methods and materials apply. References to methods of measurement or payment are not applicable.
   1. MN/DOT 3138 - Aggregate for Surface and Base Courses
   2. MN/DOT 3139 - Graded Aggregate for Bituminous Mixtures
   3. MN/DOT 3151 - Bituminous Material
   4. MN/DOT 2357 - Bituminous Tack Coat
   5. MN/DOT 2360 - Plant Mixed Asphalt Pavement
H. All materials and products used shall comply with Minnesota Department of Transportation 2020 Edition "Standard Specifications for Construction".

1.4 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.
B. Conform to all applicable code for materials and installation of the Work of this Section.
C. Verify that survey benchmark and intended elevations for the Work are as indicated.

D. The Contractor is responsible for coordinating construction schedule and required testing with testing agency prior to start of construction.

E. General: In addition to other specified conditions, comply with the following minimum requirements:

1. Subcontractor's Qualifications: The construction of bituminous paving shall be done by a responsible Paving Subcontractor having the necessary equipment, plant and experience to perform the work.

F. Governing Codes: The Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations and orders of any public authority having jurisdiction. All work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.

1.5 SUBMITTALS

A. Submit under the provisions of Division One Specifications.

1. Samples: Submit thirty-five (35) pound (4.5 kg) sample of asphalt concrete paving materials and asphalt mix design to the Independent Testing Laboratory.
2. Certificates: The Contractor and the Asphalt Concrete Producer shall jointly provide certificates certifying that materials comply with the specification requirements.
3. Job Mix Design: The bituminous mix plant shall have on file a report prepared by an approved testing laboratory that indicates the proportions of materials used in each type of bituminous courses being provided and the temperature of the mix. The job mix design shall be submitted to the Engineer for acceptance prior to placing the bituminous mix.

1.6 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.

B. Protection of Persons: The Owner's activities will continue about the site during construction. Install barricade fencing, as necessary, to provide a safe environment between construction work and pedestrian circulation.

C. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, existing structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer's satisfaction and at no cost to the Owner.

D. Existing Utilities:

1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.
2. The approximate locations of certain underground lines and structures are shown on the plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.
3. Locate and mark these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.
4. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.

E. Traffic Control:

1. Maintain vehicular and pedestrian traffic as required for construction activities.

2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of the Work.
3. When working in public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

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

G. Weather Limitations:
1. Apply bituminous tack coat only when the ambient temperature is at least 50 degrees Fahrenheit (10 degrees C), and when the temperature has not been below 35 degrees Fahrenheit (2 degrees C) for twelve (12) hours immediately prior to application.
2. Do not apply materials when the base surface is wet or contains an excess of moisture which would prevent uniform distribution and the required penetration.
3. Construct asphalt concrete surface course only when atmospheric temperature is above 50 degrees Fahrenheit (10 degrees C), when the underlying base is dry and when weather is not rainy.
4. Refer to “Minimum Placement Temperature Chart” prepared by the National Asphalt Pavement Association for minimum bituminous placement temperatures.
5. Paving shall not take place when, in the opinion of the Independent Testing Laboratory, the weather or surface conditions are considered unfavorable.

1.7 MATERIAL REQUIREMENTS

A. Mix Criteria:
1. Provide mix formulas for each required asphalt-aggregate mixture.
2. Establish a single percentage of aggregate passing each required sieve size, a single percentage of asphalt cement to be added to aggregate, and a single temperature at which asphalt concrete is to be produced.
3. Comply with the mix requirements of the Minnesota Department of Transportation (MN/DOT) standards.
4. Maintain material quantities within allowable tolerances of the governing standards.

B. Prepare and keep on file the mix formula for each course.

C. The base course shall be tested and approved by the Independent Testing Laboratory immediately prior to placement of the asphalt concrete course.

D. The Contractor will be responsible for all drainage of the finish surface. Any “bird baths” will be considered unacceptable and shall be remedied by the Contractor at their expense to the satisfaction of the Engineer.

1.8 SYSTEM DESCRIPTIONS

A. Design Requirements: Refer to plan details for pavement section thicknesses.
1. Bituminous Pavements: Design consists of minimum eight (8") inch thick aggregate base course, a minimum three (3") inch thick asphalt non-wear course, and a minimum two (2") inch thick asphalt wear course.

1.9 WARRANTY

A. Provide one (1) year warranty. Warranty shall be in addition to, and run concurrent with, other warranties required by the Contract Documents, including the Division One Specifications. Manufacturer’s disclaimers and limitations on product warranties do not relieve Contractor of obligations under the requirements of the Contract Documents.

B. Warranty: All materials and workmanship provided are guaranteed against defects after completion and final acceptance of the Work. Defects due to faulty materials or

workmanship developed during the guarantee period shall be satisfactorily repaired or replaced by the Contractor at their expense.

PART 2 PRODUCTS

2.1 AGGREGATE BASE MATERIAL

A. Reference related specification section 32 11 22 - Aggregate Bases

2.2 ASPHALT CONCRETE MATERIALS

A. Bituminous Tack Coat: The bituminous tack coat shall be RC liquid asphalt or emulsified asphalt. The tack coat shall meet the requirements of MN/DOT Specification 2357.

B. Bituminous Material for mix shall meet the requirements of MN/DOT 3151, PG (Performance Grade) 58S-28 for all non-wear/overlays and PG 58H-34 for all wear layers.

C. Non-wear Course Mix: MN/DOT 2360, Type SP; thickness indicated on "System Description" of this Section.

1. Mixture shall conform to current DOT requirements.

D. Wear Course Mix: MN/DOT 2360, Type SP; thickness indicated on "System Description" of this Section.

1. Mixture shall conform to current DOT requirements.

2.3 GRADED AGGREGATES FOR BITUMINOUS MIXTURES

A. Graded aggregates shall conform to MN/DOT 2360.

B. Gradation shall conform to:

1. Non-wear Course: MN/DOT 2360, Gradation B.
2. Wear Course: MN/DOT 2360. Gradation A.

2.4 SOURCE QUALITY CONTROL

A. Provide mix design for asphalt under the provisions of Division One Specifications.

B. Submit proposed mix design of each class of mix for review and approval prior to commencement of the Work.

C. Test samples in accordance with AI MS-2.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which the Work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Coordinate with the related specification sections 31 0000 Earthwork and 32 1122 Aggregate Bases to confirm that the sub-grade is at the proper elevation, densities, and material types. Proceeding with work indicates acceptance of the conditions constructed by the related specification section.

3.2 SURFACE PREPARATION

A. Sub-grade

1. Reference related specification Section 31 00 00

B. Aggregate Bases

1. Reference related specification Section 32 11 22

C. Remove loose and foreign material from compacted subbase surfaces immediately before paving application. Do not disturb subbase material.

3.3 TACK COAT:

A. Apply to contact surfaces of previously constructed portland cement concrete surfaces and similar surfaces.

B. Apply at rate of five-hundredths (0.05) to fifteen-hundredths (0.15) gallons per square yard of surface.
C. Apply tack coat by brush to contact surfaces of concrete curbs, gutters, manholes and other structures projecting into or abutting asphalt concrete pavement.
D. Allow surfaces to dry until material is at condition of tackiness and ready to receive pavement.

3.4 PLACING THE MIX - DOUBLE COURSE

A. Place asphalt concrete mixture on prepared surfaces; spread and strike-off using paving machine.
B. Inaccessible and small areas may be placed by hand if approved by the Civil Engineer. Prior to hand placement, the Contractor shall contact the Engineer to obtain written permission to proceed.
C. Place each course at thickness so that when compacted it will conform to the indicated grade, cross-section, finish thickness and density indicated.
D. Pavement Placing:
    1. Unless otherwise directed, begin placing non-wear course at high side of section on one-way slope.
    2. After first strip has been placed and rolled, place succeeding strips.
    3. Complete non-wear courses for a section before placing wearing courses.
    4. Place mixture in continuous operation as practicable.
    5. Place tack coat before placing wear course.
    6. Non-wear course shall be swept as required before placing wear course.
E. Hand Placed:
    1. Spread, tamp and finish mixture using hand tools in areas where machine spreading is not possible, as acceptable to the Geotechnical Engineer.
    2. Place mixture at a rate that will ensure handling and compaction before mixture becomes cooler than acceptable working temperature.
F. Joints:
    1. Gradually make joints between old and new pavements, or between successive day's work, to ensure a continuous bond between adjoining work.
    2. Construct joints to have same texture, density and smoothness as adjacent sections of asphalt concrete course.
    3. Clean contact surfaces free of sand, dirt or other objectionable material and apply tack coat.
    4. Offset transverse joints in succeeding courses not less than five (5') feet.
    5. Cut back edge of previously placed course to expose an even, vertical surface for full course thickness.
    6. Offset longitudinal joints in succeeding courses no less than six (6") inches.
    7. When the edges of longitudinal joints are irregular, honeycombed, or inadequately compacted, cut back unsatisfactory section to expose as even, vertical surface for the full course thickness.

3.5 COMPACTING THE MIX

A. Provide sufficient number of rollers to obtain the required pavement density of 93 percent for non-wear and 92 percent for wear course mix and no more than 97 percent on any layer based on the maximum specific gravity in accordance with the gyratory mix design.
B. Begin rolling operations as soon after placing mix when the mixture will bear weight of roller without excessive displacement.

C. Do not permit heavy equipment, including rollers, to stand on finished surface before it has thoroughly cooled or set.
D. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
E. Start rolling longitudinally at extreme lower side of sections and proceed toward center of pavement. Roll to slightly different lengths on alternate roller runs.
F. Do not roll centers of section first under any circumstances.
G. Breakdown Rolling:
   1. Accomplish breakdown or initial rolling immediately following rolling of transverse and longitudinal joints and outside edge.
   2. Operate rollers as close as possible to the paving machine without causing pavement displacement.
   3. Check crown, grade and smoothness after breakdown rolling.
   4. Repair displaced areas by loosening at once with lutes or rakes and filling, if required, with hot loose material before continuing rolling.
H. Second Rolling:
   1. Follow breakdown rolling as soon as possible, while mixture is hot and in condition for compaction.
   2. Continue second rolling until mixture has been thoroughly compacted.
I. Patching:
   1. Any patching of defective areas shall be discussed with the Civil Engineer prior to proceeding with work.
   2. Remove and replace defective areas.
   3. Cut-out and fill with fresh, hot asphalt concrete.
   4. Compact by rolling to specified surface density and smoothness.
   5. Remove deficient areas for full depth of course.
   6. Cut sides perpendicular and parallel to direction of traffic with edges vertical.
   7. Apply tack coat to exposed surfaces before placing new asphalt concrete mixture.

3.6 MANHOLE AND GATE VALVE PROTECTION

A. Cover manholes, catch basins and gate valves lying within the surface to be sealed to as to prohibit the bituminous material from being placed thereon.
B. Clean the surface of these structures following the application of the cover aggregate.

3.7 ADJUSTING CASTINGS

A. Castings shall be raised after the bituminous base course is placed and prior to installing the wear course.
B. The bituminous base shall be saw cut around the cover plate. The bituminous aggregate and cover plate shall be removed.
C. The casting shall be set to final grade using adjusting rings and mortar. No blocks will be allowed.
D. The aggregate base shall be placed to the design depth around the casting. The bituminous patch mix shall be placed and tamped around the casting to bring the grade up to the surface of the bituminous base.
E. The final grade of castings in paved areas shall be one-fourth (1/4") inch to one-half (1/2") inch below the top of the completed wear course. The castings shall be set to the contour of the finished surface so that the required tolerance is uniform around the circumference of the casting. The one-fourth (1/4") inch to one-half (1/2") inch tolerance shall be measured at the immediate edge of the casting and no “straightedge” measurements shall be accepted. A plywood template, one-half (1/2") inch thick, shall be fastened to the top of all non-

adjustable castings during placing and rolling of the wear course to ensure that the required tolerances are met.

F. All final adjustments to the adjustable castings shall be made by means of the casting adjustment bolts.

G. All castings, which do not meet the required tolerances, shall be removed and re-adjusted at the Contractor's expense.

3.8 FIELD QUALITY CONTROL

A. Field testing and inspection shall be performed by qualified parties as specified herein and in accordance with the provisions of Division One Specifications.

B. An Owner hired testing laboratory shall perform tests as indicated below. Density and thickness requirements listed below apply to the individual cores. Averaging of the individual cores will not be allowed to show compliance with the specified requirements.

1. Perform a minimum of one bituminous mix verification tests for each asphalt concrete layer in accordance with ASTM C136/C136M, ASTM D2172/D2172M and ASTM D2726/D2726M.
2. Perform field density tests and thickness tests on the bituminous paving by taking four (4") inch diameter core samples for every 200 tons or less of bituminous pavement per course to determine the field density and thickness of cores in accordance with ASTM D2726/D2726M and ASTM D3549/D3549M. For larger projects, perform a minimum of two tests for every 500 tons of bituminous pavement placed plus 2 tests every 500 tons thereafter.
    a. Density: Minimum acceptable density of in-place material is 93 percent for non-wear and 92 percent for wear course mix and no more than 97 percent on any layer based on the maximum specific gravity in accordance to the gyratory mix design.
        1) The Owner may require removal and replacement of any part of any lift that is constructed to less than the minimum required density at no cost to the Owner or Owner's representatives.
            (a) Patching or "checkerboard" replacement will not be tolerated. Additional pavement may be required to be removed and replaced, even pavement conforming to the specified densities, at the Owner's discretion.
        2) The Owner has option to reject all bituminous pavements failing to meet the specified densities. Rejected pavement shall be removed and replace at no additional cost to Owner or Owner's Representatives. Owner shall have the option to require the removal and replacement of all paved areas, including areas that meet the required densities.
            (a) Patching or "checkerboard" replacement will not be tolerated. Additional pavement will be required to be removed and replaced, even pavement conforming to the specified densities, at the Owner's discretion. Removal and replacement shall be at no cost to the Owner or Owner's representatives.
    b. Average Core Densities: Where the average density of all bituminous placed, per lift, is less than the specified densities (92 percent wear, 93 percent non-wear), the Owner may elect not to accept all of the bituminous pavement, including sections of the pavement that meet the specified density.
    c. Thickness: The in-place compacted thickness of the bituminous core shall be within the following allowable variation from thickness specified herein.
        1) Non-wear course: Plus or minus one-fourth (±1/4") inch.
        2) Wear course: Plus or minus one-fourth (±1/4") inch.
        3) The overall thickness of all lifts shall not be less than three-eighths (±3/8") inch of the total thickness specified.

4) The bituminous pavement thickness indicated is the minimum thickness. No additional payment will be given for pavement that exceeds the indicated thickness.
5) The Owner may require removal and replacement of any part of any lift that is constructed to less than the minimum allowable thickness at no cost to the Owner or Owner's representatives.
   (a) Patching or "checkerboard" replacement will not be tolerated. Additional pavement may be required to be removed and replaced, even pavement conforming to the specified thicknesses, at the Owner's discretion.
6) The Owner has option to reject all bituminous pavements failing to meet the specified tolerances. Rejected pavement shall be removed and replace at no additional cost to Owner or Owner's Representatives. Owner shall have the option to require the removal and replacement of all paved areas, including areas that meet the required total thickness.
   (a) Patching or "checkerboard" replacement will not be tolerated. Additional pavement will be required to be removed and replaced, even pavement conforming to the specified thicknesses, at the Owner's discretion. Removal and replacement shall be at no cost to the Owner or Owner's representatives.

d. Repair holes from test specimens as specified for patching defective work.

C. Surface Smoothness:
1. The Contractor shall provide final surfaces of uniform texture, conforming to the required grades and cross-sections. Visually observe surface smoothness of finished surface. The finished surface shall be free of segregated, open and torn sections and shall be smooth and true to grade and cross section as shown on the Drawings.
2. Test finished access drive and/or roadway surfaces for each asphalt concrete course for smoothness, using a ten (10') foot straightedge applied parallel to and at right angles in centerline of paved areas.
   a. Check surfaced areas at intervals as directed by the Geotechnical Engineer.
   b. Surfaces will not be acceptable if exceeding the following:
      1) Base Course: One-fourth (1/4") inch in ten (10') feet.
      2) Surface Course: One-fourth (1/4") inch in ten (10') feet.

D. Flood Test:
1. After completion, flood the entire asphalt concrete paved area with water by use of a tank truck or hoses.
2. If a depression or bird bath is found where water ponds to a depth of more than one-sixteenth (1/16") inch, fill areas or otherwise correct to provide proper drainage to the satisfaction of the Owner.
3. Feather and smooth the edges of fill so that the joint between the fill and the original surface is invisible.

E. If tests indicate that the Work does not meet the specified requirements, remove the Work, replace and retest at no additional cost to the Owner.

3.9 CLEANING

A. After completion of paving operations, clean surfaces of excess or spilled asphalt materials to the satisfaction of the Engineer.

3.10 PROTECTION

A. The Contractor shall be required to protect all adjacent concrete surfaces from chipping and damage during the asphalt pavement placement.
B. Protect all concrete surfaces from staining or discoloration during placement of asphalt materials or vehicle trucking during construction.

C. Immediately after placement of asphalt paving, provide traffic cones, barricades and other devices needed to protect pavement and marking paint from mechanical injury for a minimum of seven (7) days.

END OF SECTION

SECTION 32 13 13 - EXTERIOR CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Exterior concrete pavement systems above base course; as indicated on the Drawings, specified herein, and complete with all accessories.
C. Granular base under exterior concrete sidewalk Work is specified under the provisions of Section 31 00 00.
D. Exterior Concrete Work:
   1. Concrete curb and gutter.
   2. Aprons and Driveway slabs.
   3. Sidewalks.
E. Joint Sealant and Joint Backing.

1.2 RELATED SECTIONS

A. Section 31 00 00 - Earthwork.
B. Section 32 11 22 - Aggregate Bases
C. Section 32 12 16 - Asphalt Concrete Paving.

1.3 REFERENCES

A. ACI 301 - Specifications for Concrete Construction; 2020.
B. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
C. ACI 305R - Guide to Hot Weather Concreting; 2020.
D. ACI 306R - Guide to Cold Weather Concreting; 2016.
E. ACI 325.9R - Guide for Construction of Concrete Pavement; 2015.
F. ACI 330.1 - Specification for Unreinforced Concrete Parking Lots and Site Paving; 2014.
G. ACI 330R - Guide for the Design and Construction of Concrete Parking Lots; 2013.
H. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.
I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.
J. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
K. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2020.
L. ASTM C231/C231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method; 2017a.
M. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
N. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
O. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2024.
P. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2023.
Q. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2023.
R. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements; 2021.
S. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2024.

T. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types); 2023.
U. ASTM D5893/5893M - Standard Specifications for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements; 2016.
V. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).
W. Minnesota Department of Transportation 2020 Edition "Standard Specifications for Construction". Only applicable portions of construction methods and materials apply. References to methods of measurement or payment are not applicable.
   1. MN/DOT 2301 Concrete Pavement
   2. MN/DOT 2521 Walks
   3. MN/DOT 2531 Concrete Curbing
   4. MN/DOT 3137 Coarse Aggregate for Portland Cement Concrete
X. ACI 309R - Guide for Consolidation of Concrete, American Concrete Institute; 2005.

1.4 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.
B. Conform to all applicable code for materials and installation of the Work of this Section.
C. Verify that survey benchmark and intended elevations for the Work are as indicated.
D. The Contractor is responsible for coordinating construction schedule and required testing with testing agency prior to start of construction.
E. Perform the Work in accordance with ACI 325.9R and ACI 330R.
F. Acquire cement and aggregate from same source for all Work.
G. The complete exterior concrete Work shall give the appearance of uniformity in surface contour and texture and shall be accurately constructed to line and grade. The required joints shall show neat workmanship.
H. The Owner shall employ the services of an independent testing lab to perform the specified field quality control.
I. Quality Control:
   1. Do not commence placement of concrete until mix design has been reviewed and approved by the Architect/Engineer and until copies are at the jobsite, the batch plant and the building inspection department.
J. Governing Codes: The Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations and orders of any public authority having jurisdiction. All work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.

1.5 SUBMITTALS

A. Submit under provisions of Division One Specifications.
B. Submit under the provisions of Division One Specifications.
   1. Delivery Tickets: Submit one copy to Architect indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump and time of batching for each load delivered.
   2. Product Data: Provide manufacturer's data on joint filler and curing compounds.
   3. Test Reports and Mix Designs: Contractor shall submit mix designs and aggregate test reports, directly from testing laboratory. Submit mix designs and aggregate test reports at least 14 days prior to placing. Do not place concrete until the

Architect/Engineer has reviewed mix designs and aggregate test reports. Mix identification designation.

C. The independent testing laboratory will submit concrete compression tests, entrained air test, and slump test reports.

1.6 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.

B. Protection of Persons: The Owner's activities will continue about the site during construction. Install barricade fencing, as necessary, to provide a safe environment between construction work and pedestrian circulation.

C. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer's satisfaction and at no cost to the Owner.

D. Existing Utilities:
   1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.
   2. The approximate locations of certain underground lines and structures are shown on the plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.
   3. Locate and mark these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.
   4. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.

E. Traffic Control:
   1. Maintain vehicular and pedestrian traffic as required for construction activities.
   2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of the Work.
   3. When working in public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

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

G. Cold Weather Protection: Place and protect concrete in accordance with ACI 306R, and the following:
   1. When mean daily temperature is 40ºF or lower, provide suitable protection for concrete work as required to maintain minimum concrete temperature of 50ºF for five (5) days, or 70ºF for three (3) days.
      a. So as to avoid thermal shock to the finished work, following protection period, do not allow concrete to cool more than 20ºF each successive day.

H. Hot Weather Protection: Place and protect concrete in accordance with ACI 305R. Employ suitable means to prevent too-rapid drying. Shade fresh concrete as soon as is possible without marring surface.

I. Wet Weather Protection: Do not place concrete in rain, sleet, or snow, without providing adequate protection.

1.7 DELIVERY STORAGE AND HANDLING

A. Furnish delivery tickets with each load of concrete delivered to the Project. Information on each ticket shall be as follows:
   1. Name of ready-mix batch plant.
   2. Ticket number
   3. Date.
   4. Truck number.
   5. Project name and location.
   6. Type of concrete (mix number).
   7. Amount of concrete.
   8. Weights of all ingredients.
   9. Time loaded or time of first mixing.
   10. Maximum aggregate size.
   11. Type, brand, and amount of admixtures.
   12. Total water in the batch and maximum amount of water that can be added at the site without exceeding design mix proportions.
   13. Amount of water added at site and initials of person adding water.

B. The Contractor shall retain delivery tickets for the duration of construction.

1.8 FIELD MEASUREMENTS

A. Verify actual locations of exterior concrete work and other construction to which concrete work must fit, by accurate field measurements before installation. Show recorded measurements on final Shop Drawings. Coordinate installation schedule with construction progress to avoid delay of the Work.

B. The Contractor is to employ the services of a registered land surveyor to perform the specified layout work.

1.9 WARRANTY

A. Provide one (1) year warranty. Warranty shall be in addition to, and run concurrent with, other warranties required by the Contract Documents, including the Division One Specifications. Manufacturer’s disclaimers and limitations on product warranties do not relieve Contractor of obligations under the requirements of the Contract Documents.

B. Warranty: All materials and workmanship provided are guaranteed against defects after completion and final acceptance of the Work. Defects due to faulty materials or workmanship developed during the guarantee period shall be satisfactorily required or replaced by the Contractor at their expense.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cement
   1. Cement for normal weight structural concrete: ASTM C150/C150M, Type I.
   2. Blended cement: ASTM C595/C595M , Type IL.
   3. Use only one type and brand of Portland Cement for all exposed concrete. Architect's permission is required to change brands.

B. Aggregates
   1. Fine aggregates for normal weight structural and non-structural concrete: ASTM C33/C33M

a. Alkali Silicate Reactivity: Expansion of fine aggregate tested per ASTM C1260 shall not exceed 0.15%. If fly ash or other pozzolans are used to reduce shrinkage to meet this requirement, expansion of fine aggregate tested per ASTM C1260 without fly ash or other pozzolans shall not exceed 0.25%.

2. Coarse aggregates for normal weight structural and non-structural concrete: MN/DOT 3137.2.D.2, Class A aggregates
   a. Limits for deleterious substances and physical properties of coarse aggregate for concrete shall meet the requirements of MN/DOT 3137.2.D.2, Class A aggregates.
3. Maximum nominal size of coarse aggregate shall be ¾" for all concrete.

C. Water: Clean and free from deleterious amounts of acids, alkalis or organic materials.

D. An air entraining admixture, conforming to ASTM C260/C260M, shall be used for all concrete.

2.2 ACCESSORIES

A. Curing Materials
1. Moisture-Retaining Cover: ASTM C171, waterproof paper or polyethylene film.
2. Liquid Membrane Curing Compound: ASTM C309, Type 2, Class B.

B. Form Release Agent: Commercial product to facilitate stripping without staining or damaging concrete or impairing future concrete treatment.

C. Expansion Joint and Isolation Joint Filler: ASTM D1751, preformed, resilient, non-extruding, asphalt impregnated joint filler, 1/2" thick unless otherwise indicated.

D. Provide stabilized aggregate base under all concrete sidewalks, ramps and stairs as specified under the provisions of Section 32 11 22 Aggregate Bases

E. Provide stabilized aggregate base under all concrete curb and gutter as specified under the provisions of Section 32 11 22 Aggregate Bases.

F. Provide stabilized aggregate base under all concrete pavements as specified under the provisions of Section 32 11 22 Aggregate Bases.

G. Pavement Joint Sealing Compound:
1. Provide silicone joint sealant meeting the requirements of ASTM D5893/5893M and the following:
   a. Primer-less.
   b. Low modulus.
   c. Does not contain solvents or diluents that can cause shrinkage or expansion during curing.
   d. Smooth and uniform in appearance with a consistency that allows application with air pressure guns or hand caulking applicators.
   e. Capable of withstanding repeated joint movement from negative fifty (-50) to one hundred (100) percent without losing adhesion to the concrete and without cohesion failure.
2. Joint Backing: As recommended by sealant manufacturer.

H. Evaporation Retardants
1. An evaporation-retarding agent may be used during the concrete finishing operation to control plastic cracking of the fresh concrete.
2. Acceptable materials are:
   a. “Confilm”, by Master Builders
   b. “Eucobar”, by Euclid Chemical Co.

2.3 PRODUCTS

A. Concrete Walks: MN/DOT Spec 2521, as detailed and dimensioned on the Drawings.

B. Concrete Curbs/Gutters: MN/DOT Spec 2531, as detailed and dimensioned on the Drawings.

2.4 CONCRETE MIXES

A. Provide mixes meeting the following minimum requirements. Submit concrete mix design for each type of concrete. Mix designs must be reviewed prior to pouring concrete. Review is

for conformance with specification requirements only. Contractor is responsible for performance.

1. 28-day Compressive Strength: 4,500 psi.
2. Maximum Aggregate Size: 3/4", MN/DOT 3137.2.D.2, Class A aggregate.
3. Slump Range: 2"-5".
4. Air Content ASTM C231: 6.5% ±1-1/2%
5. Maximum Water/Cement Ratio:
   a. 0.45 for unreinforced concrete.

B. Concrete shall conform to the requirements of ASTM C94/C94M.

C. Provide concrete with workability such that it will fill the forms, without voids or honeycombs, when properly vibrated, without permitting materials to separate or excess water to collect on the surface.

2.5 FORM MATERIALS

A. The forms shall be of metal, wood or other suitable material, and shall be capable of sustaining the concrete in its proper position until set. Do not use aluminum materials in contact with concrete. Concrete form materials must be used in a manner to provide the surface finish specified.

B. Form Coating Material: Coat forms with a non-staining form release agent that will not discolor or deface the surface of the concrete.

C. Side forms shall have a height at least equal to the edge thickness of concrete being formed.

D. Flexible or curved forms shall be used on curves having a radius of 150 feet or less.

E. Face forms for curbing shall conform to the shape and design of the curb.

2.6 SOURCE QUALITY CONTROL

A. Provide concrete mix design under the provisions of Division One Specifications

B. Submit proposed mix design of each class of concrete to appointed firm for review prior to commencement of work.

C. Provide an independent testing laboratory to perform the following:

1. At the beginning of the concrete operations for the project and for each 1,000 yards of concrete delivered to the project, test the fine and coarse aggregate gradation in accordance with ASTM C136/C136M for conformance with this specification.
2. Verify that the concrete supplied meets the mix design requirements.
3. Submit test results to the Architect/Engineer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which the Work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Coordinate with the related specification sections 31 0000 Earthwork and 32 1122 Aggregate Bases to confirm that sub-grade, granular base, and aggregate base is at the proper elevation, densities, and material types. Proceeding with work indicates acceptance of the conditions constructed by the related specification section.

3.2 SURFACE PREPARATION

A. Sub-grade

1. Reference related specification Section 31 00 00

B. Aggregate Bases

1. Reference related specification Section 32 11 22

C. Base Placement

1. Spread granular cushion as specified in Section 31 00 00 over prepared base to a total compacted thickness as indicated on the Drawings.
2. Place granular cushion base in maximum three (3") inch layers and roller compact.
3. Level and contour surfaces to elevations and gradients indicated on the Drawings.
4. Compact placed aggregate materials to achieve compaction to 100 percent of its maximum dry density in accordance with ASTM D698.
5. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
6. Use mechanical vibrating tamping in areas inaccessible to compaction equipment.

D. Remove loose and foreign material from compacted subbase surfaces immediately before paving application. Do not disturb subbase material.

E. Coat surfaces of manhole and catch basin frames with oil to prevent bond with concrete pavement.

F. The Contractor shall notify the Architect/Engineer and the Independent Inspection Agency a minimum of twenty-four (24) hours prior to commencement of concrete operations.

3.3 ADJUST CASTINGS

A. The casting shall be set to final grade using adjusting rings and mortar. No blocks will be allowed.

B. The aggregate base shall be placed to the design depth around the casting.

C. The final grade of castings in paved areas shall be one-fourth (1/4") inch to one-half (1/2") inch below the top of the completed concrete pavement. The castings shall be set to the contour of the finished surface so that the required tolerance is uniform around the circumference of the casting. The one-fourth (1/4") inch to one-half (1/2") inch tolerance shall be measured at the immediate edge of the casting and no “straightedge” measurements shall be accepted. A plywood template, one-half (1/2") inch thick, shall be fastened to the top of all non-adjustable castings during placement of the concrete to ensure that the required tolerances are met.

D. All final adjustments to the adjustable castings shall be made by means of the casting adjustment bolts.

E. All castings which do not meet the required tolerances shall be removed and re-adjusted at the Contractor's expense.

3.4 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

D. Install forms to allow continuous progress of Work and so that forms can remain in place at least twenty-four (24) hours after concrete placement.

E. Slipform equipment may be used if the resulting curb and gutter conforms to the shape as specified on the drawings and the finish is satisfactory to the Architect/Engineer.

3.5 JOINTING

A. General Joint Requirements:
1. All joints shall be vertical and straight.
2. Transverse joints shall be placed at right angles to the longitudinal axis of the Work.
3. Joints shall align with similar joints in adjoining work where practicable.
4. The panels shall be square where practicable.
5. Maximum length to width ratio shall be one and one-quarter to one (1.25:1).
6. Eliminate or minimize acute angle panels (especially less than sixty (60) degrees) provide reinforcing steel if this is not possible.

7. Unless provided elsewhere in the construction documents (I.E. architectural/landscape plans) contractor shall submit a jointing plan to the architect/engineer prior to start of construction. Jointing plan shall clearly indicate location of control joints, construction joints, and isolation joints.
8. All joint work shall coordinate precisely with grids, modules and radials as prescribed on the Drawings.

B. Expansion/Isolation Joints:
1. Provide isolation joints at the following locations:
   a. At the beginning and end of all curved sections.
   b. Where new concrete surrounds, adjoins or abuts any fixed objects, such as fire hydrants, valve boxes, manholes, light poles, flag poles, curbs, walks or other rigid structures.
   c. At sixty (60') foot maximum spacing for sidewalks or as indicated on the drawings.
   d. Between curb and gutter and immediately adjacent slabs behind curb and gutter.
2. Joints shall be filled with one-half (1/2") inch thick pre-formed joint filler material except as noted below.
   a. Joint filler material shall not be provided between concrete slabs and curb and gutter except under the following circumstances.
      1) Where concrete slabs behind the curb and gutter are immediately adjacent to the curb and the concrete extends behind the curb and gutter by more than 12-feet.
      2) Where concrete slabs are constrained from lateral movement by other objects such as asphalt pavement, curbs, or other fixed objects.
   b. Joints and filler material shall be equal in depth to the full thickness of the slab.

C. Contraction (Control) Joints:
1. Curbing shall be provided with contraction joints at ten (10') feet on center or as indicated on the Drawings.
2. Sidewalks shall be provided with contraction joints at a maximum interval of one-half (1.5) times the sidewalk thickness, unless otherwise approved by engineer. (For Example: Four (4”) Inch thick sidewalk x one-half (1.5) = six (6’) foot joint spacing.)
3. Pavements shall be provided with contraction joints at a maximum interval of twenty-four (24) times the pavement thickness, with a maximum interval of fifteen (15’) feet. (For Example: Six (6”) Inch thick pavement x twenty-four (24) = twelve (12’) foot joint spacing)

D. Hand Tooled Joints:
1. Hand tooled joints shall be provided for the following concrete work:
   a. Sidewalks.
   b. Curbs.
2. All joints and edges, including against isolation/expansion joints, shall be rounded with a one-fourth (1/4”) inch radius tool.
3. Contraction joints shall extend to at least twenty-five (25%) percent of the concrete thickness. (t/4)
4. Contraction joints in curbs shall extend to at least two (2”) inches deep.
5. Contraction joints shall be five-eighths (5/8”) inch wide, width includes both radii.

E. Sawcut Joints:
1. Sawcut joints shall be provided for the following concrete work:
   a. Pavements.
2. Sawcut joints shall extend to at least twenty-five (25%) percent of the pavement thickness. (t/4)

3. Contractor shall sawcut joints as soon as concrete is hard enough such that sawing does not ravel joint edges or dislodge coarse aggregate particles. The maximum time to wait prior to sawing shall be twelve (12) hours or less.

3.6 PLACING CONCRETE

A. Place concrete in accordance with ACI 330.1 and comply with the requirements for mixing and placing concrete as herein specified.
B. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.
C. Immediately before concrete placement, dampen base to reduce absorption. Standing water will not be permitted.
D. Do not place concrete on frozen ground.
E. Incorporate all concrete admixtures into the concrete at the ready-mix plant.
F. Reject concrete not placed within 90 minutes of initial mix.
G. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
H. Place concrete to pattern indicated on the Drawings or as directed by the Architect/Engineer.
I. Place concrete by methods that prevent segregation of the mix. Consolidate concrete along the face of the forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, and side forms.
J. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.7 CONCRETE FINISHING

A. After striking off and consolidating concrete, smooth surfaces by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.
B. After floating and before final finishing, check the concrete with a ten (10') foot steel straightedge to ensure there is no variation greater than three-sixteenth (3/16") inch from the straightedge.
C. Work edges of slabs, gutters top edge of back of curbs and formed joints with an edging tool, and round to one-half (1/2") inch radius, unless otherwise indicated. Eliminate tool marks on concrete surfaces.
D. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surfaces as follows:
    1. Sidewalks: Light broom, radius edges to one (1") inch and trowel joint edges.
    2. Curb and Gutters: Light broom.
    3. Straight Curbs: Light broom, radius edges to one (1”) inch and trowel joint edges.

3.8 CONCRETE CURING

A. Unformed Surfaces: Apply curing materials as soon as finishing operations are complete and the concrete's sufficiently hard to be undamaged by the curing process.
    1. Waterproof paper or polyethylene film: Use appropriate color of film based on ambient temperature. Sprinkle concrete with water as necessary during application of covering. Lap edges and ends at least 6 inches, and seal laps. Weight down covering to prevent movement. Patch holes and tears that occur during the curing period.
B. Compound Application:
    1. Apply a membrane-curing compound to the exposed surface of the concrete within one (1) hour of finishing the concrete.
    2. The compound shall be thoroughly mixed before it is applied.

3. If forms are removed in less than seventy-two (72) hours after placing the concrete, the curing compound shall be applied immediately to the exposed surfaces.
4. The curing compound shall be applied by an approved airless spraying machine at the approximate rate of one (1) gallon of compound to 150 square feet of surface curing area.
5. In all cases, the Contractor shall be responsible for the protection of the concrete from frost during the cure period.

3.9 PAVEMENT JOINT SEALING

A. Prior to sealing, the joint faces shall be cleaned and dried.
B. Prepare joints and sealing compounds in accordance with the manufacturers installation instructions.
C. Install sealing compounds in accordance with manufacturer's instructions in the following locations;
   1. At all construction and expansion/isolation joints.
D. Top of sealer shall be flush to one eighth (1/8") inches below top of concrete surface.

3.10 FIELD QUALITY CONTROL

A. Conventional testing and inspection services herein describe those items not specifically required by the Minnesota State Building Code but are considered essential to the proper performance of the building systems.
B. Field testing and inspection shall be performed by qualified parties as specified herein and in accordance with the provisions of Division One Specifications:
   1. Compressive Test Specimens:
      a. Make one set of test cylinders (four per set), per ASTM C31/C31M, for each day's pour in excess of one cubic yard for each type of concrete. If day's pour exceeds 25 cubic yards, make one set of test cylinders for each additional 50 cubic yards or fraction thereof. Mold and store cylinders for laboratory cured specimens.
   2. Compressive Strength Tests:
      a. Test cylinders per ASTM C39/C39M. Testing shall be performed by independent testing lab. One specimen shall be tested at 7 days for information and two cylinders shall be tested at 28 days for acceptance. One specimen shall be retained in reserve for later testing if required.
   3. Slump Tests:
      a. Furnish and maintain a slump cone and tamping rod. Test first batch of each type of concrete delivered for each day's pour, plus one test for each 25 cubic yards or fraction thereof, ASTM C143/C143M.
   4. Entrained Air Tests:
      a. Furnish and maintain a properly calibrated pressure-type air meter. Test first batch of air entrained concrete delivered for each day's pour plus one test for each 50 cubic yards or fraction thereof, ASTM C231/C231M.
C. Contractor shall maintain records of placed concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

3.11 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures and mechanical injury.

END OF SECTION

SECTION 32 17 23 - PAVEMENT MARKING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Pavement markings; as indicated on the Drawings, specified herein, and complete with all accessories.
   1. Parking bays.
   2. "No Parking" curb painting.
   3. Miscellaneous pavement markings.

C. Labor, material, equipment, and accessories to complete the Work.

D. Prepare pavement surfaces and furnish and apply traffic paint for pavement striping and marking of proposed parking lots and drives as shown on the Drawings and specified herein.

1.2 RELATED SECTIONS

A. Section 32 1216 - Asphalt Concrete Paving

B. Section 32 1313 - Exterior Concrete Paving

1.3 REFERENCES

A. MN/DOT Approved/Qualified Products: Pavement Marking Materials

B. Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)

1.4 SUBMITTALS

A. Product Data: Manufacturer’s data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements.
   3. Installation methods.

1.5 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.

B. Protection of Persons: The Owner’s activities will continue about the site during construction. Install barricade fencing (snow fence), as necessary, to provide a safe environment between construction work and pedestrian circulation.

C. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, existing structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer’s satisfaction and at no cost to the Owner.

D. Traffic Control:
   1. Maintain vehicular and pedestrian traffic as required for construction activities.
   2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of Work.
   3. When working in the public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

E. Weather Limitations

1. No painting shall be performed during the threat of rain or when the pavement surface is damp.
2. Paint shall be applied when the air temperature is between 40°F and 90°F and at least 5°F above the dew point. Paint shall be applied when the relative humidity is 85% or less.
3. The Contractor shall not begin marking pavement surface until conditions are acceptable to the Engineer.

1.6 WARRANTY

A. Provide one (1) year warranty. Warranty shall be in addition to, and run concurrent with, other warranties required by the Contract Documents, including the Division One Specifications. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under the requirements of the Contract Documents.

B. Warranty: All materials and workmanship provided are guaranteed against defects after completion and final acceptance of the Work. Defects due to faulty materials or workmanship developed during the guarantee period shall be satisfactorily repaired or replaced by the Contractor at their expense.

PART 2 PRODUCTS

2.1 PAVEMENT MARKING PAINT MATERIALS

A. Low VOC Latex Traffic Marking Paint
   1. Contractor to provide paint products meeting the following requirements:
      a. Latex Paint Product on the MN/DOT Approved/Qualified Products: Pavement Marking Materials List.
      b. Seal Master - "Traffic Paint."
      c. Sherwin Williams - "Traffic Paint."
      d. PPG - "Zoneline Traffic & Zone Marking Paint."

B. Paint shall be specifically formulated for use as exterior pavement marking paint in traffic areas.

C. Paint shall be white in color unless specified otherwise.

D. Substitutions: Under the provisions of Division One Specifications.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which the Work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 SURFACE PREPARATION

A. Lane and parking lot striping shall not be performed until the excess oils in the new asphalt paving have dissipated, allowing a better bond between the paint and asphalt pavement. The Contractor shall wait 3 to 4 weeks after the asphalt pavement has been installed before placing striping.

B. Immediately prior to application of the traffic paint, the surface shall be properly swept.

C. All sweeping operations and disposal of sweepings shall be the responsibility of the Contractor and will be considered incidental to the Contract.

3.3 LANE STRIPING AND HANDICAPPED MARKINGS

A. Cleaning: Sweep the surface with power broom, supplemented by hand brooms, to remove loose material and dirt.

B. Provide paint striping and handicap logos as indicated on the Drawings. Dimensions shown are to center of stripe unless noted otherwise.

C. Markings: The lines shall be four (4") inches wide unless noted otherwise. The parking stalls shall be the width called for on the Drawings.

D. Paint the International Wheelchair Symbol of Accessibility in each handicapped parking stall. The painted symbol on the pavement shall be in accordance with the state code requirements.

E. Access aisles adjacent to accessible parking stalls shall be painted with a minimum of 5 equally spaced hash bars at a 45 degree angle from the adjacent striping.
   1. Where a "No Parking" sign cannot be installed at the head of the access aisle due to obstruction of a curb ramp or pedestrian route, the contractor shall paint a "No Parking" designation on the surface of the access aisle.

F. Application: Paint shall be applied with mechanical equipment according to the manufacturer's suggested procedure. The applicator shall provide a uniform straight line with sharp edges. Apply two (2) separate coats at a rate of three hundred and twenty (320') lineal feet of standard four (4") inch strip per gallon, unless otherwise recommended by the paint manufacturer.

3.4 PROTECTION

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

3.5 CLEANING

A. Paint containers shall be properly disposed of in accordance with applicable regulatory requirements.

B. When marking paint is thoroughly dry, visually inspect the entire applications, and:
   1. Touch up paint as required to provide clean, straight lines and surfaces throughout.
   2. Using a permanently opaque paint identical in color to the surface on which the paint was applied, block out and eliminate all traces of splashed, tracked and/or spilled pavement marking paint from the background surfaces.
   3. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.
   4. Remove markings in manner to avoid damage to the surface on which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or approved method.
   5. Replace removed markings at no additional cost to Owner.

END OF SECTION

SECTION 33 10 00 - WATER DISTRIBUTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Water distribution system for domestic consumption and firefighting as indicated on the drawings, herein specified and required for a complete and proper installation.
   1. Water Distribution Pipe.
      a. Ductile Iron.
   2. Pipe Fittings.
   3. Valves and boxes.
      a. Gate Valves.
   4. Gaskets.
   5. Electrical bonding of joints.
   6. Granular materials.
   7. Polyethylene encasement.
   8. Tapping sleeves.

1.2 RELATED SECTIONS

A. Section 02 41 13 - Selective Site Demolition.

B. Section 31 23 33 - Trenching and Backfilling.

C. Section 33 30 00 - Sanitary Sewerage Utilities.

D. Section 33 40 00 - Storm Drainage Utilities.

1.3 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.

B. Conform to all applicable code for materials and installation of the Work of this Section.

C. Verify that survey benchmark and intended elevations for the Work are as indicated.

D. The Contractor is responsible for coordinating construction schedule and required testing with testing agency prior to start of construction.

E. Construction of water main and building service pipelines utilizing plant fabricated pipe and other appurtenant materials, installed for conveyance of potable water. Relocation or adjustment of existing facilities as may be indicated on the Drawings.

F. Removal of existing facilities, trench excavation and backfill, and restoration is included in Section 31 23 33.

G. All references to MN/DOT Specifications shall mean the latest published edition of the Minnesota Department of Transportation Standard Specifications for Construction, as modified by any MN/DOT Supplemental Specification edition published prior to the date of advertisement for bids. All reference to other Specifications of AASHTO, ASTM, ANSI, AWWA, etc.

H. All references to Cast Iron material shall be construed to include both Gray Iron and Ductile Iron products, except where one or the other is specified. All references to “structure” shall include any man-made object that is not otherwise exempted by special terminology or definition.

I. Regulatory Requirements:
   1. Local Codes and Ordinances.

2. Local Authority having Jurisdiction.

J. Record Drawings:
1. Refer to "Submittals" and "Field Quality Control" of this Section.

K. Perform Work in accordance with the City of St. Paul's requirements.

1.4 FIELD MEASUREMENTS

A. Verify actual locations of water distribution systems with other construction in which water distribution systems must fit by accurate field measurements before installation. Coordinate installation schedule with construction progress to avoid delay of the Work. No additional compensation will be given for problems resulting from Contractor's failure to verify and/or coordinate storm sewer work.

1.5 SUBMITTALS

A. Submit under the provisions of Division One Specifications.

B. Shop Drawings: The Contractor shall submit a Shop Drawing portfolio showing all piping, valves, fittings, accessories, etc. provided under this Section prior to construction.

C. Record Drawings: The Contractor shall mark, in red pencil or ink, field change made in the Contract Drawings. One set of clean prints shall be used for this purpose. This set of prints shall not be used for construction purposes and shall be kept as clean as possible.
1. The record drawing shall be submitted after the date of Substantial Completion, prior to project closeout, and prior to the release of retainage Engineer.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

D. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe discovery of uncharted utilities.

E. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

1.7 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.

B. Protection of Persons: The Owner's activities will continue about the site during construction. Install barricade fencing, as necessary, to provide a safe environment between construction work and pedestrian circulation.

C. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer's satisfaction and at no cost to the Owner.

D. Existing Utilities:
1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.
2. The approximate locations of certain underground lines and structures are shown on the plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.

3. Locate and mark these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.
4. Locate, excavate, and expose all existing underground lines in advance of trenching operations.
5. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.

E. Traffic Control:
1. Maintain vehicular and pedestrian traffic as required for construction activities.
2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of the Work.
3. When working in public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

1.8 CONFLICTING UTILITIES

A. When alterations to existing utilities are shown to avoid conflicts, make alterations at no cost to the Owner.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, handle and protect products to the site under the provisions of Division One Specifications.
B. Deliver new packaged materials, well-marked and identified, clean, dry and protected against dampness, freezing and damage.
C. Storage of Ductile Iron Pipe Materials:
1. Store in unit packages as received from manufacturer until just prior to use.
2. Stack units in such a manner as to prevent deformation to pipe barrel and bells.
3. Protect from direct sunlight by covering with opaque material if storage period will exceed six (6) weeks.
D. Avoid severe impact blows, gouging or cutting by metal surfaces or rocks.

1.10 WARRANTY

A. Provide one (1) year warranty. Warranty shall be in addition to, and run concurrent with, other warranties required by the Contract Documents, including the Division One Specifications. Manufacturer’s disclaimers and limitations on product warranties do not relieve Contractor of obligations under the requirements of the Contract Documents.
B. Warranty: All materials and workmanship provided are guaranteed against defects after completion and final acceptance of the Work. Defects due to faulty materials or workmanship developed during the guarantee period shall be satisfactorily repaired or replaced by the Contractor at their expense.

PART 2 PRODUCTS

2.1 MATERIALS

A. Materials required for this Work shall be new material conforming to the requirements of the referenced Specifications for the class, kind, type, size, grade and other details indicated in these Specifications. Unless otherwise indicated, all required materials shall be furnished by the Contractor. If any options are provided for, as to type, grade, or design of the material, the choice shall be limited as may be stipulated in the Plans and Specifications.
B. Manufactured products shall conform in detail to such standard design drawings as may be referenced or furnished in the Plans. Otherwise, the Engineer may require advance approval

of material suppliers, product design or other unspecified details as he deems desirable for maintaining adopted standards.

2.2 WATER DISTRIBUTION PIPE

A. Ductile Iron Pipe:

1. Ductile iron pipe shall be Class 52 and shall conform to AWWA C151/A21.51. Mechanical joints shall conform to AWWA C111/A21.11.
2. All ductile iron pipe shall cement lined on the inside in accordance with AWWA C104/A21.4. All exterior surfaces of the pipe and fittings shall have an asphaltic coating at least one mil thick. Spotty or thin seal coating, or poor coating adhesion, shall be cause for rejection.

2.3 PIPE FITTINGS

A. Ductile Iron Fittings:

1. Ductile iron fittings shall have mechanical joints and shall be Class 350 and shall conform to AWWA C110/A21.10. AWWA C153/A21.53 Class 350 compact fittings are considered equal. Mechanical joints shall conform to AWWA C111/A21.11.
2. All fittings shall be tar coated on the outside and cement lined on the inside in accordance with AWWA C104/A21.4.
3. The fittings shall be furnished with steel nuts and bolts and spray-coated with a bituminous coal tar supplied by the manufacturer.

2.4 VALVES AND BOXES

A. Gate Valves:

1. Gate Valves shall conform to AWWA C509 for Resilient Seated Valves and shall comply with the following supplementary requirements:
   a. Working pressure rating of 200 psig for all sized
   b. Two-inch square operating nut opening counterclockwise (left).
   c. Double "O" ring stem seal, one above and below the stem seal.
   d. Weather seal on bonnet cover.
   e. Non-rising stem.
   f. Mechanical Joints.
   g. Valves shall be Tyler Series 6860 or approved equal.

B. Valve Boxes:

1. All valves smaller than twelve (12") inches in diameter are to be provided with vertical valve boxes.
2. Valve boxes shall be cast iron of the three-piece type suitable for a depth of eight (8.0') feet of cover over the top of the pipe or to a depth as shown on the Drawings. Shafts shall be five and one-fourth (5-1/4") inch diameter; bases may be round or oval with a minimum internal diameter of seventeen and one-eighth (17-1/8") inches; and length adjustment shall be screw type. Valve boxes shall be Tyler 6860 or approved equal. The minimum valve box extension shall be one (1') foot.
3. Drop covers on valve boxes shall bear the word “WATER” on the top and be Tyler 6860 covers with extended skirt or approved equal.
4. Valve boxes shall have a minimum of a six (6") inch adjustment above and below specified depth of pipe.

2.5 GASKETS

A. Rubber gaskets for mechanical joints and push-on joints shall conform to ASA A21.11 and shall be designed and manufactured to exact dimensions to assure a liquid-tight joint.

2.6 ELECTRICAL BONDING OF JOINTS

A. Conductive gaskets with copper inserts as manufactured by American Ductile Iron pipe.

B. Each joint on ductile iron pipe, valves, hydrants or fittings, whether “push-on” or mechanical joint type shall be electrically bonded with an external copper jumper capable of carrying 600 amperes of current for an extended period of time to provide integral electric thawing capabilities.

C. These copper jumpers can be either shop or field applied in accordance with these Specifications. For field applied copper jumpers, either the “Burndy-Thermoweld” as supplied by Burndy Corporation, Norwalk, Connecticut, or “Cadweld” by Erico Products Company, Cleveland, Ohio will be permitted.

D. The Contractor shall submit the proposed method to be used for approval by the Engineer prior to construction.

E. The copper jumper shall be a minimum 48 ounce, soft, 1/16" x 3/4" wide flat strip or equal cross section round copper wire in the annealed condition conforming to ASTM Specification B152-58 Type DHP.

F. The copper jumpers shall be welded to the pipe and fittings by the metallic-arc welding process, if shop applied or by the exothermic welding process if field applied.

G. The copper jumper can be applied as a single strip welded at each end across the joint or by multiple strips with bolted connections in the middle. 5/16" x 3/4" silicon bronze hex head bolts and nuts shall be used on all bolted connections.

H. All welded connections shall be made on a clean metal surface that has been ground to remove coating and oxide. The area at the connection, including the weld, shall be refinished with its original coating or other suitable protective coatings as specified.

I. The assembled copper jumper across the joints shall be so installed so that expansion, contraction, or relative pipe movement incidental to normal service will not damage the connection to such an extent that electrical resistance will vary across the joint.

J. The completed water main system shall be tested for electrical conductivity according to these specifications.

2.7 GRANULAR MATERIALS

A. Granular materials furnished for foundation, bedding, backfill or other purposes as may be specified shall consist of any natural or synthetic mineral aggregate such as sand, gravel, crushed rock, crushed stone or slag that shall be so graded as to meet the gradation requirements specified in Section 31 23 33.

2.8 POLYETHYLENE ENCASEMENT

A. All metal pipes shall be covered with a polyethylene tube with a minimum thickness of eight (8) mils. The polyethylene may be natural color or black. All requirements of AWWA C105/A21.5 shall be in effect for this work.

B. Gate valves shall be encased to the operating nut and taped at the operating stem, with hydrants being wrapped to the ground surface and taped at the ground surface. The Contractor shall cut an “X” above each weep hole of the hydrant prior to the construction of the drainage pit and backfill, unless otherwise specified by the Engineer.

2.9 ACCESSORIES

A. Concrete for Thrust Blocks: Concrete type specified in Section 32 13 13 or 03 30 00.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

B. Examine the areas and conditions under which the Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSPECTION AND RESPONSIBILITY OF MATERIALS

A. During the process of unloading, the Contractor shall inspect all pipe and accessories for damage. Notify the Engineer of all material found that has cracks, flaws or other defects. The Engineer shall inspect the damaged material and have the right to reject any materials he/she finds unsatisfactory. Promptly remove all rejected material from the site.

B. Pipe and other accessories shall, unless otherwise directed by the Engineer, be unloaded at the point of delivery, hauled to and distributed at the site of the project by the Contractor. They shall at all times be handled with care to avoid damage.

C. The Contractor shall be responsible for all material furnished and shall replace at their own expense all such material that is found to be defective in manufacture or that has become damaged in handling after delivery by the manufacturer. This shall include the furnishing of all material and labor required for the replacement of installed material discovered defective prior to the final acceptance of the work.

D. The Contractor's responsibility for material furnished by the Owner shall begin at the point of delivery by the manufacturer, or Owner, and upon acceptance of the material by the Contractor. The Contractor shall examine all material furnished by the Owner at the time and place of delivery and shall reject all defective material.

E. The Contractor at their own expense shall replace any material furnished by the Owner that becomes damaged after acceptance by the Contractor.

F. The Contractor shall be responsible for the safe storage of material furnished by or to him/her, and accepted by him/her, and intended for the Work until it has been incorporated in the completed project.

3.3 REMOVALS, TRENCH EXCAVATION AND BACKFILL AND RESTORATION

A. Removal of existing facilities, trench excavation and backfill and restoration shall be in accordance with the provisions of Section 31 23 33.

3.4 WATER MAIN PIPE LAYING OPERATIONS

A. Prior to start of water main construction, the Contractor is to verify with the Building Mechanical Contractor the exact location and elevation at the building. No additional compensation will be allowed for work not coordinated.

B. A registered Land Surveyor employed by the Contractor shall perform the primary line and grade. No deviation from the required line or grade will be allowed except with the consent of the Engineer.

C. Trench excavation and bedding preparations shall precede ahead of the pipe placement as will permit proper placement and joining of the pipe and fittings at the prescribed grade and alignment without unnecessary hindrance. Every reasonable precaution shall be taken to prevent foreign materials from entering the pipe while it is being placed in the line. The water main materials shall be carefully lowered into laying position by the use of suitable restraining devices. Under no circumstances shall the pipe be dropped or dumped into the trench.

D. Before being lowered into laying position, the Contractor shall make a thorough visual inspection of each pipe section and appurtenant units to detect damage, foreign matter needing removal or unsound conditions that may need corrective action or be the cause for rejection. Inspection procedure shall be as approved by the Engineer, with special methods being required as he deems necessary to check out suspected defects more definitely. The Contractor shall inform the Engineer of any defects discovered and the Engineer will

prescribe the required corrective actions or order rejection and prompt removal from the site.

E. Immediately before placement, the joint surfaces of each pipe section and fitting shall be inspected for the presence of foreign matter, coating blisters, rough edges or projections, and any imperfections so detected shall be corrected by cleaning, trimming, or repair as needed.

F. At the time of pipe placement, the bedding conditions shall be such as to provide uniform and continuous support for the pipe between bell holes. Bell holes shall be excavated as necessary to make the joint connections, but they shall be no larger than would be adequate. No pipe material shall be laid in water or when the trench or bedding conditions are otherwise unsuitable or improper. Unless otherwise permitted by the Engineer, bell and spigot pipe shall be laid with the bell end facing upgrade and the laying shall start at the downgrade end, proceeding upgrade.

G. When placement or handling precautions prove inadequate, in the Engineer's opinion, the Contractor shall provide and install suitable plugs or a cap effectively closing the open ends of each pipe section before it is lowered into laying position, and they shall remain so covered until removal is necessary for connection of an adjoining unit.

H. As each length of bell and spigot pipe is placed in laying position, the spigot end shall be centered in the bell and the pipe forced home and brought to the correct line and grade. The pipe shall be securely in place with approved backfill material, which shall be thoroughly compacted around the pipe. The joint areas shall remain exposed and precautions shall be taken to prevent the soil from entering the joint space, until the joint seal has been established. All valve stems and hydrant barrels shall be plumb.

I. All openings along the line of the water main shall be securely closed, as directed, and at the suspension of work at any time, suitable stops shall be placed to prevent earth or any substances from entering the water main. If water is present in the trench, the seals shall remain in place until the trench is pumped completely dry.

J. The water main shall generally be placed with eight (8.0') feet of cover. However, a slightly greater depth may be required to clear existing storm and sanitary sewer services. Accordingly, the pipe will be laid to the depth substantially as shown on the plans. Minor adjustments to this may be required in the field, and no unit of measurement or payment shall apply for such variation.

K. In certain locations where the water main is in direct conflict with the storm or sanitary sewer, the water main shall be constructed under the sewer. Where it is necessary to use vertical bends to avoid sewer mains, no extra compensation will be made for this construction.

L. Water mains crossing storm sewers or sanitary sewers shall be laid to provide a separation of at least eighteen (18") inches between the bottom of the water main and the top of the sewer. When local conditions prevent a vertical separation as described, the following construction shall be used:

1. Sewers passing over or under water mains shall be constructed of materials equal to water main standards of construction.
2. Water main passing under sewers shall, in addition, be protected by providing:
    a. A vertical separation of at least eighteen (18") inches between the bottom of the sewer and the top of the water main;
    b. Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking of the water mains;
    c. That the length of water pipe be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.

M. Water mains shall be laid at least ten (10') feet horizontally from any sanitary sewer, storm sewer or sewer manhole, whenever possible. When local conditions prevent a horizontal separation of ten (10') feet a water main may be laid closer to a storm or sanitary sewer provided that:
   1. The bottom of the water main is at least eighteen (18") inches above the top of the sewer.
   2. Where this vertical separation cannot be obtained, the sewer shall be constructed of materials and with joints that are equivalent to water main standards of construction and shall be pressure tested to assure water tightness prior to backfilling.

N. The Contractor shall not operate any valve or other control on the existing system for any purpose without approval by the City.

O. Give the City at least two (2) days' notice when it is necessary to take a water main out of service. Disruption of service shall be during the time of day when the least inconvenience will be caused to the customer.

P. Where pipe cannot be placed by open trench excavation, the method for placing shall be approved by the Engineer.

3.5 WATER MAIN FITTINGS AND ACCESSORIES

A. Wet Tapping a Lateral to a Main:
   1. When tapping a lateral water main or service to an existing water main, the Contractor shall expose the water main sufficiently to facilitate the connection and shall furnish the necessary materials, including tapping sleeves and valves.

B. Setting Valves, Valve Boxes, Hydrants, Fittings and Curb Stops and Boxes
   1. Gate valves and pipe fittings shall be set and jointed in new pipe in the manner heretofore specified for cleaning, laying and jointing pipe.
   2. Valve boxes shall be firmly supported and maintained centered and plumb over the wrench nut of the gate valve, with box cover flush with the surface of the finished pavement or such other level as may be directed.
   3. Hydrants shall be installed plumb and at the proper grade height. Any hydrant extensions or hydrant lowering to meet proper grade requirements are the contractor's responsibility.

C. Polyethylene Wrap:
   1. An approved plastic film wrap for protection of ductile iron pipe shall be provided at all locations. The wrap shall be the “tube” type having 8-mil thickness. A two (2") inch wide polyethylene adhesive tape shall be used to secure the tube of film to the pipe. The unit bid price per lineal foot shall include the cost of furnishing and installing the plastic wrap and shall be compensated in full regardless of the size of the pipe to be protected.

D. Joint Restraint:
   1. Retainer glands shall be used for joint restraint on all bends having a deflection of twenty-two and one-half (22-1/2) degrees or greater, tees, crosses, plugs, valves at the end of a line, all hydrant valves and all hydrants. Retained joints cast onto the pipe by the manufacturer (lok-Tyton, Fastite, etc.), will be considered as being equivalent to the use of retainer glands. If retainer glands are not available, thrust blocking may be used with the approval of the City.
   2. The use of zinc-coated tie rods suitably attached by half-circle clamps may be utilized with the Engineer's permission.
   3. Where valves are located on dead ends, the plug may be tied or lugged across the valves with tie rods. Hydrants shall not be tied across the valve.

4. Plugged tees and crosses in a straight run do not require restraint. For restrained joints, the number of feet of tied pipe required shall be in accordance with the following table:
5. TABLE OF RESTRAINED OR TIED PIPE REQUIRED ON EACH SIDE OF THE BEND

4' Cover					6' Cover				8' Cover			
Bend Sizes by Degrees					Bend Sizes by Degrees				Bend Sizes by Degrees			
Pipe Size	22.5	45	67.5	90	22.5	45	67	90	22.5	45	67.5	90
3"	NR	NR	NR	NR	1'	3'	4'	8'	1'	2'	3'	4'
4"	NR	NR	NR	NR	2'	4'	5'	13'	1'	3'	4'	5'
6"	NR	NR	NR	NR	3'	6'	8'	9'	2'	4'	5'	6'
8"	NR	NR	NR	NR	4'	7'	9'	11'	3'	5'	7'	9'
12"	NR	NR	NR	NR	6'	10'	14'	17'	5'	8'	10'	12'
16"	NR	NR	NR	NR	7'	13'	18'	21'	6'	10'	14'	17'
20"	12'	22'	30'	37'	9'	15'	22'	27'	7'	12'	17'	20'
24"	14'	25'	37'	43'	10'	18'	26'	30'	NR	NR	NR	NR
30"	17'	30'	45'	52'	12'	21'	30'	37'	NR	NR	NR	NR
36"	19'	35'	50'	61'	14'	25'	35'	43'	NR	NR	NR	NR

6. Notes: (1) Table based on sand excavation, for silt, increase 50%
   a. (2) If polyethylene wrapping is used, increase value by 100%
   b. NR = Not Recommended
7. The table was determined from the “Cast Iron Pipe News” published by the Cast Iron Research Association.

E. Jointing of Pipe
1. Before laying the pipes, the outside of the spigot and the inside of the bell shall be wire brushed and wiped clean and dry. Pipe ends shall be kept clean until joints are made.
2. All jointing of mechanical joint pipe and push-on pipe shall be in accordance with the requirements of the AWWA C600.
3. Ductile iron pipe shall be cut only by sawing, milling or torch cutting in accordance with the manufacturer's recommendations, provided the cut joint is properly ground.

3.6 FIELD QUALITY CONTROL

A. Field inspection testing and compaction testing shall be performed in accordance with the Specifications.
B. If tests indicate that the Work does not meet the specified requirements, remove the Work, replace and re-test at no cost to the Owner.

3.7 METHODS OF TESTING AND DISINFECTION

A. The Contractor shall perform all testing and disinfecting in the Engineer's presence.
B. Hydrostatic Pressure Test:
1. Before a new water main can be filled for testing, or flushing, a “48” hour notice must be given to the City. A permit may be issued for this purpose when Water Department personnel are not available for valve operation, but only after a “48” hour-notice has been given.
2. If it becomes necessary to interrupt water service because of new utility construction, sufficient notice must be given to the City so that written notice may be given to the

affected customers “48” hours prior to interruption of service. When notified, the City will take the responsibility for customer notification.

3. If a Contractor, acting on their own, operates a fire hydrant or water main valve without a valid permit in their possession, the City and the Public Safety Department will seek the maximum allowable penalty because of the potential for jeopardizing the safety and health of the public.
4. After the pipe has been laid including fittings, services, valves and hydrants, and the line has been backfilled in accordance with these Specifications, all newly laid pipe, or any valved section thereof including building services unless otherwise directed by the Engineer, shall be subjected to a hydrostatic pressure test.
5. Each isolated section of pipe shall be slowly filled with water. The specified test pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, gauges and the Contractor shall furnish all necessary apparatus. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation and afterward tightly plugged.
6. The test pressure shall be brought to one hundred fifty (150psi) pounds per square inch for domestic water services and two hundred (200 psi) pounds per square inch for fire services. Thereafter, the test shall be considered satisfactory if without additional water, the pressure remains constant for a period of two (2) hours at the specified pressure. The maximum pressure drop allowed for a domestic water service is two (2 psi) pounds per square inch during the last hour of the two hour test. The maximum pressure drop allowed for a fire service is five (5 psi) pounds per square inch during the last hour of the two hour test.
7. Any cracked or defective pipes, fittings, valves or hydrants discovered due to the consequence of the pressure test shall be removed and replaced by the Contractor and the test shall be repeated until satisfactory to the Engineer. All costs for removing, replacing and re-testing are considered part of the Base Bid Contract.

C. Electrical Conductivity Test:
   1. After the hydrostatic test has been completed, a conductivity test shall be conducted in accordance with the following specifications:
      a. The system (pipeline and hydrants) shall be tested for electrical continuity and current capacity. The electrical test shall be made after the hydrostatic pressure test. Backfilling shall have been completed. The line may be tested in sections of convenient length as approved by the Engineer.
      b. Direct current of three hundred (350) amperes, +10 percent, shall be passed through the pipe line for five (5) minutes. Current flow through the pipe shall be measured continuously on a suitable ammeter and shall remain steady without interruption or excessive fluctuation throughout the five (5) minute test period.
      c. Insufficient current or intermittent current or arcing, indicated by large fluctuation of the ammeter needle, shall be evidence of defective electrical contact in the pipeline. The cause shall be isolated and corrected. Thereafter, the section in which the defective test occurred shall be retested as a unit and shall meet the requirements. All costs of removing, replacing and re-testing are part of the Base Bid Contract.
   2. Sources of D.C. current for these tests may be motor generators, batteries, arc welding machines, etc. D.C. arc welding machines will probably be the usual source. These machines are available in adequate capacity for these tests and are equipped with controls for regulating the current output.

3. Cables from the power source to the section of the system under test should be of sufficient size to carry the test current without overheating or excessive voltage drop. Usable sizes will probably be in the range of 2/0 to 4/0 A.W.G.
4. Connections for the test shall be made at hydrants. The hydrants shall be in the open position with the caps on during the test. The cable shall be clamped to the top-operating nut. Note: After the test, the hydrant shall be shut off and a cap loosened to allow hydrant drainage. Tighten cap after drainage.
5. A hook-on type D.C. ammeter placed on one of the cables leading to the hydrant is a convenient method of measuring current.
6. In using arc-welding machines, the current control should be set at a minimum before starting. After starting the machine, advance the control until the current indicated on the ammeter is at the desired test valve. Caution: In case of open circuits at joints or connection, the voltage across the defective joint or connection will be in the order of 50 - 100 volts.

D. Disinfection of Water Mains:
1. General: All pipelines installed shall be disinfected with a strong chlorine solution according to AWWA C651. Disinfecting may be done concurrently with pressure and leakage testing or after pressure and leakage testing at the option of the Contractor. Each section line that is repaired shall be disinfected after such repairs are made. The Contractor shall provide all necessary disinfection equipment and materials.
2. Flushing: The pipeline shall be flushed at a velocity of at least two and one-half (2-1/2') feet per second immediately prior to disinfection. A 48-hour notice is required to the City Water Department for pipeline flushing. The pipe shall be flushed with clean, potable water until potable water appears at the points of outlet.
3. Disinfectants: Disinfection shall be performed using either chlorine gas or calcium hypochlorite solution. Chlorine gas shall conform to AWWA B301 and shall be handled under pressure as an aqueous solution. Calcium hypochlorite shall conform to AWWA B300 and shall be granules with 70 percent available chlorine.
4. Feeding: Chlorine gas shall be used only as a solution. Introduction of chlorine gas into the pipeline directly will not be permitted. When chlorine is used, a chlorinator and booster pump with injector shall be provided.
5. Calcium hypochlorite shall be made into a solution and pumped into the pipeline with a suitable chemical feed pump.
6. Application: Pipelines shall be disinfected by either the continuous feed method or the slug method.
7. In using the continuous feed method, chlorine feed shall be proportional to the rate of flow into the pipe so that the entering water contains at least 50 mg/1 of available chlorine. Chlorine application shall be continuous until the entire pipeline is filled with the chlorine solution. The treated water shall be retained in the pipeline for at least 24 hours and the chlorine residual at the end of the period shall be at least 10 mg/1.
8. In using the slug method, chlorine shall be fed at a rate that will produce at least 300 mg/1 in the water entering the pipeline and a sufficient quantity of water shall be chlorinated so that all parts of the pipeline will be exposed to chlorine concentration of 300 mg/1 for at least three (3) hours.
9. Following the allowed standing time, the system shall be flushed with clean, potable water until the chlorine residual in the water coming from the system does not exceed the chlorine residual in the flushing water.

10. During disinfection all valves and hydrants shall be operated to ensure that all appurtenances are disinfected.

E. Bacteriological Tests:
   1. Bacteriological testing of the water main shall be performed according to AWWA C651.
   2. Following disinfection and final flushing and before the new main is connected to the distribution system, two consecutive sets of samples, taken at least 24 hours apart, must be collected from the new water main. At least one set of samples shall be collected from every 1,200 feet of main, plus one set from the end of line, and at least one set from each branch. The Contractor shall collect the samples and the cost of these tests paid for by the Contractor. A “48” hour notice is required to the City Water Department for pipeline flushing.
   3. Repeat Testing: If initial disinfection fails to produce satisfactory bacteriological samples, the disinfection shall be repeated until satisfactory bacteriological samples are obtained. Costs for additional disinfection shall be borne by the Contractor.
   4. Inspection: a qualified Inspector furnished by the City or Owner shall supervise the above operation. The City or Owner shall have at least a 48 hour notice for said inspection.

END OF SECTION

SECTION 33 30 00 - SANITARY SEWERAGE UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Site sanitary sewerage construction to within five feet from building. Municipal sanitary drains; including fittings, accessories and bedding.
C. Sanitary drainage piping:
   1. Ductile Iron Pipe and Gray Iron Pipe (DIP and GIP).
   2. Building services.
D. Insulation.
E. Bulkheading open end pipes.

1.2 RELATED SECTIONS

A. Section 02 41 13 - Selective Site Demolition.
B. Section 31 23 33 - Trenching and Backfilling.
C. Section 33 10 00 - Water Distribution.
D. Section 33 40 00 - Storm Drainage Utilities.

1.3 REFERENCES

A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).
B. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings; 2022.
C. AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings; 2021.
D. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2023.
E. AWWA C115/A21.15 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges; 2020.
F. AWWA C116/A21.16 - Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings; 2015.
G. AWWA C150/A21.50 - Thickness Design of Ductile-Iron Pipe; 2021 (Reaffirmed 2023).
H. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast; 2023.
I. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances; 2023.
J. Minnesota Department of Labor and Industry - Minnesota State Building Code.
K. Plumbing and Drainage Institute (PDI).
L. City Engineers Association of Minnesota.
M. Minnesota State Health Department.

1.4 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.
B. Conform to all applicable code for materials and installation of the Work of this Section.
C. Verify that survey benchmark and intended elevations for the Work are as indicated.
D. The Contractor is responsible for coordinating construction schedule and required testing with testing agency prior to start of construction.
E. Submit documents under the provisions of Division One Specifications.
F. Record location of pipe sizes, materials and runs, connections, manholes, cleanouts and invert elevations.

G. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

H. Record Drawings:

1. Refer to "Submittals" and "Field Quality Control" of this Section.

1.5 FIELD MEASUREMENTS

A. Verify actual locations of sanitary sewage systems with other construction to which sewage systems must fit by accurate field measurements before installation. Coordinate installation schedule with construction progress to avoid delay of the Work. No additional compensation will be given for problems resulting from the Contractors failure to verify and/or coordinate sanitary sewer work.

1.6 SUBMITTALS

A. Submit under provisions of Division One Specifications.

B. Shop Drawings: The Contractor shall submit a Shop Drawing portfolio showing all piping, fittings, manholes, covers, etc., provided under this section prior to construction.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

D. Project Record Drawings: The Contractor shall mark, in red pencil or ink, field changed made in the Contract Drawings. One set of clean prints shall be used for this purpose. This set of prints shall not be used for construction purposes and shall be kept as clean as possible.

1. The record drawing shall be submitted after the date of Substantial Completion, prior to project closeout, and prior to the release of retainage Engineer.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

1. Minnesota Department of Labor and Industry.
2. Local Codes and Ordinances.
3. Local Authority having Jurisdiction.

1.8 COORDINATION

A. Prior to construction and start of building plumbing, the Contractor shall coordinate all work with the Building Mechanical Contractor and any public agency where connections are to be made. The Contractor is to verify all pipe sizes, material and invert elevations at connections. No additional compensation will be allowed for work not verified or not coordinated.

1.9 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.

B. Protection of Persons: The Owner's activities will continue about the site during construction. Install barricade fencing, as necessary, to provide a safe environment between construction work and pedestrian circulation.

C. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, existing structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer's satisfaction and at no cost to the Owner.

D. Existing Utilities:

1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.
2. The approximate locations of certain underground lines and structures are shown on the plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.
3. Locate and mark these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.
4. Locate, excavate, and expose all existing underground lines in advance of trenching operations.
5. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.

E. Traffic Control:
1. Maintain vehicular and pedestrian traffic as required for construction activities.
2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of the Work.
3. When working in public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

1.10 CONFLICTING UTILITIES

A. When alterations to existing utilities are shown to avoid conflicts, make alterations at no cost to the Owner.

1.11 DELIVERY

A. Deliver, store, handle and protect products to the site under the provisions of Division One Specifications.

1.12 WARRANTY

A. Provide one (1) year warranty. Warranty shall be in addition to, and run concurrent with, other warranties required by the Contract Documents, including the Division One Specifications. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under the requirements of the Contract Documents.

B. Warranty: State that all materials and workmanship provided are guaranteed against defects after completion and final acceptance of the Work. Defects due to faulty materials or workmanship developed during the guarantee period shall be satisfactorily repaired or replaced by the Contractor at their expense.

PART 2 PRODUCTS

2.1 PIPE AND MATERIAL

A. General:
1. Materials required for this Work shall be new materials conforming to the requirements of the referenced Specification for the class, kind, type, size, grade and other details indicated on the drawings.
2. Wherever connection of dissimilar materials or design is required, the method of joining and any special fittings employed shall be subject to approval by the Architect/Engineer.
3. The Drawings indicate various lengths of sanitary sewer. These dimensions are from center of structure to center of structure. The Contractor is to verify the pipe lengths prior to bidding.

B. Ductile Iron Pipe (DIP) and Ductile Iron and Gray Iron Fittings: Pipe shall be Ductile Iron pipe and fittings shall be of the Ductile Iron or Gray Iron type as specified for each particular use of installation. When Gray Iron is specified, either type may be furnished. Gray Iron may not be substituted for Ductile Iron unless specifically authorized in the Plans, Specifications, and Special Provisions.

1. Ductile Iron pipe shall conform to the requirements of AWWA C115/A21.15 or AWWA C151/A21.51 for water, and thickness design shall conform to AWWA C150/A21.50. In addition, the pipe shall comply with the following supplementary provisions:
   a. Fittings shall conform to the requirements of AWWA C110/A21.10 (Gray Iron and Ductile Iron Fittings) or AWWA C153/A21.53 (Ductile Iron Compact Fittings) for the joint type specified.
   b. Unless otherwise specified all pipe and fittings shall be furnished with cement mortar lining meeting the requirements of AWWA C104/A21.4 for standard thickness lining. All exterior surfaces of the pipe and fittings shall have an asphaltic coating at least on mil thick. Spotty or thin seal coating, or poor coating adhesion, shall be cause for rejection.
   c. Fittings specified to be furnished with fusion bonded epoxy external coating and/or interior lining shall conform to the requirements of AWWA C550 and AWWA C116/A21.16, with 6-8 mil nominal thickness.
   d. Rubber gasket joints for Ductile Iron Pressure Pipe and fittings shall conform to AWWA C111/A21.11.
   e. The nuts and bolts shall be constructed of corrosion resistant, high-strength, low-alloy steel with a ceramic filled, baked on fluorocarbon resin. The nuts and bolts shall be in compliance with AWWA C111/A21.11.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which the Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Verify that building service connection and municipal utility sanitary sewer size, location, and invert are as indicated.

C.

3.2 LAYING OUT WORK

A. Provide all materials, labor, instruments, etc. required to lay out the Work.

B. The Contractor is to employ the services of a Registered Land Surveyor to perform specified layout work.

C. Promptly inform the Engineer of discrepancies found, in order that proper corrections may be made.

3.3 MATERIAL HANDLING

A. Proper and adequate implements, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the Work. During the process of unloading, the Contractor shall inspect all pipe and accessories for damage. The Contractor shall notify the Engineer of all material found to have cracks, flaws or other defects. The Engineer shall inspect the damaged materials and have the right to reject any materials found to be unsatisfactory. The Contractor shall promptly remove all rejected material from the site. All materials shall be handled carefully to prevent damage to protective coatings, linings and joint fillings; preclude contamination of interior areas; and avoid jolting contact, dropping or dumping.

B. All work and materials are subject to tests by the Owner at such frequency as may be determined by the Engineer. The Owner shall pay for such tests.

C. While suspended and before being lowered into laying position, each pipe section and appurtenant unit shall be inspected by the Contractor to detect damage or unsound conditions that may need corrective action or be cause for rejection. The Contractor shall inform the Engineer of any defects discovered and the Engineer will prescribe the required corrective actions or order rejection.

D. Immediately before placement, the joint surfaces of each pipe section and fitting shall be inspected for the presence of foreign matter, coating blisters, rough edges or projections and any imperfections so detected shall be corrected by cleaning, trimming or repair as needed.

3.4 INSTALLATION OF SANITARY PIPING

A. Trenching, Backfilling and Compacting.

1. Trenching and backfilling shall be constructed in accordance with Section 31 23 33 - Trench Excavation and Backfill for Utilities.

B. Installing Piping and Appurtenances:

1. Provide and use the proper implements, tools and facilities for the safe and convenient prosecution of the Work.
2. Unload and distribute materials at the site carefully to prevent materials from being damaged, minimize handling and not hamper construction activities. In no case shall materials be thrown or dumped from the truck.
3. Lower pipe into trench carefully to prevent damage to pipe and protective coatings and linings. Under no circumstances shall pipe be dumped into the trench.

C. Immediately before placement, the joint surfaces of each pipe section and fitting shall be inspected for the presence of foreign matter, coating blister, rough edges and projections, and any other imperfections so detected shall be corrected by cleaning, trimming or repair as required.

D. Pipe shall be laid using laser equipment or grade boards. Grade boards shall be furnished and set by the Contractor according to the established grade stakes. No pipe shall be laid unless there is a minimum of four (4) grade boards set to check the proper grade and alignment ahead. Provide and use a suitable grade rod to ensure the proper grade of the pipe. Grade boards shall be no more than twenty-five (25') feet apart.

E. Pipe shall not be laid in water or when the trench conditions are unsuitable for work. Protect the exposed ends of all pipes with a board or approved stopper to prevent earth or substances from entering the pipe.

F. At the time of pipe placement, the bedding conditions shall be such as to provide uniform and continuous support for the pipe between bell holes. Bell holes shall be excavated as necessary to make the joint connections, but they shall be no larger than would be adequate. Bell and spigot pipe shall be laid with the bell ends facing upgrade and the laying shall start at the downgrade end and proceed upgrade.

G. As each length of bell and spigot pipe is placed in laying position, the spigot end shall be centered in the bell and the pipe forced hole and brought to correct line and grade. The pipe shall be secured in place with approved backfill material, which shall be thoroughly compacted around the pipe. The joint areas shall remain exposed and precautions shall be taken to prevent soil from entering the joint space.

H. Carefully clean the interior of the sewer from dirt, cement or superfluous material of every description as the work progresses. If necessary, thoroughly flush pipe at the completion of the Work.

I. When existing utility structures or branch connections leading to main sewers or to main drains present obstructions to the grade and alignment of the pipe, they shall be permanently supported, removed, relocated or reconstructed.

J. When water main, water services and sewer services, whether lowered or existing, are in danger of freezing due to proximity of storm sewers, catch basin leads or storm sewer structures, the Engineer may direct the placement of insulation between the storm sewer and the water main or service pipe at no additional cost to the Owner or the Owner's representative.

K. The interior of all pipe shall, as the work progresses, be cleaned of all dirt and superfluous materials. The exposed end of the pipe shall be protected with suitable temporary covers. Pipe laid in place shall be protected from injury and disturbance.

3.5 PIPE JOINTING

A. Watertight and airtight joints are required, without concrete encasement, the joints shall be sealed as follows; subject to such other approved method as the Engineer may authorize as being an acceptable alternative:

1. Ductile Iron Pipe jointing shall be mechanical joint pipe or push-on pipe in accordance with the requirements of AWWA C600.

B. Watertight and airtight joints are required.

3.6 BULKHEADING OPEN PIPE ENDS

A. All pipe and fitting ends left open for future connection shall be bulkheaded by approved methods prior to backfilling. Unless otherwise specified or approved, all openings of twenty-four (24") inches in diameter or less shall be closed off with prefabricated plugs or caps and all openings larger than twenty-four (24") inches in diameter shall be closed off with masonry bulkheads.

B. Prefabricated plugs and caps shall be of the same material as the pipe material or an approved alternate material and they shall be installed with watertight seal as required for the pipeline joints. Masonry bulkheads shall be constructed with clay or concrete brick to a wall thickness of eight (8") inches.

C. Bulkheads installed for temporary service during construction may be constructed with two (2") inch timber planking securely fastened together and adequately braced, as an alternate to the masonry construction.

D. Pipes designated for abandonment shall be thoroughly bulk headed at all exposed pipe ends for a minimum pipe length equivalent to one pipe diameter.

3.7 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under the provisions of Division One Specifications.

B. General:

1. All pipe will be visually inspected.
2. All visible leaks shall be repaired.
3. Broken or cracked pipe, mislaid pipe and other defects shall be corrected.
4. All repairs, relaying of sewers, etc. required to bring the sewers to specified status shall be made at no additional cost to the Owner or the Owner's representative.
5. Testing all manholes and sewer piping must comply with the construction requirements of the Minnesota Plumbing Code.

C. Inspection:

1. Request inspection prior to and immediately after placing aggregate cover over pipe.
2. Compaction testing will be performed in accordance with ASTM D698.

3. Clean and prepare for inspection each block or section of sewer upon completion, or at such other time as the Engineer may direct.

D. If tests and inspections indicate that the Work does not meet the specified requirements, remove Work, replace and retest at no cost to the Owner or the Owner's representative.

3.8 TESTING/INSPECTION

A. All testing shall be witnessed by the local Plumbing Inspector and the Owner's Representative or the Engineer. The Contractor shall provide forty-eight (48) hours' notice to the Owner's Representative or the Engineer prior to conducting tests.

B. Visual Inspection:

1. Sanitary sewer pipes shall be straight and uniform in alignment and grade. Pipe and manholes shall be free of dirt, mortar and other debris.

C. Deflection Test:

1. Deflection tests shall be performed on all plastic gravity sewer pipes. The test shall be conducted after the sewer trench has been backfilled to the desired finished grade and has been in place for 30 days.
2. The deflection test shall be performed by pulling a rigid ball or pointed mandrel through the pipe without the aid of mechanical pulling devices. The ball or mandrel shall have a minimum diameter equal to 95 percent of the actual inside diameter of the pipe. The maximum allowable deflection shall not exceed 5 percent of the pipe's internal diameter. The time of the test, methods of testing and the equipment to be used for the test shall be subject to the approval of the Engineer.
3. The Contractor at their expense shall perform all testing without any direct compensation being made therefore and they shall furnish all necessary equipment and materials required.
4. Test Failure and Remedy: Any test section that fails shall be replaced, with all repair work subject to the approval of the Engineer. The replaced section shall be re-tested for leakage and deflection in conformance with the Specifications contained herein.
5. All repairs, replacement and re-testing shall be at the Contractor's expense.

D. Sanitary Sewer Leakage Testing

1. All sanitary sewer lines, including service connections, shall be substantially watertight and shall be tested for excessive leakage upon completion and before connections are made to the service by others. Each test section of the sewer shall be subjected to exfiltration testing, either by hydrostatic or air test method as described below and at the Contractor's option. The requirements set forth for maximum leakage shall be met as a condition for acceptance of the sewer section represented by the test.
2. If the ground water level is greater than three (3') feet above the invert elevation of the upper manhole and the Engineer so approves, infiltration testing may be allowed in lieu of the exfiltration testing, in which case the allowable leakage shall be the same as would be allowed for the Hydrostatic Test.
3. The Contractor shall perform all testing without any direct compensation being made therefore and the Contractor shall furnish all necessary equipment and materials, including plugs and standpipes as required.
4. Air Test Method:
   a. The sewer pipe section under test shall be clean at the time of testing but the pipe may be wetted. Pneumatic balls shall be used to plug the pipe ends at the manholes. Low pressure air shall be introduced into the plugged lines until the internal air pressure reaches four (4.0) pounds per square inch greater than the average back pressure of any ground water pressure that may submerge the pipe. At least two (2) minutes shall be allowed for the air temperature to

stabilize before readings are taken and the timing started. During this time the Contractor shall check all plugs with soap solution to detect plug leakage. If plugs are found to leak, air shall be bled off, the plugs shall be re-tightened and the air shall be reintroduced into the line.

b. The sewer section under test will be accepted as having passed the air leakage test if it does not lose air at a rate to cause the pressure to drop from three and six-tenths (3.6) to three (3.0) pounds per square inch in less time than one-half minute per inch in diameter of the pipe tested.

5. Hydrostatic Test Method:

a. After bulkheading the test section, the pipe shall be subjected to a hydrostatic pressure produced by a head of water at a depth of three (3') feet above the invert elevation of the sewer at the manhole of the test section. In areas where ground water exists, this head of water shall be three (3') feet above the existing water table.

b. The water head shall be maintained for a period of one (1) hour during which time it will be presumed that full absorption of the pipe body has taken place and thereafter for an extended period of one (1) hour the water head shall be maintained as the test period. During the one (1) hour test period, the measured water loss within the test section, including service stubs, shall not exceed the Maximum Allowable Loss (in Gallons Per Hour per one hundred (100') feet of Pipe) given below for the applicable Main Sewer Diameter.

Main Sewer Diameter (In Inches)	Maximum Allowable Loss* (In Gallons Per Hour Per 100-feet)
6	0.5
8	0.6

c. *Based on 100 gallons per day per pipe diameter inch per mile

E. If measurements indicate exfiltration within a test action section is not greater than the allowable maximum, the section will be accepted as passing the test.

F. Testing Failure and Remedy:

1. In the event of test failure on any test section, testing shall be continued until all leakage has been detected and corrected to meet the requirements. All repair work shall be subject to the approval of the Engineer. Introduction of sealant substances by means of the test water will not be permitted.

2. Unsatisfactory repairs or test results may result in an order to remove and replace pipe as the Engineer considers necessary for test conformance. All repair and replacement work shall be at the Contractor's expense.

G. Televising:

1. Sewer line televising may be required by the Engineer, at the cost of the Contractor, if visual inspection, leakage testing or deflection testing indicate the sewer has not been constructed in accordance with these Specifications and the requirements of the Plans, Specifications and Special Provisions.

3.9 PROTECTION

A. Protect finished installation under the provisions of Division One Specifications.

B. General Requirements: Protect sanitary drainage system from damage and construction operations until date of Substantial Completion.

END OF SECTION

SECTION 33 40 00 - STORM DRAINAGE UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Site storm drainage construction to buildings and municipal storm drainage: including all pipes, fittings, attachments and connections needed for a complete and proper installation.
C. Foundation Drain Tile Systems.
   1. Perforated Schedule 40 Polyvinyl Chloride (PVC) Pipe.
D. Biofiltration Drain Tile Systems.
   1. Perforated Schedule 40 Polyvinyl Chloride (PVC) Pipe.
E. Storm drainage piping for surface, or a combination of surface and subsurface water;
   1. Reinforced Concrete Pipe (RCP).
   2. Schedule 40 Polyvinyl Chloride (PVC) Pipe.
F. Tracer wire for non-conductive pipe.
G. Storm sewer structures, covers, grates and frames.
   1. Concrete Catch Basins.
   2. Concrete Manholes.
   3. Flared End Sections.
   4. Flared End Section with Riprap.
H. Structures for access to underground pipe.
I. Impermeable Liner.
J. Protection of completed system against sedimentation during subsequent construction activities.

1.2 RELATED SECTIONS

A. Section 02 41 13 - Selective Site Demolition.
B. Section 31 23 33 - Trenching and Backfilling.
C. Section 33 10 00 - Water Distribution.
D. Section 33 30 00 - Sanitary Sewerage Utilities.

1.3 REFERENCES

A. AASHTO M 278 - Standard Specification for Class PS46 Poly(Vinyl Chloride) (PVC) Pipe; 2015.
B. AASHTO M105 - Standard Specification for Gray Iron Castings; 2018.
C. ACI 301 - Specifications for Concrete Construction; 2020.
D. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2022.
E. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2021.
F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
G. ASTM A760/A760M - Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains; 2015.
H. ASTM A762/A762M - Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains; 2015.
I. ASTM C1479 - Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations; 2016.
J. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
K. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016(2016).

L. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets; 2021.
M. ASTM C478 - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections; 2019.
N. ASTM C506 - Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe; 2016.
O. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2020a.
P. ASTM C923/C923M - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals; 2020.
Q. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.
R. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe; 2022a.
S. ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable; 2016.
T. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2020.
U. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.
V. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2020.
W. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.
X. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.; 1999a (Reapproved 2014).
Y. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a (Reapproved 2023).
Z. ASTM D4751 - Standard Test Methods for Determining Apparent Opening Size of a Geotextile; 2021a.
AA. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).
BB. Minnesota Department of Transportation 2020 Edition "Standard Specifications for Construction". Only applicable portions of construction methods and materials apply. References to methods of measurement or payment are not applicable.
    1. MN/DOT 3149 - Granular Material
    2. MN/DOT 3601 - Riprap Materials
    3. MN/DOT 3733 - Geotextiles
CC. Minnesota Department of Labor and Industry - Minnesota State Building Code.

1.4 QUALITY ASSURANCE

A. All Work of this section occurring on public property shall be constructed in accordance with the laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction. All Work required to be constructed by regulatory authorities in a manner differing from the Contract Documents shall be considered part of the Base Bid Contract.
B. Conform to all applicable code for materials and installation of the Work of this Section.
C. Verify that survey benchmark and intended elevations for the Work are as indicated.

D. The Contractor is responsible for coordinating construction schedule and required testing with testing agency prior to start of construction.
E. Record location of pipe sizes, materials and runs, connections, manholes, cleanouts and invert elevations.
F. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
G. The Contractor is to employ the services of a Registered Land Surveyor to perform the specified layout work.
H. Record Drawings:
   1. Refer to "Submittals" and "Field Quality Control" of this Section.

1.5 FIELD MEASUREMENTS

A. Verify actual locations of storm sewage systems with other construction in which sewage systems must fit by accurate field measurements before installation. Coordinate installation schedule with construction progress to avoid delay of the Work. No additional compensation will be given for problems resulting from Contractor's failure to verify and/or coordinate storm sewer work.

1.6 SUBMITTALS

A. Submit under the provisions of Division One Specifications.
B. Shop Drawings: The Contractor shall submit a Shop Drawing portfolio showing all piping, fittings, manholes, covers, etc. provided under this Section prior to construction.
C. Record Drawings: The Contractor is to retain the services of a Registered Land Surveyor to prepare a utility verification survey. The record drawing shall be submitted after the date of Substantial Completion of storm sewer installation. At least 2 weeks prior to paving and/or turf restoration contractor shall send record drawings to architect/engineer for review and approval before continuation of work.
D. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

1.8 PROJECT CONDITIONS

A. The Contractor shall visit the site and review all Drawings, Specifications, and Geotechnical Report(s) prior to bidding. No additional compensation will be allowed for items that could have been clarified prior to bidding. Requests for clarifications shall be submitted two (2) weeks prior to the bid closing date.
B. Protection of Persons: The Owner's activities will continue about the site during construction. Install barricade fencing, as necessary, to provide a safe environment between construction work and pedestrian circulation.
C. Protection of Existing Property to Remain: Protect existing benchmarks, survey control points, existing structures, fences, sidewalks, paving, curbs, utilities, and other miscellaneous items that are in areas where Work will be performed and which are to remain. Repair or replace existing property that is to remain that is damaged by the Work of this Contract, to the Architect/Engineer's satisfaction and at no cost to the Owner.
D. Existing Utilities:
   1. Existing utilities currently exist within the construction areas, including waterworks, storm drainage, sanitary sewers, gas mains, and other utilities.

2. The approximate locations of certain underground lines and structures are shown on the plans based on the topographic survey provided by the Owner. Other underground lines or structures may not be shown.
3. Locate and mark these and other possible unknown utility lines using Gopher State One Call, electronic pipe finder, contacting property owner or other approved means.
4. Locate, excavate, and expose all existing underground lines in advance of trenching operations.
5. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these existing utilities in the execution of their Work under this section. All repairs are part of the Base Bid Contract.

E. Traffic Control:
1. Maintain vehicular and pedestrian traffic as required for construction activities.
2. Provide flag men, barricades, warning signs, and warning lights for the movement of traffic and safety and to cause the least interruption of the Work.
3. When working in public right-of-way, the Contractor is responsible for all traffic control and permit requirements. No additional compensation will be allowed to provide these services.

1.9 CONFLICTING UTILITIES

A. When alterations to existing utilities are shown to avoid conflicts, make alterations at no cost to the Owner.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, handle and protect products to the site under the provisions of Division One Specifications.

1.11 WARRANTY

A. Provide one (1) year warranty. Warranty shall be in addition to, and run concurrent with, other warranties required by the Contract Documents, including the Division One Specifications. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under the requirements of the Contract Documents.
B. Warranty: State that all materials and workmanship provided are guaranteed against defects after completion and final acceptance of the Work. Defects due to faulty materials or workmanship developed during the guarantee period shall be satisfactorily repaired or replaced at no additional expense to the Owner.

PART 2 PRODUCTS

2.1 PIPE AND MATERIAL

A. General:
1. Materials required for this Work shall be new materials conforming to the requirements of the referenced Specification for the class, kind, type, size, grade and other details indicated on the Drawings.
2. Wherever connection of dissimilar materials or design is required, the method of joining and any special fittings employed shall be subject to approval by the Engineer.
3. The Drawings indicate various lengths of storm sewer. These dimensions are from center of structure to center of structure and include pipe end sections. The Contractor is to verify the pipe lengths prior to bidding.

B. Reinforced Concrete Pipe (RCP) and End Sections: Pipe shall meet the requirements of ASTM C76 for Class V, Wall B, unless noted otherwise on drawings. Sizes shall be as indicated on the Drawings. Provide pipe with joints designed for flexible watertight gaskets.
1. Gaskets: "O" ring rubber complying with ASTM C443 and/or AASHTO Designation M-198.

2. End sections shall be provided with a galvanized trash guard in accordance with the Detail Drawings that shall be incidental to the cost of the end sections. End sections shall be tied back a minimum of three (3) pipe joints with approved pipe ties.

C. PVC Pipe (Schedule 40): Pipe and fittings shall conform to the requirements of ASTM D2665,
1. Polyvinyl Chloride (PVC) Pipe joints shall be joined with a bell and spigot type joint with solvent cement meeting the requirements with ASTM D2564 and applied according to the manufacturer's recommendation and ASTM D2855. The pipe shall be installed in accordance to ASTM D2321.
2. Schedule 40 pipe and fittings shall be used for building roof drains connections, where sewer is within ten (10') feet of a building, within ten (10') feet of water crossings where pipe crosses over the watermain, and where indicated on plans.

D. Drain Tile:
1. Perforated PVC Pipe and Fittings - ASTM D2729.
2. Stone material for foundation subdrain pipe shall meet the requirements of ASTM C33/C33M gradation #4.
3. Stone material for biofiltration subdrain pipe shall mee the requirements of ASTM C33/C33M gradation # 8 and #57.
4. Geotextile Filter Fabric: MN/DOT 3733 Type I.
   a. Minimum Grab Tensile Strength in Either Direction: 100 pounds ASTM D4632/D4632M.
   b. Minimum Seam Breaking Strength: 90 pounds ASTM D4632/D4632M.
   c. Maximum Apparent Opening Size: 40 US standard sieve size ASTM D4751.
   d. Minimum Permittivity: 0.7 minimum G per second (falling head) ASTM D4491.

E. Geotextile fabric under riprap and flared end section shall meet MN/DOT 3733 Type III Specifications.

F. Riprap shall meet MN/DOT 3601, class number indicated on the Plans.

G. Concrete: Concrete shall be minimum 4,000 pounds per square inch air-entrained concrete, meeting the requirements of ACI 301.

2.2 TRACER WIRE FOR NON-CONDUCTIVE PIPE

A. Tracer wire for use with thermoplastic pipe types shall be rated for direct burial applications. Tracer wire shall be a minimum 12 AWG copper clad steel rated to 30 volts, High Molecular Weight Polyethylene (HMWPE) meeting ASTM D1248, with designation identified on the outside of the wire casing.

B. Tracer wire boxes shall be a minimum of twelve (12") inches in height and two and three-eighths (2 3/8") inches inside diameter, constructed of ABS plastic, flared to prevent pull out or settlement, and furnished with a cast iron cover/lid assembly. There shall be two solid stainless steel terminals within each box.

2.3 PRECAST CONCRETE MANHOLE/CATCH BASIN

A. Precast concrete riser sections and appurtenant units (grade rings, top and base slabs, special sections, etc.) used in the construction of manhole/catch basin structures shall conform with the requirements of ASTM C478, subject to the following supplementary provisions:
1. The precast sections and appurtenant units shall conform to all requirements as shown on the Detailed Drawings.
2. The joints of structure riser sections shall be tongue and groove with rubber “O” ring joints provided on storm sewer structures. Storm sewer inlet and outlet pipes shall be joined to the structure with a gasketed, flexible, watertight connection or any watertight connection arrangement that allows differential settlement of the pipe and structure wall to take place.

3. Air-entrained concrete shall be used in the production of all units. Air content shall be maintained within the range of 5 to 7 percent.
4. A Certificate of Compliance shall be furnished with each shipment of precast manhole and catch basin sections stating that the materials furnished have been tested and are in compliance with the Specification requirements.
5. Lift holes will be permitted in precast manholes/catch basins.

B. Manhole Steps
1. All manhole steps shall conform to Neenah Foundry Step No. R-1981J in dimension and strength. Manhole steps shall be spaced 16" on center on the downstream face of the manhole unless specified otherwise. Cast iron manhole steps shall be manufactured from high test metal having a minimum tensile strength of 35,000 pounds per square inch. Provide steps having non-skid top surfaces, safety stops at each end, minimum width of ten (10”) inches and not less than five (5”) inches projections from the wall.
2. Aluminum manhole steps of a design similar to the cast iron steps specified may be used. Aluminum manhole steps shall be made of Apex Ternalloy No. 5 aluminum alloy. Aluminum steps shall support one thousand (1,000) pound load at center with no deformation, coat embedded ends with bituminous paint.
3. Copolymer Polypropylene plastic manhole steps (PSI-PF) or equal may be used.

C. Frames and Covers:
1. Provide gray iron castings, complying with ASTM A48/A48M /AASHTO M105, Class 30 iron.
2. Machine all bearing surfaces.
3. Provide frames weighing not less than 208 pounds with inside opening between twenty-one (21") inches and twenty-four (24") inches.
4. Covers to have the words “STORM SEWER” in two (2") inch high letters cast in the metal.
5. Where indicated on plans, provide watertight covers with a minimum of two “pick” holes conforming to above requirements and with frame tapped for four (4) bolts, countersunk in cover.
    a. Provide rubber gasket between frame and cover.
6. Unless otherwise specified, provide vented circular cover with a minimum of two “pick” holes and weighing not less than one hundred twenty (120) pounds.
7. Covers must fit closely on the adjusting rings so there will be no rocking from pressure applied on the cover.

D. Invert Shaping Grout: One part Type 1, ASTM C150/C150M, cement by volume, two parts clean and sharp, ASTM C33/C33M, sand by volume, and 12 parts 1/4" ASTM C33/C33M, aggregate by volume.

2.4 FLARED END SECTION, TRASH GUARDS AND OTHER MATERIALS

A. Follow plan details and specifications to provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and subject to the approval of the Engineer.

2.5 IMPERMEABLE LINER

A. Stormwater management system shall include an impermeable liner as detailed on the drawings. Liner shall meet MPCA and manufacturer's guidelines for level 1 HDPE liner, including any subgrade modifications or additional geotextile under and overlayments.

B. Liner installer shall have directed the installation of a minimum of three similar projects.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which the Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Verify that building service connection and municipal storm sewer size, location, and invert are as indicated.

3.2 LAYING OUT WORK

A. Provide all materials, labor, instruments, etc. required to lay out the Work.

B. The Contractor is to employ the services of a Registered Land Surveyor to perform specified layout work.

C. Promptly inform the Engineer of discrepancies found, in order that proper corrections may be made.

3.3 BEDDING

A. Install and bed PVC pipe in accordance with ASTM D2321, Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe. Embedment materials shall be Class I or Class II. These materials shall pass a one and three-fourths (1-3/4") inch sieve and not more than 12 percent shall pass a No. 200 sieve. Compact embedment materials in six (6") inch lifts to twelve (12") inches above the pipe and to a density of at least 95 percent of Standard Proctor Density described by ASTM D698. Test embedment materials for compliance with the above specification and forward test results to the Architect/Engineer.

B. Install and bed reinforced concrete pipe in accordance with ASTM C1479, Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations, Type II bedding.

3.4 INSTALLATION OF STORM SEWER PIPING

A. Trenching, Backfilling and Compacting.

1. Trenching and backfilling shall be constructed in accordance with Section 31 23 33 - Trench Excavation and Backfill for Utilities.

B. Installing Piping and Appurtenances:

1. Provide and use the proper implements, tools and facilities for the safe and convenient prosecution of the Work.
2. Unload and distribute materials at the site carefully to prevent materials from being damaged, minimize handling and not hamper construction activities. In no case shall materials be thrown or dumped from the truck.
3. Lower pipe into trench carefully to prevent damage to pipe and protective coatings and linings. Under no circumstances shall pipe be dumped into the trench.

C. Immediately before placement, the joint surfaces of each pipe section and fitting shall be inspected for the presence of foreign matter, coating blister, rough edges and projections, and any other imperfections so detected shall be corrected by cleaning, trimming or repair as required.

D. Pipe shall be laid using laser equipment or grade boards. Grade boards shall be furnished and set by the Contractor according to the established grade stakes. No pipe shall be laid unless there is a minimum of four (4) grade boards set to check the proper grade and alignment ahead. Provide and use a suitable grade rod to ensure the proper grade of the pipe. Grade boards shall be no more than twenty-five (25') feet apart.

E. Pipe shall not be laid in water or when the trench conditions are unsuitable for work. Protect the exposed ends of all pipes with a board or approved stopper to prevent earth or substances from entering the pipe.

F. At the time of pipe placement, the bedding conditions shall be such as to provide uniform and continuous support for the pipe between bell holes. Bell holes shall be excavated as necessary to make the joint connections, but they shall be no larger than would be adequate. Bell and spigot pipe shall be laid with the bell ends facing upgrade and the laying shall start at the downgrade end and proceed upgrade.

G. As each length of bell and spigot pipe is placed in laying position, the spigot end shall be centered in the bell and the pipe forced hole and brought to correct line and grade. The pipe shall be secured in place with approved backfill material, which shall be thoroughly compacted around the pipe. The joint areas shall remain exposed and precautions shall be taken to prevent soil from entering the joint space.

H. Carefully clean the interior of the sewer from dirt, cement or superfluous material of every description as the work progresses. If necessary, thoroughly flush pipe at the completion of the work.

I. When existing utility structures or branch connections leading to main sewers or to main drains present obstructions to the grade and alignment of the pipe, they shall be permanently supported, removed, relocated or reconstructed. Work shall be considered part of the base bid contract.

J. When water main, water services and sewer services, whether lowered or existing, are in danger of freezing due to proximity of storm sewers, catch basin leads or storm sewer structures, the Engineer may direct the placement of insulation between the storm sewer and the water main or service pipe at no additional cost to the Owner or the Owner's representative.

K. Rigid polystyrene insulation board shall be installed on all storm sewer stubs servicing the building where less than 5-feet of cover exists over the top of the pipe.

L. Openings along the line of the storm sewer shall be securely closed, and at the suspension of the Work at any time, suitable stops shall be placed to prevent earth or any substance from entering the storm sewer. If water is present in the trench, the seals shall remain in place until the trench is completely dry.

M. The interior of all pipe shall, as the work progresses, be cleaned of all dirt and superfluous materials. The exposed end of the pipe shall be protected with suitable temporary covers. Pipe laid in place shall be protected from injury and disturbance.

3.5 INSTALLATION OF TRACER WIRE FOR NON-CONDUCTIVE PIPE

A. Tracer wire shall be installed along the length of all non-conductive mainline pipe, laterals, and services except for;
   1. Drain tile pipe.
   2. Straight line storm sewer pipe between two manholes.

B. Provide vertical riser to the surface and terminate tracer wire in an adjacent tracer wire access box at;
   1. Manholes.
   2. Catch basins.
   3. Stubs.
   4. Laterals.
   5. Services.

C. Installation of the wire shall be after the initial backfilling and shall be located directly above and within six (6") inches of the pipe.

D. Splicing tracer wire shall be by mechanical split bolt type or a crimp type compression fitting fully encased in approved electrical insulation putty. A twelve (12") inch tracer wire loop shall be provided on each side of a spliced connection.
E. Tracer wire boxes shall be flush with the finished grade and turf.
F. Contractor shall leave sufficient slack in the wire to allow the wire to reach three (3') feet above the tracer wire box.

3.6 MANHOLE/CATCH BASIN PRECAST STRUCTURES

A. Set bases level so that walls will be plumb.
B. Apply joint sealer or ring gasket to wall section(s) and set firmly in place to assure watertight joints.
C. Form manhole invert channels directly in the concrete of the structure base, with mortar. Smooth the floor of the manhole outside the channels, and slope toward the channels at not less than one (1") inch per foot and not more than two (2") inches per foot.
    1. Shape the invert channels to be smooth and semicircular, conforming to the inside of the adjacent sewer section.
    2. Make changes in direction of flow with a smooth curve of as large a radius as the size of the manhole will permit.
    3. Make changes in size and grade of channels smoothly and evenly.
    4. Slope invert uniformly from invert of inlet to invert of outlet.
D. Unless otherwise specified or approved, catch basins and manholes shall be constructed on a precast concrete base and the barrel riser sections, cone section and top adjusting rings shall all be of precast concrete. All units shall be properly fitted and sealed to form a completely watertight structure. Barrel and cone height shall be such as to permit placement of at least two (2) and not more than four (4) standard two (2") inch precast concrete adjusting rings immediately below the casting assembly which shall be set in a mortar bed. Each adjusting ring shall also be set in mortar. A concrete collar shall encase casting and concrete adjusting rings. Concrete shall conform to concrete curb and gutter mix or mortar mix (MNDOT specifications 2506.2B). Do not place concrete on interior of manhole. No blocks will be allowed to raise casting and frame.
E. All joints and connections in the storm sewer system shall be gastight or watertight in accordance to MN plumbing code. Flexible compression joints located between 12 and 36 inches from the structure must be used to make watertight connections to manholes, catch basins, and other structures. Where permitted by the administrative authority as an alternate installation method, approved resilient rubber joints may be used to make watertight connections to manholes, catch basins, and other structures. Cement mortar joints are permitted only for repairs and connections of existing lines constructed with such joints.

3.7 BUILT-IN-PLACE STRUCTURES

A. All structures are to be precast concrete unless specifically allowed by the Engineer.

3.8 SUB-SURFACE DRAIN

A. Sub-surface drain construction shall be performed in accordance with the provisions of MN/DOT 2502, except as modified below and as detailed on the Drawings:
    1. The pipe shall be installed at the locations indicated on the Drawings, or as determined at the time of the construction operations to drain the subgrade and granular backfill.
    2. The pipe may be furnished with either bell or spigot joints or with sleeve couplings on the straight pipe. All joints in the perforated pipe shall be left unsealed.
    3. To prevent infiltration of soil and aggregate into the pipe, the perforated pipe and rock pack shall be wrapped with strong, porous, rot proof geotextile filter fabric, the openings in which will be compatible with the gradation of the backfill material.

4. The filter fabric shall meet the requirements of MN/DOT Specification Section 3733 Geotextiles Type I. Torn or punctured fabric shall not be accepted and in no case shall the fabric be exposed to heat or direct sunlight to the extent that its strength or toughness is diminished.
5. The over-wrapping and securing of the filter cloth to the pipe shall be done in a manner approved by the Independent Testing Inspector. Spiral wrapping of the filter cloth on the pipe will not be permitted.
6. Biofiltration sub-surface drains shall be placed as detailed on the drawings, with minimum stone depths as detailed. Rock pack shall not be wrapped with geotextile fabrics.

3.9 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under the provisions of Division One Specifications.
B. General:
   1. All pipes shall be visually inspected.
   2. All visible leaks shall be repaired.
   3. Broken or cracked pipe, mislaid pipe and other defects shall be corrected.
   4. All repairs, relaying of sewers, etc. required to bring the sewers to specified status shall be made at no additional cost to the Owner or the Owner's representative.
   5. Testing all manholes, catch basins and storm sewer piping must comply with the construction requirements of the Minnesota Plumbing Code, 712.
C. Inspection:
   1. Request inspection prior to and immediately after placing aggregate cover over pipe.
   2. Compaction testing will be performed in accordance with ASTM D1557.
   3. Clean and prepare for inspection each block or section of sewer upon completion, or at such other time as the Engineer may direct.
D. Tracer Wire:
   1. All new tracer wire installations shall be located using typical low frequency (512Hz) line tracing equipment. The contractor shall complete a preliminary verification line tracing locate of all tracer wire systems upon completion of rough grading.
   2. Continuity testing in lieu of actual line tracing shall not be acceptable.
E. If tests indicate that Work does not meet specified requirements, remove Work, replace and retest at no additional cost to the Owner or the Owner's representative.

3.10 ADJUSTING AND CLEANING

A. Correcting Deficiencies: Correct imperfections and irregularities in Work at no expense to the Owner.
B. Cleaning Drains: Drains shall be free of silt, debris and other obstructions at the time of final acceptance.
C. Cleaning Site: Remove excess earth, excess construction materials, construction equipment and construction debris, which is related to this Work, from the site at the completion of the work.
D. The Contractor shall clean all sumps after final surfaces are established and prior to project closeout.

3.11 PROTECTION

A. Protection of finished work under provisions of Division One Specifications.
B. General Requirements: Protect storm drainage system from damage and construction operations until date of Substantial Completion.

END OF SECTION

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of a building or structure.
2. Repair procedures for selective demolition operations.

B. Related Sections include the following:

1. Division 1 Section "Temporary Facilities and Controls" for construction of temporary enclosures and barriers at demolished areas, and procedures to control noise and the migration of dust and other debris to areas outside the Construction Zone.
2. Division 1 Section "Cutting and Patching" for cutting and patching procedures for demolition operations.
3. Division 1 Section “Construction Waste Materials Management and Disposal” for the disposal and recycling of demolished materials.

1.2 SECTION REQUIREMENTS

A. The Prime Contractor shall examine the various Drawings, visit the site, determine the extent of the Work, the extent of work affected therein, and all conditions under which he is required to perform the various operations. Owner assumes no responsibility for condition of areas to be demolished

1. Owner will maintain conditions existing at time of inspection for bidding purpose as far as practical.
2. Provide all demolition and repair as required to complete all the work as indicated in the Documents, including all work that can be reasonably inferred to be necessary to complete the work described in other sections of the specifications, drawings or manufacturer’s installation directions, but may or may not be directly identified on the demolition plans or may be outside the areas of Construction or Demolition as identified on the Documents.
3. The Contractor and their Subcontractors shall be responsible for field verification of all existing conditions affecting their work as described on the Contract Documents prior to submitting a bid.
    a. The Owner shall make reasonable efforts to make the construction and demolition areas accessible to the Prime Contractor and their Subcontractors prior to the bid submittal. Failure of the Prime Contractor or Subcontractor to visit any area of the site to make field verifications does not exclude them from any responsibility to provide all required demolition required for this Work.
    b. If the Prime Contractor or their Subcontractors observe conditions that conflict with the information on the Contract Documents or with the feasibility of the Work described in the Contract Documents; the Prime Contractor, or the Subcontractor through the prime bidder, shall immediately notify the Architect so that they may make accommodations to amend the Work through an Addendum.
    c. Submission of a bid by either the Prime Contractor or Subcontractor presumes that all these field observations have been provided the Architect, that the bidder accepts the existing conditions and that all required demolition work, whether or not it has been specifically identified by the Contract Documents or Addendum, has been incorporated into the bidder’s bid proposal.

B. The Prime Contractor shall be responsible for determining step-by-step procedures and obtain technical expertise as needed to ensure safe and controlled demolition. The Prime Contractor is solely responsible for the means and methods of demolition, as required, to attain the finished work results as described in the Contract Documents, whether not such methods may be described in the drawings or specifications.

C. The Owner will occupy portions of building immediately adjacent to demolition area. The Prime Contractor shall conduct demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures so Owner's operations will not be disrupted.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
2. Maintain or relocate code-required exit paths as determined by Building and Life/Safety Codes and/or authorities having jurisdiction.
3. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel and students during demolition and removal operations.
4. Schedule with the Owner all noise producing construction activities prior to proceeding with demolition to minimize the disturbance to the occupants in areas of the building still occupied.

D. The Prime Contractor shall coordinate the Work of this section with all other Work and shall construct and maintain shoring, bracing, and supports as required. The Prime Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have the Structural Engineer’s approval

E. It is not expected that hazardous materials will be encountered in the Work. If hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. The Prime Contractor is required to give the Owner 72 hours notice prior to any demolition or removal of items, lines or systems that will result in the shutdown of existing utility serving areas of the building outside of the area of construction.
2. Maintain fire-protection facilities in service during selective demolition operations.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless Construction Documents indicate to be remove and salvage or remove and reinstall.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5 SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other specified information.

B. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Locations of temporary partitions and means of egress.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

D. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

E. Pre-demolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damaged caused by selective demolition operations. Submit before Work begins.

1.6 DISPOSAL OF MATERIAL

A. The Demolition Contractor shall coordinate with the Owner to identify materials that are to be salvaged and returned to the Owner for storage prior to beginning of any demolition.

B. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

C. The on-site storage of removed items is prohibited. Off-site sale of salvageable material by the Contractor is acceptable.

1.7 WARRANTY

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

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that match existing adjacent surfaces to the fullest extent possible in appearance.
2. Use materials whose installed performance equal or surpass that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Survey of Existing Conditions: Record existing conditions by the use of preconstruction digital photographs

1. The Contractor shall provide such photographic record to Owner prior to the start of any demolition activities.

F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

A. Maintain services/systems indicated to remain and protect them against damage during selective demolition operations. Before proceeding with demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of the building.

B. Utility Requirements: Refer to Division 22,23 and 26 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

C. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.

1. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.

3.3 PREPARATION

A. Existing Facilities: Comply with the campus facilities manager's requirements for using and protecting stairs, walkways, building entries, and other building facilities during selective demolition operations.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic-ways, if required by governing regulations.
2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
3. Protect existing site improvements, appurtenances, and landscaping to remain.

C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.

D. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior. See Division 1 Section “Temporary Facilities and Controls”.

E. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
See Division 1 Section “Temporary Facilities and Controls”.

F. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition

3.4 POLLUTION CONTROLS

A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.

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

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

D. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
2. Remove demolition waste materials from Project site. Do not burn demolished materials
3. See Division 1 Section “Construction Waste Materials Management and Recycling” for the disposal and recycling of demolished materials.

3.5 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Use cutting torches only within the limitations as described in Section 01149 Use of Site in the Specifications. Follow all prescribed procedures for Hot Work Requirements. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.
10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

B. Removed and Salvaged Items: Comply with the following:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items: Comply with the following:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

E. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated

F. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

G. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

H. Roofing:

1. Remove no more existing roofing than be covered at the end of the day so that areas of the existing building interior, indicated as remaining, remains watertight and weathertight.
2. Removed materials need not be salvaged unless specifically required for reuse.
3. Remove roofing only as far as required to patch the existing roofing indicated to remain to newly installed construction.
4. Protect areas of existing roofs indicated as to remain from damage as a result of demolition activities. Patch damage immediately to existing roofing, indicated as remaining, whether it is within or outside the area of construction so that the building interiors remain watertight and weathertight. The General Contractor is responsible for repair any damage to the building interiors that is a result of penetration of water from areas affected by demolition activities. Repair such damage to a condition that is equal or better than that as existing prior to the start of demolition activities.

3.6 CLEAN-UP

A. On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to Owner. Clean-up shall include the disposal of all items and materials not required to be incorporated into the Work as well as all debris and rubbish resulting from demolition operations

END OF SECTION

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SECTION 035413 - GYPSUM CEMENT FLOOR UNDERLAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes self-leveling, gypsum cement underlayment for application below interior floor coverings.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Manufacturer’s Instruction: Indicate mix and application instructions.

C. Qualification Data: For Installer.

1.4 QUALITY ASSURANCE

A. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

B. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.

1. Place gypsum cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS.

A. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM CEMENT UNDERLAYMENTS

A. Gypsum Cement Underlayment: Self-leveling, gypsum cement product that can be applied in minimum uniform thickness of 3/4”.

1. Basis-of-Design Product: Subject to compliance with requirements, provide USG Corporation; USG Levelrock® Brand 2500 Floor Underlayment or a comparable product by one of the following:

    a. Allied Custom Gypsum Plasterworks, LLC.
    b. ARDEX Americas.
    c. Euclid Chemical Company (The); an RPM company.
    d. Hacker Industries, Inc.
    e. MAPEI Corporation.
    f. Maxxon Corporation.

2. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C 219.

3. Compressive Strength: Not less than 2500 -3500 psi (17.2 - 24.1 MPa) at 28 days when tested according to ASTM C 472.

4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.

B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.

1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

C. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).

D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.

E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

F. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance of the Work.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Prepare and clean substrate according to manufacturer's written instructions.

1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
2. Fill substrate voids to prevent underlayment from leaking.

B. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.

1. Install underlayment reinforcement recommended in writing by manufacturer.

C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION.

A. General: Mix and apply underlayment components according to manufacturer's written instructions.

1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
2. Coordinate application of components to provide optimum adhesion to substrate and between coats.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface.

1. Apply a final layer without aggregate to product surface.
2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

F. Apply surface sealer at rate recommended by manufacturer.

G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Shop fabricated ferrous metal fabrications manufactured from standard metal shapes and plates to conventional details. Items indicated on Drawings and specified herein. Include related connections, fittings, attachments, and accessories. Prime paint and galvanized where indicated.
2. Architecturally Exposed Metal Fabrications are classified as “Architecturally Exposed Structural Steel” (AESS) as defined by AISC.
3. Ships Ladder access to roof.
4. Elevator Ladder.
5. Guardrails and Handrails.
6. Architectural metal column covers
7. Galvanized steel chain link fencing and fittings.

B. Related Sections include the following:

1. Division 5 Section "Metal Stairs" for steel tube railings included with metal stairs.
2. Division 6 Section "Miscellaneous Carpentry" for wood blocking for anchoring metal fabrications.
3. Division 8 Section "Glass and Glazing" for laminated glass infill panels.
4. Division 9 Section "Gypsum Board Assemblies" for metal backing for anchoring metal fabrications.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s descriptive literature for products specified in this Section.

B. Shop Drawings:

1. Indicate detailed fabrication and erection of each metal fabrication.
2. Indicate profiles, sizes, plans, elevations, connection attachments, reinforcing, anchorage, sizes and types of fasteners, and accessories.
3. Indicate bearings, anchors, and other products required for construction activities of this Section. Indicate products not furnished by manufacturer of products of this Section.
4. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

C. Design Data: Connection calculations for loading and stresses, bearing seal and signature of professional engineer licensed in State of [Minnesota].

D. Mill Certificates for each type structural framing member and bolts, indicating the following information:

1. Bare metal thickness of steel, measured to 1/1000 inch.
2. Yield strength of steel.
3. Tensile strength of steel.
4. Total elongation of steel in 2 inch gauge length.
5. Chemical analysis of steel.
6. Thickness of galvanized coating, measured to 1/1000.

E. Welder's Certificates: Manufacturer's certificates, certifying welders employed on Work, verifying AWS qualifications within the previous 12 months.

1.4 QUALITY ASSURANCE

A. Prepare Shop Drawings under direct supervision of a professional structural engineer experienced in design of this Work and licensed in the State of [Minnesota].

B. Perform Work per AISC - Specifications for Architectural Exposed Structural Steel.

C. Perform welding operations per AWS, D1.1 - "Structural Welding Code Steel".

D. SSPC, Volume 2, Systems and Specifications, "Steel Structures Painting Manual".

1. Metal primers: Chromate free and VOC compliant.

E. Exterior Metalwork:

1. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

a. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces

1.5 PROJECT CONDITIONS

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

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver anchor bolts and other anchorage devices to be embedded in concrete or masonry construction to site in time for installation.

B. Store steel members above ground on platforms, skids, or other acceptable supports. Protect steel from corrosion.

C. Store other materials in a watertight and dry place until ready for incorporation into Work.

1.7 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Surfaces: For metal fabrications exposed to view upon completion of Work, provide new materials selected for surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variation in flatness exceeding those permitted by reference standards for stretcher-leveled sheet. Provide steel tubing and plates with sharp edging, unless noted otherwise.

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

C. Aluminum Castings: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated. ASTM B 26/B 26M, Alloy A356.0-T6.

D. Steel Sections: ASTM A36.

E. Steel Plates: ASTM A283.

F. Steel Pipe: ASTM A53-93a, Grade B.

1. Interior Type F, standard weight (schedule 40), unless noted otherwise.

2. Galvanized: Exterior locations and other areas where indicated.

G. Steel Tubing: ASTM A 500, cold-formed steel tubing.

H. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

I. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed

J. Stainless Steel:

1. Tubing: ASTM A 554, Grade MT 304.

2. Pipe: ASTM A 312/A 312M, Grade TP 304.

3. Plate and Sheet: ASTM A 666, Type 304

K. Anchors-Inserts:

1. Threaded Type: ASTM A27; hot dip galvanized per ASTM A153.

2. Slotted Type: ASTM A283; hot dip galvanized per ASTM A153.

L. Fasteners:

1. General:

a. Select fasteners for type, grade, and class required for installation of miscellaneous metal items.
b. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed
c. Galvanized Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
d. Provide zinc coated, galvanized for exterior use or when used in exterior walls, in compliance with ASTM A153-82.
e. Stainless steel components: Provide Type 304 stainless-steel fasteners.

f. Aluminum components: Provide type 304 stainless-steel fasteners.
g. Dissimilar Metals: Type 304 stainless-steel fasteners.

2. Standard Bolts and Nuts: Regular hexagon type, ASTM A307-94, Grade A; and, where indicated, flat washers.

3. Lag Bolts: ASME B18.2.1.

4. Machine Screws: Cadmium plated steel, FS FF-S-92.

5. Plain Washers: Round, general assembly grade carbon steel, FS FF-W-92.

6. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

7. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

a. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
b. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

8. Anchor Bolts: ASTM F 1554, Grade 36.

a. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized

9. Other Fastener Types: As required to suit application.

M. Welding Electrodes: Appropriate type for metal to be welded. Comply with AWS D1.1.

N. Rough Hardware:

1. Bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring and securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6.

2. Fabricate items to sizes, shapes, and dimensions required to complete Work. Furnish malleable iron washers for heads and nuts that bear on wood structural connections. Furnish steel washers elsewhere.

O. Miscellaneous Framing and Supports:

1. General: Provide steel framing and supports for applications indicated on Drawings, or those which are not a part of structural steel framework but are required to complete Work.

2. Fabricate units to sizes, shapes, and profiles indicated on Drawings and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connections. Cut, drill, and tap units to receive hardware, hangers, and similar items.

3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units are to be installed after concrete is placed.

2.2 GUARDRAILS AND HANDRAILS

A. Performance Requirements:

1. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

a. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
b. Stainless Steel: 60 percent of minimum yield strength.
c. Steel: 72 percent of minimum yield strength.

2. Structural Performance of Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

   a. Handrails:

      1) Uniform load of 50 lbf/ ft. applied in any direction.
      2) Concentrated load of 200 lbf applied in any direction.
      3) Uniform and concentrated loads need not be assumed to act concurrently.

   b. Top Rails of Guards:

      1) Uniform load of 50 lbf/ ft. applied in any direction.
      2) Concentrated load of 200 lbf applied in any direction.
      3) Uniform and concentrated loads need not be assumed to act concurrently.

   c. Infill of Guards:

      1) Uniform load of 25 lbf/ ft. applied horizontally.
      2) Infill load and other loads need not be assumed to act concurrently.

3. Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.

4. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings. Grind welds smooth to architectural finish.

5. Brackets, Flanges, Fittings, and Anchors:

   a. Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work.
   b. Furnish inserts and other anchorage devices for connecting to concrete or masonry work
   c. Brackets, Flanges, and Anchors: Same metal and finish as supported rails, unless otherwise indicated.
   d. Connect posts to stair framing by direct welding, unless otherwise indicated.

6. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

7. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

8. Close exposed ends of railing members with prefabricated end fittings

9. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate

B. Guardrail infill materials: (Select those that apply)

1. Balusters and railings constructed from materials as specified in preceding section 055000.2.1.

2. Glazing as specified in Section 088000 – Glazing.

a. Fabricate to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.

3. Tensioned stainless-steel cabling:

a. Provide cabling systems meeting all requirements listed below from any of the following manufacturers:

1) AGS Stainless, Inc. – Cable Rail
2) Feeny Inc. (CableRail, DesignRail)
3) Stainless Cable & Railing Inc.
4) The Cable Connection, Ultra-Tec Cable Railing Systems
5) Approved Equal

b. Material: ASTM A492, stainless steel, Type 316
c. Construction: 1 x 19
d. Diameter 1/8 inch (3 mm) diameter
e. Lay: Left Hand Lang's
f. Core: Stainless steel
g. Spacing: As indicated on drawings.
h. Cable provided cut to length with fittings attached to both ends
i. Cable Fitting Material: Stainless Steel, Type 316

1) Include washers, nuts, end caps and any accessory items as recommended by manufacturer for installation conditions
2) Type: Use most economical combinations of fitting practical
3) Factory Assembly: Factory Threaded Tensioner/Factory. Threaded Terminal/ Acorn Nut/ Hex Nut/ Stainless Washer.

4. Steel Wire Mesh Panels:

a. Square Weave Wire Mesh, Plain Steel Cold Rolled, 2" Square Opening, 0.1920" Wire Diameter, Lockcrimp Weave, 83% Open Area.
b. Frames: 1" x 1/2" x 1/8" thick steel channels, 1" x 1" x 1/8" thick steel angles and 1/8" thick steel bar and angle closures and other shapes as shown on drawings.
c. All wires welded to frame within channel legs and hidden from view

2.3 ARCHITECTURAL METAL COLUMN COVERS

A. Acceptable Manufacturers:

1. Column Cover Basis of Design Product: Series 100 Una-Clad Aluminum Column Cover, by Firestone Metal Products.

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:
a. Centria
b. Fry Reglet
c. Pittcon Industries

B. Aluminum Plate: ASTM B209, Aluminum Association specification sheet 3003-H14/3105-H14 for painted finish.

1. Thickness: 0.125 inch.

C. Tolerances

1. Roll columns to a true radius with return attachment legs formed to accommodate proper installation.

2. Radius: Refer to Drawings.

3. Reinforce columns covers with stiffeners where applicable to meet design criteria.

D. Accessories

1. Fasteners: as recommended by the column cover manufacturer.
2. Column attachment clips: 1/8 inch thick formed metal, compatible with the column skin – column clips to ship loose for field installation.
3. Column Cover System Subgrits: Provide G90 galvanized steel of gauge and spacing required for column system structural requirements, as recommended by column manufacture and in accordance with approved shop drawings. To avoid galvanic reaction, separate dissimilar metals.

E. Column Cover Finishes:

1. Comply with NAAMM's Metal Finishes Manual for architectural metal products for recommendations for applying and designating finishes.
2. Coating shall be Spray-Applied Fluorocarbon Resin utilizing 70% Kynar 500 resins.
3. Color as selected by Architect from manufacturer's standard colors.
4. Number of Coats: 2-coat. Coating shall be factory applied on a continuous process paint line. Coating shall consist of a 0.2 mil prime coat, a 0.75 mil barrier coat, a 0.75 mil metallic/color coat containing 70% Kynar resins, and a 0.5 mil clear coat containing 70% Kynar resins (Note mil thickness is approximate.)
5. Relevant to the color selected, material to be painted in accordance with either AAMA specification 2605 or 2604.
6. Provide factory applied strippable plastic film for protection during fabrication and installation

2.4 CHAIN LINK MATERIALS:

A. Fabric: Hot-dip galvanizing conforming to ASTM A123 and A153 as applicable

1. Mesh size and gauge: 2 inches, 8-gauge wire
2. Top and bottom salvages twisted and barbed
3. Tension wire (top and bottom edges): coil spring wire, 7 gauge
4. Use on piece fabric widths.

B. Round Steel Pipe and Rails: Schedule 40 ASTM F1083, Grade 1 A, regular standard weight. 1.8 oz/sq ft hot dipped galvanized zinc exterior and interior per ASTM A125

C. Miscellaneous hardware, fitting and appurtenances: Manufacture to industry standards, commercial quality and suitable for the purpose used.

D. Post Caps: Cast or malleable iron ball or acorn shape. Caps shall have opening for through rail where top rails are indicated.

E. Wire ties shall be as follows:

1.For tying fabric to tension wires: 11-gauge hog rings spaced 24 inches on center

2. For tying fabric to line posts: 9-gauge wire spaced 12 inches on center

3.For tying fabric to rails and braces: 9-gauge wire spaced 9inches on center.

F. Bands: Use 14 gauge by 1-inch-wide steel bands space 15 inches on center for securing stretcher bars to end, corner, pull and pate posts. Bands may be used in conjunction with special fitting for securing rails to end, corner and pull posts. Chamfer or ease projecting edges of bands.

G. Gates shall be swing type furnished complete with all hardware and accessories as required for a complete installation.

1. Gate Frames: Frames shall be fabricated with material as specified for fence framework and fabric.
2. Fabrication: Conform to applicate requirements of ASTM F900, Federal specification RR-F-191/C
3. Gate Hardware: Provide gate hinges, latch, stop and keeper for gate leaf, conforming to applicable requirements of ASTM F900 and Federal Specification RR-F-191/2C. Provide latch with provision for locking gate with a padlock.

2.5 ACCESSSORIES

A. Non-Shrink Non-Metallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.6 FABRICATION

A. Form metal fabrications from materials of size, thickness, and shapes indicated on Drawings, but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on approved Shop Drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

B. Form exposed Work true to line and level with accurate angles and surfaces and straight sharp edges.

C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in design, fabrication, and installation of metal assemblies to prevent buckling, opening up of joints, and over-stressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

D. Fabricate handrails and guardrails in accordance to approved shop drawing and field dimensions using mitered and welded joints with bends where indicated on shop drawings.

E. Provide metal free from pitting, seam marks, roller marks, grinding marks and stains at areas exposed to view on completed rail units.

F. Form bends to uniform radius, free of distortion, twists, cracks and grain separation.

G. Top rails shall be continuous over posts for strength with splices for expansion located within 6 to 12 inches of post

H. Splices and expansion joints shall utilize internal splice connectors with set screws to allow for rail expansion over ambient temperature change.

I. Shear and punch metals cleanly and accurately. Remove burrs and ease exposed edges. Form bent-metal corners to smallest radius possible without impairing work.

J. Welding:

1. Weld shop connections and field connections, unless noted or specified otherwise.
2. Weld corners and seams continuously and per requirements of AWS Code.
3. Employ welders qualified per requirements of AWS Code.
4. Weld connections to comply with the following:
    a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    b. Obtain fusion without undercut or overlap.
    c. Remove welding flux immediately.

d. Weld exposed corners and seams continuously, unless otherwise indicated.
e. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface

K. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

L. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located, consistent with design of component, except where specifically noted otherwise.

M. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

N. Ease exposed edges to a radius of 1/32 inch, unless noted otherwise. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing Work.

O. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for re-assembly and coordinate installation.

P. Fabricate ladders for locations shown, complying with ANSI A14.3, welded-steel construction.

1. Provide non-slip surfaces on top of each rung, whether by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

2. Galvanize ladders and stairs, including brackets and fasteners.

2.7 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Shop Primer for Ferrous Metals:

1. Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field applied topcoats despite prolonged exposure.

2. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications.

a. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

1) Zinc Rich Primer Exterior metal surfaces unless otherwise indicated.

b. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning

3. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

4. Do not prime surfaces in the following conditions:

a. Those with galvanized finishes.

b. Those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated.
c. Those in direct contact with concrete.
d. Those where field welding is required.

E. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight and complying with DOD-P-21035 or SSPC-Paint-20.

F. Exterior Exposed Ferrous Metal: Commercial blast-clean surfaces to be exposed to conform to SSPC-SP6.

1. Primer: TNEMEC No. 161-1211 TNEME-FASCURE Primer or approved substitute.

2. Dry film thickness: Minimum 4.0 mils. Verify thickness by independent testing agency.

G. Aluminum finishes: Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

H. Stainless-Steel finishes:

1. Remove tool and die marks and stretch lines or blend into finish.

2. Grind and polish surfaces to produce uniform finish indicated, free of cross scratches.

a. Run grain of directionally textured finishes with long dimension of each piece.

3. Directional Satin Finish: No. 4.

4. Mirrorlike Reflective, Nondirectional Polish: No. 8.

5. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates to appropriate Sections.

C. Coordinate and furnish anchorage; setting drawings, diagrams, templates, instructions, and directions for installation of anchorage, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded due to shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.

E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding Work, and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blend so that no roughness shows after finishing and contour of welded surface matches those adjacent material and has the appearance of a weld free butt joint connection at inside and outside corners, or the appearance of a continuous piece at straight butt joints.

F. Provide anchorage devices and fasteners where needed to secure items to in-place construction.

G. Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation, with edges and surfaces level, plumb, true, and free of rack.

H. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint or zinc chromate primer.

I. Installing Steel Railings

1. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:

   a. Anchor posts to steel by welding directly to steel supporting members.
   b. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with post-installed anchors and bolts.

2. Attach steel handrails to wall with steel brackets and plates. Provide bracket with minimum 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets and plates as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as follows:

   a. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt
   b. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
   c. For hollow masonry anchorage, use toggle bolts.
   d. For steel-framed gypsum board assemblies, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.

3.3 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset from True Alignment: 1/4 inch.

3.4 CLEANING

A. Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Section 09900 – Paints and Coatings.

B. For galvanized surfaces clean welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

C. Clean aluminum and stainless steel by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

D. Clean and polish glass.

3.5 PROTECTION

A. Protect finishes from damage during construction period with temporary protective coverings approved by manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units

3.6 SCHEDULE [Select all items that apply]

A. Refer to Drawing details for items not specifically scheduled.

B. Sheet Blocking: Steel plates in connection with studs and furring necessary for engaging and fastening of wall hung items at locations indicated on Drawings, or as necessary.

1. Backing plates: Securely weld to structure, heavier than 14 gauge; self-drilling screwed or bolted to 14 gauge and lighter steel stud supporting members in required position. Galvanized finish.

C. Railings and Handrails: Steel pipe as detailed. Insure that runs of horizontal pipe on opposite sides of posts are in same plane, both vertically and horizontally. Make joints flush with concealed seamless fittings. Accurately cut, miter, weld, and grind smooth to flush surfaces. Make bends to preserve the contour of the pipe. Shop prime finish at interior rails and hot-dip galvanize finish after fabrication for exterior rails.

1. Secured to Walls: Cast brackets of stock design providing 1-1/2 inch minimum clearance between railing and wall. Secure to wall with machine bolts and steel backer plate secured to metal studs. Attach to concrete and masonry with expansion shields and galvanized bolts

2. Pipe Sleeves Set in Concrete: Minimum 16 gauge galvanized steel with welded, closed bottoms. Deliver pipe sleeves to Project site for installation in concrete forms. Pipe standards set in metal sleeves wedged true and plumb and cemented in place with non-shrink grout. Finish surface of grout smooth and flush with concrete surface

D. Roof Ladders: Provide ladders as indicated on drawings. Accurately cut, miter, weld and grind smooth all connections.

E. Elevator Pit Ladders: Provide ladders as indicated on drawings. Accurately cut, miter, weld and grind smooth all connections. Ladders to receive hot-dip galvanize finish after fabrication.

F. Architectural Metal Column Covers.

G. Furnish other miscellaneous metal fabrications for a Project of this type, as indicated on Drawings.

END OF SECTION

SECTION 055110 - METAL STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Preassembled steel stairs with concrete-filled treads.
2. Cast-in-place metal stair nosings.

B. Related Sections include the following:

1. Section 033000 "Cast-in-Place Concrete" for concrete fill for stair treads and landings.
2. Section 055000 "Metal Fabrications" for guardrails and handrails at steel stairs.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance of Stairs: Provide metal stairs capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft.
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Limit deflection of treads, landings, and framing members to L/360 or 1/4 inch, whichever is less.

B. Structural Performance of Railings: See Section 055000 “Metal Fabrications”

1.4 SUBMITTALS

A. Product Data: For metal stairs and the following:

1. Abrasive nosings.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Indicate detailed fabrication and erection of each metal component.
2. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, sizes and types of fasteners, and accessories.
3. Indicate bearings, anchors, and other products required for construction activities of this Section. Indicate products not furnished by manufacturers of products of this Section.
4. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.
5. Provide templates for anchors and bolts specified for installation under other Sections.

6. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in State of Minnesota responsible for their preparation.

C. Welding certificates.

D. Qualification Data: For professional engineer.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.

1. Preassembled Stairs: Commercial class.

C. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."

2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 COORDINATION

A. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500 (cold formed).

C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

D. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.

2.3 NONFERROUS METALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

B. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.4 FASTENERS

A. General:

1. Select fasteners for type, grade, and class required for installation of miscellaneous metal items.
    a. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed
    b. Galvanized Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
    c. Provide zinc coated, galvanized for exterior use or when used in exterior walls, in compliance with ASTM A153-82.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts for stairs indicated to be shop primed with zinc-rich primer.

D. Machine Screws: ASME B18.6.3.

E. Lag Bolts: ASME B18.2.1.

F. Plain Washers: Round, ASME B18.22.1.

G. Lock Washers: Helical, spring type, ASME B18.21.1.

H. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primer for Ferrous Metals:

1. Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field applied topcoats despite prolonged exposure.
2. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications.
    a. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
        1) Zinc Rich Primer Exterior metal surfaces unless otherwise indicated.
    b. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning
3. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

4. Do not prime surfaces in the following conditions:
    a. Those with galvanized finishes.
    b. Those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated.
    c. Those in direct contact with concrete.
    d. Those where field welding is required.

C. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight and complying with DOD-P-21035 or SSPC-Paint-20

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

E. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

F. Concrete Finish: Trowel smooth to receive finishes specified in Division 9.

G. Welded Wire Fabric: ASTM A 185, 6 by 6 inches--W1.4 by W1.4, unless otherwise indicated.

2.6 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding, unless otherwise indicated.

2. Use connections that maintain structural value of joined pieces.

3. Fabricate treads and platforms of exterior stairs so finished walking surfaces slope to drain.

B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

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

D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

F. Weld connections to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. Weld exposed corners and seams continuously, unless otherwise indicated.

5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.7 STEEL-FRAMED STAIRS

A. Stair Framing:

1. Fabricate stringers of steel channels and plates.

a. Provide closures for exposed ends of stringers.

2. Construct platforms of steel plate, channel or tube headers and miscellaneous framing members as indicated.

3. Weld stringers to headers; weld framing members to stringers and headers.

4. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.

B. Metal-Pan Stairs: Form subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than 0.0677 inch.

1. Steel Sheet: Uncoated cold-rolled steel sheet, unless otherwise indicated.

2. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.

3. Attach perforated riser panels to subtreads as shown on drawings.

4. Attach abrasive nosings to risers.

5. At Contractor's option, provide stair assemblies with metal-pan subtreads filled with reinforced concrete during fabrication.

C. Steel Guardrails, Handrails and Brackets: See Section 055000 “Metal Fabrications”.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal stairs after assembly.

C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed products:

1. Interior Stairs (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

D. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.9 STAIR NOSINGS

A. Manufacturers:

1. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or other approved equal:

    a. ACL Industries, Inc.
    b. American Safety Tread Co., Inc.
    c. Armstrong Products, Inc.
    d. Balco Inc.

B. Materials:

1. Stair nosing system: for use on metal pan stair treads.

    a. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions.

2. Stair nosings shall be solid, slip resistant, and removable and replaceable.

3. Abrasive:

    a. Standard Abrasive: Two (2) part Epoxy combined with aluminum oxide grit.
    b. Abrasives with cementitious-based resins shall not be acceptable.

C. Fabrication:

1. Fabricate stair nosing assemblies as detailed. Provide anchors and accessories necessary for complete installation.

    a. Fabricate solid surface abrasive tread 3/8-inch thick by full width of tread.
    b. Provide specified anchors and, where required, tread plate securing screws.

2. Package components with anchors.

D. Finishes:

1. Aluminum subchannels and tread plates shall be:

    a. Mill finish.
    b. Heat-treated for strength.
    c. Clear acrylic lacquer coated for components to be embedded in concrete.

2. Solid abrasive tread as selected from manufacturers full range

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete, unless otherwise indicated.

D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

F. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

G. Place and finish concrete fill for treads and platforms to comply with Division 3 Section "Cast-in-Place Concrete."

1. Install abrasive nosings with anchors fully embedded in concrete. Center nosings on tread width.

3.2 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 painting Sections.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

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SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood framing, blocking and nailers.
2. Wood furring.
3. Sheathing.
4. Plywood backing panels.
5. Fire-retardant treated concealed wood blocking within non-combustible or rated building assemblies
6. Fire-retardant treated plywood backing concealed within non-combustible or rated building assemblies
7. Preservative treated wood materials.
8. Related fasteners, attachments, and adhesives.

B. Related Sections include the following:

1. Section 061005 – Roof Related Rough Carpentry for wood blocking and other wood construction used in conjunction with roofing assemblies.

1.3 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority.
3. SPIB - Southern Pine Inspection Bureau.
4. WWPA - Western Wood Products Association.

B. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.

1.4 QUALITY ASSURANCE

A. Codes and Standards: In addition to complying with the pertinent codes and regulation of governmental agencies having jurisdiction, unless specifically directed or permitted by the Architect/Engineer or Construction Manager.

1. Product Use Manual of the Western Wood Products Association for selection and use of products included in that manual.
2. Plywood Specification and Grade Guide of the APA-The Engineered Wood Association.

1.5 SUBMITTALS

A. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of fire-resistant treated materials.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Grade Stamps: Factory mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, and moisture content at time of surfacing and mill.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Dressed sizes of green lumber are larger than dry lumber in DOC PS 20.
4. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
5. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
6. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 TREATED MATERIALS

A. Fire-Retardant-Treated Materials: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Use Exterior type for exterior locations and where indicated.
2. Use Interior Type A unless otherwise indicated.
3. For enclosed roof framing, framing in attic spaces, and where high-temperature fire-retardant treatment is indicated, provide material with design adjustment factors of not less than 0.85 for modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
4. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
5. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.
6. Provide fire-retardant treated materials for all rough carpentry concealed with building interior wall framing located in non-combustible Construction Types (Types I and II), in rated construction, and elsewhere as indicated on Drawings.

B. Wood Preservative Pressure-Treated Materials:

1. Treated Lumber and Plywood: Comply with requirements of AWPA U1 – Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

   a. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
   b. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.

   a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   b. Treat lumber exposed to weather
   c. Treat wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
   d. Treat wood floor plates that are installed over concrete slabs directly in contact with earth.
   e. Treat lumber less than 18 inches above grade.
   f. Treat lumber in other locations as indicated.

3. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft. retention.

   a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
   b. Treat plywood in contact with masonry or concrete.
   c. Treat plywood less than 18 inches above grade.
   d. Treat plywood in other locations as indicated

4. All fasteners used to secure or attach pressure treated lumber, or in direct contact with pressure treated lumber are to be stainless steel, or otherwise corrosion resistant to the materials used in pressure treatment.

2.3 MISCELLANEOUS LUMBER

A. General:

1. Provide dimension lumber with each piece factory marked with grade stamp of an accredited grading agency identifying grade, species, and moisture content at time of surfacing

2. Provide lumber for support or attachment of other construction, including the following:

   a. Blocking.
   b. Nailers.
   c. Furring.

3. Provide fire-retardant treated materials for all rough carpentry concealed with building interior wall framing located in non-combustible Construction Types (Types I and II), in fire rated construction, and elsewhere as indicated on Drawings.

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and the following species:

1. Douglas Fir
2. Eastern Pine
3. No. 3 Southern Pine

4. No. 2 Western Hemlock
5. Spruce-Pine-Fir

C. For exposed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; D Select (Quality) grade; NELMA, NLGA, WCLIB, or WWPA.
2. Mixed southern pine, B & B Finish grade; SPIB.
3. Hem-fir or Hem-fir (north), Superior or C & Btr Finish grade; NLGA, WCLIB, or WWPA.

D. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2 grade; SPIB.
2. Eastern softwoods, No. 2 Common grade; NELMA.
3. Northern species, No. 2 Common grade; NLGA.
4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

E. Plywood Wall Backing: APA plywood touch-sanded C-D plugged, Group 2.

1. Span Index: 16/0.
2. Edges: Square.
3. Thickness: 1/2 inch, unless otherwise indicated.
4. All plywood wall backing shall be fire-retardant treated.

F. Plywood Backing Panels

1. Telephone and Electrical Equipment Backing Panels: DOC PS 1, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.4 SHEATHING

A. Wall Sheathing, For plywood/OSB walls, PS-2; APA Rated Sheathing.

1. Provide APA-rated panels with each piece factory marked with grade stamp of APA identifying type, exposure durability classification, span rating, and thickness
2. Span Index: 16/0.
3. Edges: Square.
4. Exposure Class: Exposure 1.
5. Thickness: 5/8-inch, nominal, unless otherwise indicated.

B. Glass Mat Gypsum Wall Sheathing: ASTM C1177/C, 1177M.

1. Product: Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum Corporation, “GlasRoc” by CertainTeed or approved equal.
2. Type ‘X’
3. Thickness: 5/8 inch thick.
4. Edge and end Configuration: Square ends
5. Size: 48 by 96 inches for vertical installation

2.5 ACCESSORIES

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide stainless steel fasteners.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1.

G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

H. Nails: Bright finish steel for interior and galvanized steel for exterior.

I. Plywood Clips: Simpson Company, PSC; size to match plywood thickness.

J. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

D. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.

E. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

G. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

3.2 LUMBER SEASONING

A. Allow lumber to attain a state of equilibrium with local atmosphere prior to incorporating into Work.

B. If wood treatment specifications state maximum percentage of moisture content at time of treatment, comply with those requirements.

3.3 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. In walls provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.4 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.

END OF SECTION 061000

SECTION 061005 - ROOF- RELATED ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:

1. Roof-related wood blocking to be used at exterior areas scheduled to receive roofing systems and/or flashing.

1.3 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority.
3. SPIB - Southern Pine Inspection Bureau.
4. WWPA - Western Wood Products Association.

1.2 QUALITY ASSURANCE

A. Codes and Standards: In addition to complying with the pertinent codes and regulation of governmental agencies having jurisdiction, unless specifically directed or permitted by the Architect/Engineer or Construction Manager.

1. Product Use Manual of the Western Wood Products Association for selection and use of products included in that manual.
2. Plywood Specification and Grade Guide of the APA-The Engineered Wood Association.

1.4 SUBMITTALS

A. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated materials.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver material to the site, insofar as practicable, in manufacturer’s original containers and bearing the trademarks and names thereof. Grade stamped on all standard yard dimension lumber or certified for compliance

B. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings

1.6 PROJECT CONDITIONS

A. Existing conditions: replace existing wood members intended for reuse that are in unsatisfactory condition with equivalent products.

B. Examine the areas and conditions under which work of this Section will be installed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until given conditions have been corrected.

C. Environmental Requirements: Wind velocity and temperature limitations shall be based on Contractor's ability to apply materials in the specified manner.

D. Protection: Provide appropriate protection on roof-related traffic, staging and storage areas. As a minimum, protection shall consist of 45 mil EDPM, 1" extruded polystyrene insulation and 3/4" plywood ballasted with sandbags. Remove protection materials upon completion of the work.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Grade Stamps: Factory mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, and moisture content at time of surfacing and mill.
2. Dressed sizes of green lumber are larger than dry lumber in DOC PS 20.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
5. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 TREATED MATERIALS

A. In accordance to the IBC, roof construction, including equipment, curbs, building or roof system joints, blocking and parapet or roof edge construction where wood is 24 inches or more above the roof deck, provide fire retardant treated lumber.

B. Fire-Retardant-Treated Materials: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Use Exterior type.
2. Use treatment type that does not promote corrosion of metal fasteners.
3. For enclosed roof framing and where high-temperature fire-retardant treatment is indicated, provide material with design adjustment factors of not less than 0.85 for modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
4. Kiln-dry lumber after treatment to a maximum moisture content of 15 percent.
5. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.

2.3 LUMBER

A. Miscellaneous Dimension Lumber: Standard non-preservative treated, light framing grade, thoroughly seasoned with less than 19 percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.

1. Douglas Fir
2. Eastern Pine
3. No.3 Southern Pine

4. No.2 Western Hemlock
5. Spruce-Pine-Fir

B. Plywood: C-D Exposure 1 or better, APA Rated sheathing, non-preservative treated, meeting US Products Standard PS1 or Performance Standard PRP-108 for Soft Wood Plywood Construction and Industrial, with less than 19 percent moisture content at time of installation and the time roofing is installed.

2.4 FASTENERS

A. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M with untreated lumber or Type 304 stainless steel where fasteners come into contact with treated lumber.

1. Lumber to lumber: Cement coated or annular thread nails with minimum 1¼" penetration into adjoining member.
2. Plywood to lumber:
   a. Nails: Rink shank or annular thread nails with minimum 1¼" penetration into adjoining member.
   b. Screws: Minimum #14 flat head countersunk wood screws, zinc or cadmium plated steel with minimum 1¼" penetration.
3. Lumber or plywood to concrete or masonry: Tapcom or Gripcon anchors, minimum ¼" diameter with 1" penetration, minimum 300 lb per anchor installed withdrawal resistance.
4. Lumber or plywood to steel deck: Minimum #14 flat head wood screws, zinc, cadmium plated or stainless steel with minimum 1¼" penetration.
5. Power-Driven Fasteners: CABO NER-272.

2.5 MISCELLANEOUS

A. Sheet metal angle: 12-gauge galvanized iron, as shown on Drawings.

PART 3 - EXECUTION

3.1 REMOVAL OF EXISTING

A. Removed material need not be salvaged unless specifically required for reuse.

3.2 PREPARATION

A. Grout, shim, patch or fill existing construction as necessary to properly install wood members.

B. Inspect fastening of existing wood members left in place for conformance to requirements specified herein. Fastening not found in conformance shall be upgraded to meet these requirements.

C. Reset or replace existing fastener for materials exposed but left in place that are loose, deformed, damaged or corroded.

D. Perimeter wood blocking installation shall as a minimum, be in accordance with recommendations of Factory Mutual Loss Prevention Sheet 1-49, September 2000.

3.3 INSTALLATION

A. Set miscellaneous rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Top surface of horizontal blocking is to match the surface elevation of the new roof insulation.

C. Do not use warped members unless they can be fastened adequately to permanently hold them in their required alignment.

D. When construction wood curbs with multiple vertical blocking and plywood members, provide staggered joint for all layers and 12” laps.

E. Lumber or Plywood to Lumber:

1. Maximum spacing of 12” on center, staggered across face of piece and located within 3” of each end of piece. 8” each way from outside corners for roof edge blocking.
2. Heads shall be flush with wood surface and nail shall penetrate adjoining piece minimum 1-1/4”
3. Minimum 100 lb. per nail installed withdrawal resistance.

F. Lumber of Plywood to Steel Deck:

1. Verify the presence of conduit below the steel deck prior to installation.
2. Spacing as on Drawings or 18” on-center for screw when not specified, staggered if lumber is more than 5” wide. Maximum 9” on-center., 8” each way from outside corners for roof edge blocking.
3. Countersink head flush with surface but no more than 1/3 the thickness of the fastened piece.
4. Minimum 150 lb. per anchor withdrawal resistance or number of fasteners increase accordingly from that specified, Minimum penetration of 1-1/2”

G. Lumber or Plywood to Concrete or Masonry:

1. Spacing as shown on Drawings or maximum 3’ on center when not specified, staggered. Maximum 18” on center, 8” each way from outside corners for roof edge blocking.
2. Countersink head flush with surface but no more than 1/3 the thickness of the fastened piece.
3. Minimum 300 lb. per anchor withdrawal resistance or number of fasteners increased accordingly from that specified, minimum penetration of 1”

3.4 FIELD QUALITY CONTROL

A. Alignment and elevation of installed wood shall be checked by the Contractor and may be checked by the Architect/Engineer.

B. Withdrawal test of fasteners may be required if attachment is in question.

3.5 CLEANING

A. Keep the premises in a neat, safe and orderly condition, free from an accumulation of sawdust, cut ends, and debris at all times during the execution of the Work.

END OF SECTION 061005

SECTION 064100 - ARCHITECTURAL WOOD CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Plastic-laminate cabinets.
2. Hardwood veneer cabinets.
3. Cabinet hardware.
4. Plastic-laminate countertops.
5. Plastic laminate covered window stools.
6. Wood locker room benches

B. Related Sections include the following:

1. Section 061000 "Miscellaneous Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
2. Section 066500 “Solid Surface Fabrications” for solid surface countertops and splashes.

1.2 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

1.3 REFERENCES

A. ANSI A 208.1: Particleboard.

B. ANSI A 208.2: Medium Density Fiberboard (MDF) For Interior Applications

C. AWI: Architectural Woodwork Institute.

D. AWS: Architectural Woodwork Standards.

E. BHMA A156.9: Cabinet Hardware.

F. BHMA A156.11: Cabinet Locks.

G. BHMA A156.18: Materials and Finishes.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including cabinet hardware and accessories and finishing materials and processes.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
2. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

3. At hardwood veneer plywood panels show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.

C. Samples for Verification: For the following:
   1. Plastic-laminate-clad panel products, 8 by 10 inches, for each type, color, pattern, and surface finish.
   2. Lumber with or for transparent finish, not less than 50 sq. in., for each species and cut, finished on 1 side and 1 edge.
   3. Plywood with veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork.

D. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.
   1. Submittal of formal certification/certificates of AWI Quality Standards is not required, however, the project shall follow the fabrication requirements of the AWI Quality Standards as required by 1.5.C.

D. DELIVERY, STORAGE, AND HANDLING

E. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

   1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

   2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field

measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Products: Comply with the following:

1. Composite Wood Products: Products shall be made without urea formaldehyde
2. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
3. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
5. Hardwood Plywood and Face Veneers: DHA (HPVA) HP-1.

C. Materials for Semi-exposed Surfaces and exposed adjustable shelving where shown on plans.:

1. Thermoset Decorative Overlay: Particleboard complying with ANSI A208.1, Grade M-2, or medium-density fiberboard complying with ANSI A208.2, Grade MD, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
2. Edges of Thermoset Decorative Panel Shelves: ABS/PVC extruded fabrication

D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include the following, or other approved equal product:
   a. Nevamar-Company, LLC Decorative Products Division
   b. Formica Corporation
   c. Wilsonart International; Div. of Premark International, Inc
2. Texture and Color: Selected by Architect from manufacturer's full texture and color range.
   a. P-lam 1: for use on all plastic laminate covered cabinet boxes and other components where identified on the Drawings.
   b. P-lam 2: for use at all countertops, window stools and other components where identified on the Drawings.
   c. P-lam 3:

E. Furring, Blocking, Shims, and Hanging Strips: Softwood lumber, kiln dried to less than 15 percent moisture content.

F. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

G. Adhesive for Bonding Plastic Laminate: Do not use adhesives that contain urea formaldehyde.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.2 ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.

1. Grade: Premium.
2. Type of Construction: Flush overlay.
3. Cabinet Door and Drawer Style: Standard overlay

B. Plastic Laminate Cabinets:

1. Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets
2. Provide High-pressure decorative laminate complying with the following requirements:
    a. Horizontal Surfaces Other Than Tops: HGS.
    b. Vertical Surfaces: VGS.
    c. Edges: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
3. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
    a. Match color, pattern, and finish as indicated by manufacturer's designations for these characteristics.

C. Hardwood veneer cabinets with transparent finish:

1. Hardwood plywood and veneers: ANSI/HPVA HP-1 (latest edition) Grade AA
2. Hardwood Veneer:
    a. Grade: Premium, with minimum Grade A faces. Grade AA at all exposed faces.
    b. Species:
    c. Cut: (plain, quarter, rift, or rotary)
    d. Match between veneer leaves: (book, slip, or random)
    e. Unless otherwise specified, vertical surfaces with a defined grain and/or directional pattern shall be applied and assembled with grain or pattern oriented vertically.
3. Finishing:
    a. Grade: Premium.
    b. Finish: AWI conversion varnish system.
    c. Stain: As selected by Architect, Match Architect’s sample
    d. Sheen: Semigloss.
    e. Finish all casework at factory.
4. Panel layup requires cores of veneer, lumber, particleboard, MDF, or a combination thereof. Veneer core shall not be used for cabinet door or drawer front components.
5. Surface distortions or defects, such as bubbling, blistering, cracking, crazing or ridges in the exposed face veneer, shall not occur.
6. Telegraphing shall not exceed .1 mm [.004"] in any 76.2 mm [3"] span.

7. Surfaces, Veneer Material Requirements

   a. Veneer shall be of sufficient thickness to prevent exposure of core after sanding or finishing.
   b. Edges of multi-leaf faces shall appear parallel.
   c. At exposed exterior surfaces, wood shall be of the specified species, cut, veneer match, and:

      1) Solid stock shall be well matched for color and grain
      2) Veneer shall be compatible in color with solid stock
      3) Adjacent veneer panels shall be well matched for color and grain.

D. Materials for Semi-exposed Surfaces: Provide surface materials indicated below:

   1. Surfaces Other Than Drawer Bodies: Thermoset decorative overlay.
   2. Drawer Sides and Backs: Thermoset decorative overlay.
   3. Drawer Bottoms: Thermoset decorative overlay.

E. Materials for shelf edge (concealed only). PVC matching laminate in color, pattern, and finish

2.3 PLASTIC-LAMINATE COUNTERTOPS AND WINDOW STOOLS

A. Quality Standard: Comply with AWI Section 400 requirements for high-pressure decorative laminate countertops.

B. High-Pressure Decorative Laminate Grade: HGS.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

   1. Match color, pattern, and finish as indicated by manufacturer's designations for these characteristics.

D. Edge Treatment: 1/4” round edge with continuous plastic laminate over face.

E. Core Material: Particleboard made with exterior glue.

F. Core Material at Sinks: Particleboard made with exterior glue, or exterior-grade plywood

2.4 CABINET HARDWARE

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware"

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

C. Unless noted other wise and where applicable provide anti-ligature hardware.

D. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening.

E. Pivot Hinges: Double acting gate spring pivot-type hinge where shown on Drawings:

   1. 4007MRB by McKinney or approved substitute.

F. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.

G. Catches: Magnetic catches, BHMA A156.9, B03141.

H. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.

I. Door Locks: BHMA A156.11, E07121.

J. Door and Drawer Silencers: BHMA A156.16, L03011.

K. Exposed wall mounted standards and brackets for adjustable shelving:

1. Wall mounted standards and brackets: Knape and Vogt 87 series Standard and 186.

a. Standard: 87 series stainless steel.
b. Bracket: 186 series brackets stainless steel.
c. Provide screws and anchors, shelf rest attachments as provided by system manufacturer, stainless steel.

2. Install with solid wood blocking secured directly to framing within stud cavity, at each location of attachment

L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

N. Grommets for Cable Passage through Countertops: 2-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.

O. Mounting Bracket: 208 Series Ultimate L-Bracket by Knape and Vogt, 208 TI 500:

1. Capacity up to 1,200 lbs. per pair
2. Epoxy-Coated finish, titanium color
3. 5mm steel bar and 3/4" steel strut
4. BHMA Grade 2 Compliant
5. Mount into solid wood blocking at walls. Provide L-brackets at tops longer than 49 inches, spaced equally, unless noted otherwise

2.5 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

C. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

D. Scribes, fillers and closure panels.

1. Aesthetic requirements of installed scribes, fillers, and closure panels shall be in accordance with ANSI/AWI 0620-2018 - Finish Carpentry/Installation

2. Casework shall be scribed to finished walls and/or ceilings using integral scribes, scribe fillers, or scribe moulding at voids between cabinets and adjacent walls or ceilings.

3. Voids at top and bottom of cabinet shall have closure panels. Voids exceeding the allowances indicated below in width shall have closure panels a minimum of 6.4 mm [.250”] thick

4. Maximum installed width of scribe fillers shall be 50.8 mm.

5. Material shall match exposed surfaces and be furnished by the manufacturer/supplier.

6. Fillers at inside corners where two elevations of casework meet shall be equal in width and not wider than 76.2 mm [3”], unless required for hardware clearance during operation.

2.6 FABRICATION

A. Interior Woodwork Grade: Unless otherwise indicated, provide premium-grade interior woodwork complying with referenced quality standard.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4-Inch thick or Less: 1/16 inch.
2. Edges of Rails and Similar Members More Than 3/4-Inch Thick: 1/8 inch.
3. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch

D. Fasteners:

1. At exposed exterior surfaces, exposed fasteners are not permitted except at access panels.
2. At exposed interior surfaces, fastener cover caps of compatible color to interior finish shall be furnished by the manufacturer/supplier

E. Complete fabrication to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

F. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs. For decorative plastic laminates, comply with manufacturer's written fabrication instructions.

2.7 SHOP FINISHING

A. General: Shop finish transparent-finished interior architectural woodwork at fabrication shop as specified in this Section. Refer to Division 09 painting Sections for finishing opaque-finished architectural woodwork.

B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.

C. Transparent Finish:

1. Grade: Premium.
2. Staining: Match approved sample for color.

2.8 WOOD LOCKER ROOM BENCHES

A. By WB Manufacturing, 507 E. Grant St., Thorp, WI 54771, 800-242-2303; wibenchmfg.com

1. Thickness - 1-1/4”
2. Species - Mixed hardwood (standard), oak, maple

3. Widths – 12 inches
4. As indicated on plans
5. Rail Width - 3/4" - 15/16" (nominal)
6. Rail Construction - Finger joint
7. Finish - Two-coat clear catalyzed lacquer top/sides; 1 bottom
8. Edge Profile - Radius edge on all sides and corners
9. Bench supports:
    a. Pedestals: SSLP, #0401303 16 ¼-inch stainless steel.
    b. See Section 055000 Metal Fabrications for cantilevered metal brackets supporting lockers and wood benches. Provide wood benches under this Section. See plans for locations.

B. Provide wood benches and pedestals by other equal manufacturer supplying comparable product meeting listed requirements, as approved by the Architect

2.9 RECESSED TRANSACTION COUNTER TRAY

A. By CR Laurence Inc., 2503 E. Vernon Ave., Los Angeles, CA, 90058, (800) 421-6144; info@crl-arch.com
    1. CRL Standard Drop-in Deal Tray, CTDB16, 16 inches wide, 10 inches deep, 1 9/16 inches deep
    2. Brushed stainless steel, #4 Finish, 16 gauge.

B. Provide recessed transaction tray by other equal manufacturer supplying comparable product, as approved by the Architect

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and back priming

3.2 INSTALLATION

A. Install cabinets to comply with referenced quality standard for grade specified.

B. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

C. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

E. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Maintain veneer sequence matching of cabinets doors and boxes where constructed with hardwood veneer plywood receiving transparent finish.

F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
3. Secure backsplashes to tops with concealed metal brackets at 16 inches on center and to walls with adhesive.
4. Calk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."

G. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064110

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SECTION 066500 - SOLID SURFACE FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

1. This section includes the following items constructed from solid surface material.
    1. Solid surface, one-piece shower pans, shower wall and ceiling panels, miscellaneous accessories, and trim.
    2. Solid surface one-piece countertops and backsplash with integral sinks.
    3. Manufactured stone countertops
    4. Manufactured stone interior window stools
2. Related Sections
    1. Section 061000 - Rough Carpentry.
    2. Section 064100 - Architectural Wood Casework
    3. Section 092900 - Gypsum Board Assemblies

1.2 REFERENCES

A. American with Disabilities Act Accessibility Guidelines (ADAAG).

B. American National Standards Institute (ANSI):

1. ANSI Z 124.1.2 - Plastic Bathtub and Shower Units

C. ASTM F 462 - Standard Consumer Safety Specification for Slip-Resistant Bathing Facilities

D. National Fire Protection Association: NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

E. Underwriters Laboratories: UL 723 - Test for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM REQUIREMENTS

A. Performance Requirements: Provide shower receptors that conform to the following requirements of regulatory agencies and the quality control of Inpro®.

1. Provide shower receptors that conform to ANSI 124.1.2-2005 when tested for workmanship and finish, structural integrity and material characteristics.
2. Fungal and Bacterial Resistance: Provide product that does not support fungal and bacterial growth as tested in accordance with ASTM G-21 and ASTM G-22.

B. Provide solid surface sheet that conforms to the following requirements of regulatory agencies

1. Provide solid surface material that conforms to ANSI/ICPA SS-1 for workmanship and finish, structural integrity and material characteristics.

1.4 SUBMITTALS

A. Product Data: Manufacturer's complete and current product data for each product required, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Complete installation methods.
4. Product data for anchors, hardware, fastenings, and accessories.

B. Shop Drawings: Show locations of each item and installation details. Provide plan, section and elevation drawings conditions as necessary to depict correct installation procedures.

C. Samples for verification: Provide color samples of each selected color.

D. Closeout Submittal:

1. Manufactured Stone Maintenance Data: Include recommended cleaning materials and procedures, and list of materials detrimental to quartz.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Acceptable to manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, and other manufactured items so as not to be damaged or deformed. Package wall panels for protection during transportation and handling.

B. Unload and store in a manner to prevent bending, warping, twisting, and surface damage.

C. Store materials according to manufacturer's instructions.

1.7 WARRANTY

A. Provide manufacturer's standard warranty covering defects and workmanship.

PART 2 - PRODUCTS

2.1 SOLID POLYMER FABRICATIONS

A. General:

1. Composition: homogeneous polymer compound, comprised of acrylic and polyester components filled with aluminum trihydrate. Materials are non-porous and homogenous, with uniform color and pattern throughout the entire thickness

2. Compliance:

a. Hardness, ASTM D-2583-95: 58-60.
b. Flex Strength, ASTM D-790: 9,870.
c. Gloss, NEMA LD 3-3 1513.2: 5-20
d. Wear and Clean, ANSI Z124.3: Passes
e. Abrasion Resistance, CS 221-66: No loss of pattern
f. Slip Resistance, ASTM F-462: 0.24
g. High Temperature Resistance, NEMA LD3-3.06/3.5: No effect
h. Chemical Resistance, ANSI Z124.3: No effect
i. Color Stability, ASTM D-792: Slight effect at 200 hours.
j. Conductive Heat, NEMA LD3-3.08/3.8N: Slight effect
k. Unnotched Impact, ASTM D-256-96a: 1.3
l. Notch Impact, ASTM D-256-96a: 0.33 ft-lb/in
m. Stain, ANSI Z124.3: Passes-43
n. Water Absorption, ASTM D-570-95: 0.022
o. Flammability, ASTM E-84, Class 1

3. Fire Test Data: Solid surface materials s shall be classified by Underwriter's laboratories under UL File Number R14436 for surface burning characteristics.

4. Bacterial resistance: ASTM G-22

5. Fungal resistance: ASTM G-21

B. Solid surface shower receptor and surrounds:

1. Manufacturers:

1. Manufacturer, Basis of Design: Inpro® Corporation, PO Box 406 Muskego, WI, 53150 USA; Telephone: 800.222.5556, Fax: 888.715.8407, www.inprocorp.com
2. Subject to compliance with requirements and approved by the Architect, other manufacturers may submit other equal, similar products for approval. Substitutions are required to be submitted and approved by Addendum prior to the submission of the General Contractor's bid.

2. Solid Surface Shower Systems:

1. All products to be incorporated into this installation shall be provided by a single manufacturer, designed to be installed as one complete, watertight system.
2. Shower Walls: 1/4-inch thick, full width and height of wall sections.
3. Edges: Standard, square
4. Adhere panels with silicone adhesive

3. Shower Pans:

1. ADA Transfer Shower Receptor,

1.) Size to be 37 9/16" x 36 ¾" (36" x 36" Finished)
2.) Drain Location: Center
3.) Threshold: Integral ADA compliant threshold

2. Shower pans are to be made from solid cast polyester/acrylic blend resin and have adjustable drain locations, coved sidewall, at least a 1" panels platform with a 5 degree slope and a 1" minimum water dam. Provide a non-skid floor with water channels directing water to the drain at a 2 degree slope, ¼ inch per foot.
3. Shower pans shall meet the minimum ANSI Z124.2 certification.
4. Shower pans shall have a non-slip co-efficient rating of .20 or greater as registered by the ASTM F462 slip resistance test method.

4. Accessories

1. Provide accessories in matching materials, including the following:

1.) Inside coved and outside corner moldings.
2.) Wall moldings design to protect and conceal the waterproofing silicone sealant.

5. Colors: As selected by Architect from Manufacturer's full line of standard colors and finishes

C. Solid surface lavatory tops and sinks:

1. Conform to ANSI Z 124.3-2005 when tested for workmanship and finish, structural integrity and material characteristics

2. Colors: As selected by Architect from Manufacturer's full line of standard colors and finishes.

3. Vanity top:

a. Shapes, Sizes, Quantities and Locations: As scheduled and indicated on Drawings
b. Depth: 22 inches
c. Thickness: 1-1/2 inches (38 mm).
d. Edge Treatment: Double Eased - 1/8 inch (3 mm) Radius
e. Backsplashes: Attached coved backsplash with detached sidesplash

4. Sinks:
    a. ADA compliant
    b. Inside dimensions of 15-7/8 inches w x 12-3/4 inches high x 4 inches deep (403 mm x 324 mm high x 102 mm deep
    c. Sink Mounting: Integrally bonded – Round over perimeter
5. Mounting:
    a. Mount into solid wood blocking at side walls and at rear. Provide L-brackets at tops longer than 49 inches, spaced equally, designed to hold 500 pounds. See Section 064100 - Architectural Wood Casework for steel support brackets.

2.2 MANUFACTURED STONE FABRICATIONS

A. General:
1. Quartz Sheet Product: Subject to compliance with requirements, available products that may be incorporated into the Work include the following, or other approved equal product:
    a. Zodiaq, by Dupont
    b. Cambria
    c. Silestone, by Cosentino
2. Stain resistance: Not affected by 10 percent hydrochloric acid or 10 percent KOH, tested to ASTM C650
3. Abrasive index: 65-Ha = 25, tested to ASTM C241.
4. Color: Selected by Architect from manufacturer's full color range.
5. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
6. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

B. Manufactured Stone Countertops:
1. Quality Standard: Comply with AWI Section 400 requirements for countertops
2. Grade: Premium
3. Solid-Surfacing-Material Thickness: 1/2 inch.
4. Edge Treatment: 1/4” round edge with continuous manufactured stone surfacing over face.
5. Color and pattern: Selected by Architect from manufacturer's full color range
6. Surface finish: Polished
7. Adhesive: Type recommended by quartz manufacturer
8. Core Material: Particleboard made with exterior glue.
9. Core Material at Sinks: Particleboard made with exterior glue, or exterior-grade plywood
10. Color and pattern: Selected by Architect from manufacturer's full color range
11. Fabrication:

a. Fabricate countertops in one piece with shop-applied backsplashes, edges, and side-splashes where countertops abut adjacent walls.
b. Fabricate surfaces out of the largest sections of material as possible to minimize seams, butt joint all sections and seal edges
c. Install integral sink bowls in countertops in shop
d. Drill holes in countertops for plumbing fittings and soap dispensers in shop.
e. Radius exposed edges.
f. Fabricate with hairline joints.

C. Manufactured Stone Window Stools:

1. See drawings for sizes required
2. Edge profile: Bullnose
3. Thickness: As indicated on Drawings.
4. Color and pattern: Selected by Architect from manufacturer's full color range

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's instructions

3.4 COUNTERTOP INSTALLATION

A. Preparation: Clean surfaces to receive fabrications; remove loose and foreign matter than could interfere with adhesion.

B. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

C. Secure backsplashes to tops with concealed metal brackets at 16 inches on center and to walls with adhesive.

D. Adhere fabrications with continuous beads of adhesive.

E. Set plumb and level. Align adjacent pieces in same plane.

F. Install with hairline joints.

G. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match sill material. Carefully dress joints smooth, remove surface scratches, and clean entire surface

H. Fill joints between fabrications and adjacent construction with joint sealer; finish smooth and flush.

I. Tolerances:

1. Maximum variation from level and plumb: 1/8 inch in 10 feet, noncumulative.
2. Maximum variation in plane between adjacent pieces at joint: Plus or minus 1/16 inch.

3.5 STOOL INSTALLATION

A. Install in accordance with manufacturer's instructions

B. Install stools level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

C. Scribe and cut to fit adjoining work and refinish cut surfaces and repair damaged finish at cuts.

D. Install with minimum number of joint possible, using full-length pieces to greatest extent possible.

1. Align adjacent solid-surfacing-material stools and form seams to comply with manufacturer's written recommendations using adhesive in color to match sill material. Carefully dress joints smooth, remove surface scratches, and clean entire surface
2. Caulk space between sill and wall with sealant specified in Division 7 Section "Joint Sealants."

3.6 CLEANING

A. Clean and Protect: Clean exposed surfaces of partition parts using materials and methods recommended by manufacturer and provide protection as necessary to prevent damage during remainder of construction period.

3.7 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.8 ADJUSTING AND CLEANING

A. Verify that surfaces are level, plumb and rigidly secured to substrate; make any adjustments required.

B. Clean finished surfaces and immediate areas of installation, using materials and methods recommended by manufacturer. Remove from project site packaging and debris caused by installation.

END OF SECTION

SECTION 071410 - FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 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.

1.2 SUMMARY

A. The work of this section includes, but is not limited to, the following:

1. Fluid applied waterproofing system.
2. Composite membrane
3. Prefabricated drainage composite
4. Protection board

B. Related Sections: Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 033000 – Cast-In-Place Concrete
2. Section 042731 – Reinforced Unit Masonry
3. Section 072100 – Thermal Insulation for foundation insulation
4. Section 076200 – Sheet Metal Flashing and Trim
5. Section 079000 – Joint Sealants
6. Section 079500 - Expansion Control

1.3 REFERENCE STANDARDS

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 Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
2. C 898 Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Separate Wearing Course
3. D 412 Standard Test Methods for Rubber Properties in Tension
4. D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds D 1644 Test Methods for Nonvolatile Content of Varnishes
5. D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet
6. D 3767 Standard Practice for Rubber - Measurements of Dimensions
7. D 4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
8. D 5295 Preparation of Concrete Surfaces for Adhered Membrane Waterproofing Systems
9. E 96 Standard Test Method for Water Vapor Transmission of Materials.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer’s product data, installation instructions, use limitations and recommendations.

1. Shop drawings showing locations and extent of waterproofing including details for terminations and flashings, projections, penetrations, drains and treatment of substrate joints and cracks.

2. Written documentation demonstrating installers qualifications under the "Quality Assurance" article including reference projects of a similar scope.

3. Warranty: Submit a sample warranty identifying the terms and conditions stated in Section 1.7.

1.5 QUALITY ASSURANCE

A. Installer: A firm, which is approved by manufacturer and which has at least 3 years experience in work of the type required by this section.

B. Materials: Fluid applied waterproofing material shall be two-part synthetic rubber-based system free of isocyanates and bitumen. For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in the original, unopened containers with seals unbroken, labeled with the manufacturer's name, product brand name and type, date of manufacture and directions for storage and use.

B. 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.

1. Do not double-stack pallets of waterproofing material on the job site. Provide cover on top and all sides, allowing for adequate ventilation.

2. Store drainage composite or protection board flat and off the ground. Provide cover on top and all sides.

3. Protect waterproofing materials from freezing. In cool temperatures, store the material for several hours at room temperature to facilitate mixing and application.

4. Store composite membrane. The composite membrane should be stored off the ground and not stacked more than 12 rolls high. Provide cover for material to protect top and sides

C. Sequence deliveries to avoid delays; but minimize on-site storage.

1.7 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 membrane waterproofing.

C. Do not allow waste products (i.e. petroleum, grease, oil, solvents, vegetable or mineral oil, animal fat, acids, etc.) to come into contact with the waterproofing membrane. Any exposure to foreign materials or chemical discharges must be presented to the Membrane Manufacturer to determine the impact on the waterproofing assembly performance.

D. General contractor shall assure adequate protection and ventilation during the application of the Waterproofing assembly.

1.8 WARRANTY

A. Fluid-Applied Sheet and Waterproofing System: Upon completion of the fluid-applied and sheet waterproofing system, the contractor must submit a written warranty for the water-proofing materials signed by the Waterproofing Manufacturer.

B. Warranties available from the manufacturer. Please see manufacturer specific written warranty documents for specifics (Choose one):

Material Warranty:
Manufacturer's standard 5-year material warranty
Watertightness Warranty:
Manufacturer's standard 10-year watertightness warranty

PART 2 -PRODUCTS

2.1 WATERPROOFING MATERIALS

A. Basis of Design Product:

1. Procor 75 fluid applied membranes by Grace Construction Products; a two-part, self-curing, synthetic rubber-based material is the basis of design. ASTM C 836.

a. Cured Film Thickness: 1.5 mm (60 mils) nominal, ASTM D 3767 Method A
b. Solids Content: 100%, ASTM D 1644
c. Flexibility, 180° bend over 25 mm (1 in.) mandrel at 32°C (-25°F): Unaffected, ASTM D 1970
d. Elongation: 500% minimum, ASTM D 412
e. Peel Adhesion to Concrete: Modified 880 N/m (5 lbs/in.), ASTM D 903
f. Low temperature flexibility and crack bridging - 3.2mm (1/8 in.) cracked cycled at -26°C (-15°F): Pass, ASTM C 836
g. Extensibility over 6.4 mm (1/4 in.) crack after heat aging: Pass, ASTM C 836
h. Puncture Resistance: 170 N (38 lbs), ASTM D 4833.

2. Other comparable products by other manufacturers complying with requirements of this section may be submitted for approval by the Architect, provide documentation from manufacturer showing chemical compatibility of product with other specified products in this project with which the product may come into contact, including, but not limited to, through-wall flashings, mastics and sealants, and insulation products.

B. Sheet Flashing: 50-mil- (1.3-mm-) minimum, non-staining, uncured sheet neoprene.

C. Adhesive: Manufacturer's recommended contact adhesive.

D. Composite Sheet Lap Sealing: Bituthene Low Temperature Membrane by GCP Applied Technologies, a 60 mil self-adhering waterproofing comprising 56 mils of rubberized asphalt integrally bonded to a 4-mil high density cross-laminated polyethylene film, or a recommended by waterproofing manufacturer.

E. Prefabricated Drainage Composite: Hydroduct® 660 Drainage Composite by Grace Construction Products for horizontal surfaces. Hydroduct 220 Drainage Composite by Grace Construction Products for all vertical surfaces. Drainage composite shall be designed to promote positive drainage while serving as a protection course, or a recommended by waterproofing manufacturer.

F. Waterstop: Adcor™ ES hydrophilic non-bentonite waterstop by GCP Applied Technologies for non-moving concrete construction joints, or a recommended by waterproofing manufacturer.

G. Protection Board: Foundation insulation board as specified in Section 072100 – Thermal Insulation. In thicknesses as shown on drawings.

H. Miscellaneous Materials: Tape and other accessories specified or acceptable to manufacturer of fluid applied waterproofing membrane.

PART 3 - EXECUTION

3.1 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.

3.2 PREPARATION OF SUBSTRATES

A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally 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.

B. Tie-holes and "bugholes" larger than 13 mm (1/2") in diameter or deeper than 3 mm (1/8"), or both, should be either pretreated with Procor or repaired with a lean concrete mix or with a lean concrete mix or grout. See ASTM D 5295, Preparation of Concrete Surfaces for Adhered Membrane Waterproofing Systems, for further details on substrate preparation.

C. Cracked, pitted, honeycombed or heavily bugholed surfaces can be filled by spraying from close in (10" to 12") but high material usage with result. Under these circumstances it may be more efficient to fill the surface with a parge coat of lean mortar mix before application of the Procor. It is also acceptable to fill in gaps with a compatible sealant or caulk.

D. Cast-In-Place Concrete Substrates:

1. For horizontal applications, poured in-place concrete must be cast with a minimum slope to drain of 11 mm/m (1/8 in./ft). and must be monolithic, smooth, and free of unapproved curing compounds, form release agents and other surface contaminants.
2. Fill form tie rod holes with concrete and finish flush with surrounding surface.
3. Repair bugholes over 13 mm (0.5 in.) in length and 6 mm (0.25 in.) 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.

E. Pre-cast Concrete Decks: All pre-cast units shall be mechanically fixed to minimize the potential for differential movement and all joints shall be grouted.

F. Masonry Substrates: Apply waterproofing over concrete block and brick with smooth trowel-cut mortar joints or parge coat.

G. Related Materials: Treat joints and install flashing as recommended by waterproofing manufacturer.

H. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

I. Mask off adjoining surfaces not receiving waterproofing.

J. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.

K. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, and corners according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471.

L. Install sheet flashing and bond to deck and wall substrates where required according to waterproofing manufacturer's written instructions.

3.3 WATERPROOFING APPLICATION

A. Refer to manufacturer’s literature for recommendations on installation, including but not limited to, the following:

1. Vertical Application Fluid Applied Membrane

   a. Detailing: Apply a minimum thickness of 1.5 mm (60 mils) over all detail areas (including inside corners, outside corners, pipe penetrations, cracks, construction joints, etc.) prior to application of the field of the membrane.
   b. Apply a minimum thickness of 2.3 mm (90 mils) over all vertical areas to be waterproofed and lapping a minimum of 100 mm (4 in.) onto pre-treated detail areas. Perform wet film thickness tests as work progresses to confirm thickness.

2. Horizontal Application Fluid Applied Membrane:

   a. Detailing: Apply a minimum thickness of 1.5 mm (60 mils), or as per manufacturer’s drawings and written application instructions, over all detail areas (including inside corners, outside corners, pipe penetrations, cracks, construction joints, etc.) prior to application of the field of the membrane
   b. Apply a minimum thickness of 1.5 mm (60 mils) over all horizontal areas to be waterproofed and lapping a minimum of 100 mm (4 in.) onto detail areas. Perform wet film thickness tests as work progresses to confirm thickness.
   c. Apply a second coat at a minimum thickness of 0.75 mm (30 mils) over first coat and completely covering all detail areas to give a minimum total thickness of 2.25 mm (90 mils) in the field and 3.75 mm (150 mils) at detail areas. Perform wet film thickness tests as work progresses to confirm thickness

3.4 CLEANING AND PROTECTION

A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.

B. Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.

1. A protection course should always be installed as soon as possible after completion of the waterproofing installation and flood testing to protect the membrane from mechanical damage and UV.

2. Install any protection, drainage and insulation courses according to the manufacturer's instructions.

END OF SECTION 071410

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SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Extruded-Polystyrene Board Insulation used for:
    a. Foundation wall insulation.
    b. Masonry cavity wall insulation.
    c. Continuous exterior wall insulation.
    d. Below slab insulation.
    e. Insulation in other locations as identified on Drawings.
2. Polyisocyanurate insulation used for:
    a. Masonry cavity wall insulation.
    b. Continuous exterior wall insulation.
    c. Roof insulation
    d. Insulation in other locations as identified on Drawings.
3. Nail-base polyisocyanurate insulation used for:
    a. Continuous exterior wall insulation.
    b. Roof insulation
    c. Insulation in other locations as identified on Drawings.
4. Glass-fiber-blanket insulation used for:
    a. Exterior wall framing cavity insulation.
    b. Roof framing cavity insulation.
    c. Attic insulation.
    d. Insulation in other locations as identified on Drawings.
5. Aluminum Faced Polyisocyanurate Insulation
6. Mineral Fiber Blanket Insulation
7. Sound Control insulation
8. Above grade vapor retarder
9. Closed-cell polyurethane foam insulation.
10. Metal Building Roof Insulation System
11. Curtain Wall Insulation

B. Related Sections include the following:

1. Division 3 Section “Cast-in-Place Concrete” for under slab vapor retarder.
2. Division 4 Section “Unit Masonry” for installation of insulation within cavity wall construction.
3. Division 7 Section “Fluid-Applied Membrane Air Barriers”

4. Division 7 Section “Built-up Asphalt Roofing” for vapor retarders and insulation installed as part of the built-up roofing assembly.
5. Division 7 Section “Ethylene-Propylene-Diene-Monomer (EPDM) Roofing” for vapor retarders and insulation installed as part of the EDPM roofing assembly.
6. Division 9 Section "Gypsum Board Assemblies" for installation in metal-framed assemblies of insulation specified by reference to this Section
7. Division 13 Section “Metal Building Systems” for coordination with metal building components.

C. System Description:

1. System performance to provide continuity of thermal barrier and vapor retarder at building enclosure elements in conjunction with air barrier materials in Section 072700.

1.3 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building

B. ASTM E 96 - Standard Test Method for Water Vapor Transmission of Materials in Sheet Form (Procedure B).

C. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

D. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

E. ASTM C 1136 - Standard Specification for Flexible, Low Permeance Vapor

F. ANSI/ASHRAE/IES Standard 90.1-2016 – Energy Standard for Buildings Except Low-Rise Residential Buildings.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Manufacturer's data sheets on each product to be used, including:

1. Thermal performance
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation instructions.

B. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

C. Metal Building Insulation System:

1. Product Data: Manufacturer's data sheets on each product to be used, including:
   a. Preparation instructions and recommendations.
   b. Storage and handling requirements and recommendations.
   c. Installation instructions.
2. Shop Drawings: Indicate locations of connections and attachments, general details, anchorages and method of anchorage and installation.
3. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square or long, representing actual products required for this project.
4. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer

B. Fire- Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by Underwriters Laboratories (UL), Intertek (OPL) or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Identify materials appropriate markings of applicable testing and inspecting agency.

C. Fire-Resistance Ratings:

1. ASTM E 2307 pertains to perimeter fire containment. ASTM E 119 pertains to fire rated walls, floors and ceilings. ASTM E 814 pertains to poke-throughs and penetration assemblies. ASTM E 1966 pertains to fire resistive joint systems.
2. Combustion Characteristics: Rated as non -combustible as defined by NFPA standard 220 when tested in accordance with ASTM E 136.

D. Insulation Installed in Concealed Locations Surface Burning Characteristics:

1. Other Insulation: 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

E. Insulation Installed in Exposed Locations Surface Burning Characteristics:

1. Other Insulation Materials: 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with the manufacturer's written instructions for handling, storing, and protecting during installation.

B. Handling: Handle materials to avoid damage. When installing or otherwise handling these insulation products, wear a NIOSH approved dust mask or respirator, gloves and long sleeved, loose fitting clothing closed at the neck and wrists. Wear safety glasses when installing.

C. Protect plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 GENERAL INSULATING MATERIALS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. CertainTeed Corporation.
2. DiversiFoam Products.
3. Dow Chemical Company (The).
4. Johns Manville Corporation.
5. Owens Corning.

2.2 INSULATION PRODUCTS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, cellular type,

1. Board Thickness: Provide in thickness as follows and/or as indicated on Drawings.

a. Foundation insulation: Min R= 10ci.
b. Steel stud brick cavity wall insulation: Min R= 13.3ci
c. Continuous insulation at face of metal framed exterior walls: Min. R=12.5 ci. when installed in conjunction with glass fiber blanket Insulation installed in framing cavities, Min. R=13
d. Continuous insulation at face of wood framed exterior walls:

1) Min. R=7.5 ci. when installed in conjunction with glass fiber blanket Insulation installed in framing cavities, Min. R=13
2) Min. R=5 ci. when installed in conjunction with glass fiber blanket Insulation installed in framing cavities, Min. R=19

2. Thermal Resistance: 180-day real-time aging as mandated by ASTM C578, measured per ASTM C 518 at mean temperature of 75F: R-5.0 per inch of thickness.
3. Water Absorption: In accordance with ASTM D2842; 0.3 percent by volume maximum.
4. Compressive Strength: 25.0 min, psi (173 kPa).
5. Board Edges: Square edges
6. Maximum flame-spread and smoke-developed indexes of 75 and 450, respectively: Type IV, 1.60 PCF.

C. Polyisocyanurate Board Insulation: Felt or glass-fiber mat facer on both major surfaces, rigid, cellular, polyisocyanurate thermal insulation. ASTM C1289, Type II, Class 1, Grade II, with maximum flame-spread of 75 and smoke-developed of 450 based on tests performed on unfaced core on thicknesses up to 4 inches.
1. Edges: Square.
2. Long Term Thermal Resistance: 6.0 per 1-inch thickness.
3. Compressive Strength: Minimum 20 psi.
4. Density: 2 pcf.

D. Nail-base Insulation:

1. Acceptable Manufacturers:

a. ACH Foam Technologies.
b. Atlas Roof Insulation
c. GAC Cornell ThermaCal
d. Hunter Panels

2. System: Panels shall consist of a top layer of APA/TECO rated Oriented Strand Board (OSB) core that is laminated, on-line, to a bottom layer of fiber-reinforced facers (GRF) polyisocyanurate foam insulation.

a. Polyisocyanurate foam insulation shall conform to ASTM C 1289, Type V. 2) Compressive Strength: 20 pounds per square inch (138 kPa) Grade 2.

1) OSB Top layer substrate shall conform to PS2 and shall be as follows: Standard sheathing grade, thickness: 7/16 inch (11.1 mm)

3. Overall panel thickness as indicated on Drawings.

E. Glass-Fiber-Blanket Insulation: ASTM C 665, Type I, unfaced.

1. Flame-spread and smoke-developed indexes of 25 and 450, respectively.
2. Thermal Resistance at metal framed exterior walls: Min. R-13, when installed in conjunction with a continuous rigid insulation with a min. R-value of 7.5.
3. Thermal Resistance at wood framed exterior walls:
a. Min. R=13 when installed in conjunction with a continuous rigid insulation with a min. R-value of 7.5.

b. Min. R=19 when installed in conjunction with a continuous rigid insulation with a min. R-value of 5.

F. Aluminum Faced Polyisocyanurate Insulation

1. To be used within the exterior cavities or air spaces of exterior wall assemblies.

2. Available Products: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Atlas Energy Shield Pro Exterior Insulation
b. Carlisle Coatings & Waterproofing R2+Sheathe
c. Dow Chemical Company: Thermax™ (ci) Exterior Insulation
d. Firestone: Enverge™ CI Foil Exterior Wall Insulation

3. Aluminum Foil Clad Foam-Plastic Board Insulation: ASTM C 1289, foil faced, Type I, Class 1.

a. Thickness and R-Value: 1, 2.0-inch R-13.0 units: F*ft2*h/ Btu per inch. Measured at 75 degrees F mean temperature, as per ASTM C 518 according to requirements of ASTM C 1289
b. Minimum Compressive Strength ≥25 psi when tested per ASTM D1621.
c. Minimum Flexural Strength ≥40 psi when tested per ASTM C203
d. Water Vapor Transmission ≤0.03 perms per inch when tested per ASTM E96.
e. Water Absorption Maximum ≤1% by volume when tested per ASTM C209
f. Dimensional Stability, Maximum ≤0.05% length and width, and ≤3.5% thickness when tested per ASTM D2126.
g. Maximum flame-spread and smoke-developed indexes of ≤ 25 and ≤ 450, respectively, per ASTM E84
h. Fire Propagation Characteristics: Passes NFPA 285 and NFPA 286 testing as part of an approved assembly.

4. Adhesive for Bonding Insulation: Polyurethane construction adhesive with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates and as recommended by insulation manufacturer.

5. Foam Sealant: One-component, low expansion polyurethane foam as recommended by insulation manufacturer.

6. Insulation Board Joint Tape: Aluminum foil tape approved by insulation board manufacturer

G. Sound Attenuation Batts: ASTM C 665, Type I, unfaced with flame spread and smoke-developed indexes of 25 and 450 respectively.

1. Combustion Characteristics: Passes ASTM E 136.
2. Fire Resistance Ratings: Passes ASTM E 119 as part of a complete fire tested wall assembly.
3. Thickness: 3 1/2 inches
4. Sound Transmission Class: STC 1.07
5. Dimensional Stability: Linear Shrinkage less than 0.1%

H. Mineral-Fiber-Blanket Insulation: ASTM C 665, Type I, unfaced.

1. ASTM E136 noncombustible

2. ASTM E84 Flame Spread/Smoke Developed, 0/0.

I. Closed-Cell Polyurethane Foam Insulation: ASTM C 1029, Type II, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, and minimum density of 1.5 lb/cu. ft. (24 kg/cu. m).

1. Acceptable Manufacturers:

   a. CertainTeed Corporation.
   b. Johns Manville Corporation.
   c. Dow Corporation
   d. BASF Corporation.

2.3 VAPOR RETARDERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

   1. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils (0.15 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
   2. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder
   3. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor retarders securely to substrates indicated.

2.4 METAL BUILDING ROOF INSULATION SYSTEM

A. Section includes Roof Insulation System for new Pre-Engineered Metal Building Construction.

B. Design Requirements:

   1. Thermal Resistance of Installed System: total R-Value of 36 minimum, U value: 0.031 maximum per ASHRAE 90.1 – 2013.

   2. Continuous layer of insulation over top of purlins with an R-value of 11, additional layer(s) of insulation between purlins with an R value of 25.

   3. Thermal spacers at roof panel attachments with a minimum R value of 5.

   4. Insulating system shall have a continuous vapor barrier inside of building purlins, girts, and insulation to provide complete isolation from inside air.

C. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

   1. Basis of Design Product: Simple Saver System as manufactured by Thermal Design, Inc., P.O. Box 468, 601 N. Main Street, Madison, NE 68748. ASD. Tel: (800) 255-0776 or (402) 454-6591. Email: sales@thermaldesign.com, www.thermaldesign.com.

   2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

      a. Owens Corning Optiliner Banded Liner system.
      b. Sealed ‘N’ Safe Continuous Insulation system.
      c. Other equal product meeting all requirements and approved by Architect prior to bid.

D. Materials:

   1. Batt Insulation: ASTM C 991 Type 1; preformed formaldehyde-free glass fiber batt conforming to the following:

      a. Thermal Resistance: R of 3.2 per inch minimum.
      b. Batt Size: Equal to purlin/girt spacing by manufacturer's standard lengths.
      c. Unfaced.

   2. Roof Insulation: Formaldehyde-free fiberglass batt or fiberglass blanket complying with ASTM C 991 Type 1 and ASTM E 84 with a thermal resistance and thickness as follows:

a. R-36; 11 1/2 inches (292 mm) total, 8 inches (203 mm) plus 3 1/2 inches (89 mm) (two layers).

3. Vapor Barrier Liner Fabric: Woven, reinforced, high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene coatings, as follows:

a. Product complies with ASTM C 1136, Types I through Type VI.
b. Perm rating: 0.02 for fabric and for seams in accordance with ASTM E 96.
c. Flame/Smoke Properties:
   1) 25/50 in accordance with ASTM E 84.
   2) Self-extinguishes with field test using matches or butane lighter.
d. Ultraviolet radiation inhibitor to minimum UVMAX® rating of 8
e. Size and seaming: Manufactured in large custom pieces by extrusion welding from roll goods and fabricated to substantially fit defined building area with minimum practicable job site sealing.
f. Provide with factory double, extrusion welded seams. Stapled seams or heat-melted seams are not acceptable due to degradation of fabric.
g. Factory-folded to allow for rapid installation.
h. Color: White.
i. Vapor Barrier Lap Sealant: Solvent-based, Simple Saver polyethylene fabric adhesive.
j. Vapor Barrier Tape: Double-sided sealant tape 3/4 inch (19 mm) wide by 1/32 inch (.79 mm) thick.
k. Vapor Barrier Patch Tape: Single-sided, adhesive backed sealant tape 3 inches (76 mm) wide made from same material as liner fabric
l. Thermal Breaks:
   1) Extruded Polystyrene thermal blocks, minimum R value = 5.0.
m. Straps:
   1) 100 KSI minimum yield tempered, high-tensile-strength steel.
   2) Size: Not less than 0.020 inch (0.50 mm) thick by 1 inch (25 mm) by continuous length.
   3) Galvanized, primed, and painted to match specified finish color on the exposed side.
   4) Color: White
n. Fasteners:
   1) For light gage steel: #12 by 3/4 (19 mm) inch plated Tek 2 type screws with sealing washer, painted to match specified color.
   2) For heavy gage steel: #12 by 1-1/2 inch (38 mm) plated Tek 4 type screws with sealing washer, painted to match specified color.
o. Wall Insulation Hangers: Preformed rigid hangers, 32 inch (813 mm) long galvanized steel strips with barbed arrows every 8 inches (203 mm) along its length

2.5 CURTAIN WALL INSULATION

A. Mineral fiber insulation to be installed in curtain wall assemblies, between framing members.

1. Use only insulation materials and installation devices approved by the curtain wall manufacturer.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Johns Manville Corporation.

2. Owens Corning

C. Mineral Fiber insulation: ASTM C612 Material Specification (HH-I-558B), Type 1, unfaced.

1. Material: Inorganic fibers derived from basalt, with thermosetting resin binder, with high fiber density and low shot content.
2. Nominal density of 4 lb/cu. ft. (64 kg/cu. m), Types IA and IB, thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C)
3. R-Value/inch: 4.0 hr•ft2•°F/Btu.
4. Thickness as indicated on the Drawings.
5. ASTM C1104 Water Vapor Sorption, less than 1 percent by weight: less than .02 percent by volume at 120 degrees F (49 degrees C), 95 percent RH
6. ASTM E84 Flame Spread/Smoke Developed, Unfaced 5/0 or less
7. ASTM E136 Noncombustible, Passes

D. Installation Accessories: Manufacturer’s standard types.

1. Installation clips, pins shall not penetrate the aluminum backpan vapor barrier at any location.

2.6 INSULATION INSTALLATION ACCESSORIES

A. Adhesive: Type recommended by insulation manufacturer for application:

1. Adhesive Type 1: Gun grade, mastic type, compatible with insulation and substrate.
2. Adhesive Type 2: Vapor retarder type, trowel consistency; fire retardant, compatible with insulation and substrate.

B. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer, to be adhered to surface to receive board insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow

D. Install insulation in areas and in thicknesses indicated to envelop entire area to be insulated or required to produce R-values indicated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Install rigid insulation in exterior spaces without gaps or voids. Do not compress insulation.

F. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

G. Stuff glass-fiber, loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m)

H. Spray-Applied Insulation: Apply insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to masonry substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.
2. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
3. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

3.5 INSTALLATION OF VAPOR RETARDERS

A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as necessary. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with insulation.

B. Before installing vapor retarder, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

C. Place vapor retarder on warm side of insulation by securing in place. Extend vapor retarder tight to full perimeter of adjacent window and door frames and other items interrupting plane of membrane. Tape seal in place.

D. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

F. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder

3.6 INSTALLATION OF METAL BUILDING ROOF INSULATION SYSTEM.

A. Examination:

1. Verify that metal building structure including all bracing and any concealed building systems are completed and approved prior to installing liner system and insulation in the structure.
2. Correct any unsatisfactory conditions before proceeding.
3. If conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding

B. Installation General:

1. Install pre-engineered building insulation system in accordance with manufacturer's installation instructions and the approved shop drawings.
2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
3. Install in exterior spaces without gaps or voids. Do not compress insulation.
4. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
5. Fit insulation tight in spaces and tight to exterior side of the sealed liner fabric and around mechanical and electrical services within plane of insulation.

C. Roof Insulation Installation:

1. Straps:
   a. Cut straps to length and install in the pattern and spacings indicated on shop drawings.
   b. Tension straps to required value.
2. Vapor Barrier Fabric:
   a. Install vapor barrier fabric in large one-piece custom fabricated pieces to substantially fit defined building areas with minimum practicable job site sealing.
   b. Position pre-folded fabric on the strap platform along one eave purlin.
   c. Clamp the two bottom corners at the eave and also centered on the bay.
   d. Pull the other end of the pleat-folded fabric across the building width on the strap platform, pausing only at the ridge to fasten the straps and fabric in position where plane of roof changes and to release temporary fasteners on the opposite ridge purlins
   e. Once positioned, install fasteners from the bottom side at each strap/purlins intersection.
   f. Trim edges and seal along the rafters.
   g. All seams must be completely sealed and stapled seams not acceptable.
3. Insulation:
   a. Unpack, and shake to a thickness exceeding the specified thickness.
   b. Ensure that cavities are filled completely with insulation.
   c. Place on the vapor barrier liner fabric without voids or gaps.
   d. Place top layer of insulation over and perpendicular to the purlins without voids or gaps, as roof sheathing is applied.
   e. Place thermal block on top of purlins.
   f. Place new insulation between purlins at the required thickness for the R-value specified.

4. Seal vapor barrier fabric to the wall fabric and elsewhere as required to provide a continuous vapor barrier.

D. Cleaning

1. Clean dirt or exposed sealant from the exposed vapor barrier fabric.

2. Repair or replace damaged products before completion of insulation system installation

3.7 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072715 - SHEET MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section includes, but is not limited to, the following:

1. Materials and installation methods for self-adhesive, sheet membrane air barrier 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, masonry ties, piping and other penetrations through the wall assembly.

B. Related Sections include the following:

1. Section 014100 – Air Barrier System
2. Section 033000 – Cast-In-Place Concrete
3. Section 042000 - Unit Masonry
4. Section 042731 – Reinforced Unit Masonry
5. Section 061000 - Rough Carpentry for wall sheathings, wall sheathing joint-and-penetration treatments, building paper.
6. Section 071113 – Bituminous Damp proofing
7. Section 071410 – Fluid Applied Waterproofing
8. Section 072100 - Thermal Insulation for foam-plastic board insulation.
9. Section 076200 - Sheet Metal Flashing and Trim for sheet metal flashings.
10. Section 079200 - Joint Sealants for joint-sealant materials and installation.

1.2 DEFINITIONS

A. ABAA: Air Barrier Association of America.

B. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:

1. It shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2178.
2. It shall have an air permeability not to exceed 0.04 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2357.
3. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
4. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep.
5. Adhesion Performance: The membrane shall be fully adhered to the substrate without voids, pinholes, or blisters

C. CONNECTIONS TO ADJACENT MATERIALS
   a. Provide connections to prevent air leakage at the following locations:
      1) Foundation and walls, including penetrations, ties and anchors.
      2) Walls, windows, curtain walls, storefronts, louvers and doors.
      3) Different assemblies and fixed openings within those assemblies.
      4) Wall and roof connections.
      5) Floors over unconditioned space.
      6) Walls, floor and roof across construction, control and expansion joints.
      7) Walls, floors and roof to utility, pipe and duct penetrations.
      8) Seismic and expansion joints.
      9) All other potential air leakage pathways in the building envelope.

1.4 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.

B. Shop Drawing: Submit shop drawings showing the locations and extent of air barrier assemblies and the details of all typical conditions.

   1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to project conditions coordinated with other trades.

   2. Include details for each specific substrate joints and cracks, control and expansion joints, counterflashing strips, inside and outside corners, window and door wraps, terminations, tie-ins with adjoining construction, miscellaneous penetrations, electric boxes, post installed anchors and similar items.

   3. Include details installation method at all types of wall openings in which the transition membrane will extend into the wall return, such as windows, louvers, and doors. Detail and identify the type of compatible sealant/ mastic used to seal the splice joints located within the return.

C. Product Certificates: Letter from primary manufacturer stating materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use. Submit letter from manufacturer stating that cleaning materials used during installation are chemically compatible with adjacent materials proposed for use.

D. Letter of Compatibility: Provide a letter signed by the manufacturer, verifying the compatibility of materials coming in contact with the air barrier.

E. Include manufacturer's written instructions for the installation of the air/moisture barrier and all accessories.

F. Qualification Data: For Applicator.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers.

H. Field Test Results of Mock-Up: Submit test results of air leakage test and water leakage test of mock-up in accordance with the specified standards, including retesting if initial results are not satisfactory.

I. Mock-Ups: Build mock-up representative of primary air barrier assemblies and glazing assemblies including backup wall and typical penetrations as acceptable to the Architect. Mock-up shall be dimensioned no less than eight (8) feet long by eight (8) feet high [2.50 meters long by 2.50 meters high] and include the air barrier materials and air barrier accessories proposed for use in the exterior wall assembly. Mock-ups shall be suitable for testing as noted below:

1. Mock-Up Test for Air and Water Infiltration: The third party testing agency shall test the mock-up for air and water infiltration in accordance with ASTM E1186, ASTM E783 at a pressure differential of 1.57 lb/ft^2 and ASTM E1105. Use smoke tracer to locate sources of air leakage. If deficiencies are found, the air barrier Contractor shall reconstruct mock-up at their cost for retesting until satisfactory results are obtained.

2. Mock-Up Test for Fluid Applied Air Barrier Adhesion: The third party testing agency shall test the mock-up for membrane adhesions in accordance with ASTM D4541 (modified), using a Type II pull tester, except that membrane shall be cut through to separate the material attached to the disc from the surrounding material. Perform test after curing period recommended by the manufacturer. Record mode of failure and where the material failed in accordance with ASTM D4541.

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications:

1. Manufacturer that has produced membrane air/moisture barriers available and marketed for their intended use in the last 5 years.

B. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance and that is an ABAA-licensed contractor, employs certified and registered installers, and complies with ABAA's Quality Assurance Program.

C. 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.

D. Third Party Inspection and Testing:
1. Inspection and testing services are required to verify compliance with the requirements specified or indicated, as specified in 01 41 00 Air Barrier System.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Sequence deliveries to avoid delays, and to minimize on-site storage

B. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

C. Store materials in a clean dry area in accordance with manufacturer's instructions

D. Store materials at temperatures within temperature ranges as recommended by manufacturer, and free from contact with cold or frozen surfaces.

E. Protect materials during handling and application to prevent damage or contamination.

F. Protect materials from direct sunlight or inclement weather prior to installation.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air barrier manufacturer.

B. Protect substrates prior and after installation from environmental conditions that affect performance of air barrier.

C. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

D. Do not apply air barrier if rainfall is forecast or imminent within 12 hours of application.

E. Sequencing:

1. Do not install air barrier material before the roof, wall openings and parapet walls have been sufficiently protected to prevent a buildup of water in the interior of the building or within the back-up wall.
2. Sequence the installation of the wall insulation and cladding in such a manner to protect the membrane from UV deterioration. Membrane shall not be exposed longer than manufacturer's written instructions.

1.8 Warranty

A. Material Warranty: Provide manufacturer's standard warranty for all products installed as part of the air barrier system.

B. Installation Warranty: Contractor shall warrant the installation of air barrier systems for two years from the date of installation against failures including loss of air tight seal, loss of water tight seal, loss of attachment, loss of adhesion, and failure to cure properly.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Subject to compliance with requirements, provide products from the following manufacturer: Basis of Design Manufacturer: W.R. Meadows, INC – Hampshire, Illinois

B. Contractor may submit equal products by other manufacturers listed below, complying with all requirements listed in this Section and complying the procedures as described in Section 016200 - Product Options.

1. Carlisle Coatings & Waterproofing
2. Grace Construction Products
3. Tremco Commercial Sealants & Waterproofing

2.2 SELF ADHESIVE VAPOR IMPERMEABLE AIR BARRIER

A. Basis of Design Product: Air-Sheild, as manufactured by W.R. Meadows, Inc; a fully adhered, sheet membrane, vapor impermeable air and water resistive barrier. Product shall meet the following requirements:

1. Membrane Air Permeance: ASTM E2178: Not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa)
2. Assembly Air Permeance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.04 cfm/sq. ft. of surface area under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. of surface area at 75 Pa) when tested in accordance with ASTM E2357.
3. Water Vapor Permeance: ASTM E96, Method B: < .035 perms
4. Elongation: ASTM D412: 400%
5. Tensile Strength, ASTM D412: 4000 psi
6. Lap Peel Strength at 39^0 F, ASTM D903, 180 bend: 10 lbf/in
7. Fire Resistance: Evaluated to NFPA 285 as part of various wall assemblies

2.3 SELF ADHESIVE VAPOR PERMEABLE AIR BARRIER

A. Basis of Design Product: Air-Shield SMP, as manufactured by W.R. Meadows; a fully adhered, sheet membrane, vapor permeable air and water resistive barrier. Product shall meet the following requirements:

1. Membrane Air Permeance: ASTM E2178: Not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa)
2. Assembly Air Permeance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.04 cfm/sq. ft. of surface area under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. of surface area at 75 Pa) when tested in accordance with ASTM E2357.
3. Water Vapor Permeance: ASTM E96, Method B: Greater than 54 perms
4. Peel Adhesion: ASTM D3330: Pass
5. Low temperature flexibility: AC38: Pass
6. Water resistance: AATCC 127: Pass
7. Nail sealability: ASTM D1970: Pass
8. Tensile Strength, ASTM D882: MD: 50 lbf/in
   XD: 30 lbf/in
9. Flame Spread and Smoke Development, ASTM E84: Class A.
10. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.4 ACCESSORIES

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 Flashing: Fluid applied, single component, flashing membrane for rough openings and detailing: Air-Sheild Liquid Flashing by W.R. Meadows.

C. Substrate Patching Membrane: Manufacturer's recommended trowel-grade substrate filler.

D. Adhesive and Tape: Air barrier manufacturer's recommended adhesive and pressure-sensitive adhesive tape.

E. Liquid Membrane for Details and Terminations and Substrate Patching: Air-shield Liquid Flashing by W.R. Meadows

F. Exterior Sheathing Raw Edge Treatment: MEL-Prime by W.R. Meadows

G. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, [0.0187 inch (0.5 mm)] thick, and Series 300 stainless-steel fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.

1. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

a. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.

b. Inspect substrates to be smooth without large voids or sharp protrusions. Inform General Contractor if substrates are not acceptable and need to be repaired by the concrete sub-trade.

c. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.

d. Inspect masonry joints to be reasonably flush and completely filled, and ensure all excess mortar sitting on masonry ties has been removed. Inform General Contractor is masonry joints are not acceptable and need to be repaired by the masonry subcontractor.

e. Verify that all new concrete and patched has cured and aged for minimum time period recommended by air barrier manufacturer.

f. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263 and take suitable measures until substrate passes moisture test as required by the Manufacturer.

g. Prefill all joints, gaps and cracks that are greater than ¼” with a generous bead of manufacturer’s recommended liquid flashing material and allow to cure fully.

2. Verify sealants are compatible with membrane proposed for use. Perform field peel-adhesion test on materials to which sealants are adhered.

3. Notify Architect in writing of anticipated problems using specified membrane over substrate prior to proceeding.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

B. Ensure that penetrating work by other trades is in place and complete.

C. Prepare surfaces by brushing, scrubbing, scraping, grinding or compressed air to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion of the membrane.

D. Wipe down metal surfaces to remove release agents or other non-compatible coatings using clean sponges or with a material chemically compatible with the primary air material.

E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

F. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

G. Bridge isolation and expansion joints and minor discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details

3.3 EXTERIOR SHEATHING PANELS

A. Coordinate with exterior sheathing panel installer to ensure all panels have been installed in accordance with sheathing manufacturer’s instructions and the following.

1. Fasteners shall be flush with the surface and into the framing
2. Remove any fasteners that are countersunk
3. Pre-treat any holes from the removal of fasteners with liquid flashing prior to full wall membrane installation
4. Inspect all joints to ensure that all areas are clean, dry, smooth, and free from bond-breaking contaminants.

3.4 CONCRETE MASONRY UNITS OR CONCRETE

A. Coordinate with mason or concrete contractor to ensure concrete masonry units and/or concrete substrates are installed in accordance with the following.

1. Cure concrete for a minimum of 14 days prior to full wall sheet membrane installation.
2. Strike all masonry joints flush.
3. Patch all holes and voids smooth without any surface misalignments.

3.5 JOINT TREATMENT

A. Ensure joints between dissimilar building materials are sealed with a strip of manufacturer’s recommended self-adhesive membrane, 6” wide min. centered over joint.

3.6 APPLICATION OF AIR BARRIER SYSTEM

A. Rough Opening Transition Membrane
1. Self-Adhesive Transition Membrane
   a. Prefill inside corners of the frame with liquid flashing material.
   b. Pre-cut the self-adhesive membrane for each area of the rough opening to ensure ease of handling.
   c. Apply membrane strips into each inside corner allowing for 3” coverage in all directions
   d. Apply the first pre-cut strip at the base of the rough opening by removing the release paper and rolling firmly into place, ensuring that there is a minimum of 3”

of membrane extending onto the wall and a minimum of 3" of membrane extending into the rough opening

e. Repeat this procedure for the vertical areas of the rough opening and the header portion of the opening.
f. Overlap any cut edges of the membrane a minimum of 3"
g. Seal all terminations with liquid flashing material.

B. Crack and Joint Treatment
1. Treatment of joints or cracks larger than ¼" and less than ½"
a. Prefill any joints or cracks with the liquid flashing material
b. Apply a generous bead of material over the joint
c. Press, and spread liquid flashing into the joint
d. Allow material to skin over prior to full application of air barrier
2. Treatment of joints or crackers larger than ½"
a. Install backer rod into the joint to control depth of liquid flashing material
b. Apply generous bead of material over and into the joint
c. Press, and spread liquid flashing into the joint
d. Smooth out using a spreader tool or putty knife
e. Allow material to cure prior to full application of air barrier

C. Penetrations
1. Self-Adhesive Transition Membrane
a. Pre-cut air barrier membrane to length to fully cover the penetration
b. Prepare membrane for application by cutting slits a minimum of 2.5" down the strip of membrane
c. Apply air barrier membrane around penetration and apply a bead of liquid flashing at termination point on the penetration
d. Apply full sheet of air barrier membrane cut around the penetration and seal the edge with liquid flashing

D. Air Barrier Membrane Installation
1. Horizontal installation
a. Snap chalk line for guidance
b. Pre-cut material to required length
c. Roll cut length of membrane with release paper outwards
d. Peel back the release paper starting at the corner, by approximately 6"
e. Fold release paper back and use hand roller or stiff brush to lightly apply exposed adhesive surface to the prepared substrate.
f. Remove release paper only as membrane is being applied
g. Use hand roller or stiff brush, starting in the middle, to smooth out any air bubbles, releasing the air to each side.
h. Overlap subsequent courses of membrane a minimum of 2.5"
i. Apply liquid flashing to all reverse lap terminations
j. Apply liquid flashing to any leading edge termination at the end of each working day.
2. Vertical Installation
a. Snap chalk line for guidance
b. Pre-cut material to required length
c. Roll cut length of membrane with release paper outwards
d. Peel back the release paper starting at the corner by approximately 6"

e. Fold release paper back and using hand roller or stiff brush, lightly apply the exposed adhesive surface to the prepared substrate
f. Remove release paper only as membrane is being applied
g. Use hand roller or stiff brush, starting in the middle, to smooth out any air bubbles and check for proper alignment
h. Allow rest of rolled up material to drop down with release paper still attached and check for proper alignment
i. Remove remaining release paper and use hand roller or stiff brush across the entire adhered section
j. Smooth out air bubbles with stiff brush or roller
k. Overlap subsequent courses of membrane a minimum of 2.5”
l. Apply liquid flashing to all reverse lap terminations
m. Apply liquid flashing to any leading edge termination at the end of each working day.

3.7 TRANSITION STRIP INSTALLATION AND ADJACENT SYSTEMS/SURFACES

A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

B. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials as recommended by the air barrier manufacturer.

C. At end of each working day, seal top edge of strips and transition strips to substrate with liquid flashing.

D. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

E. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames.

F. Seal strips and transition strips around masonry reinforcing or ties and penetrations with liquid flashing or termination mastic as recommended by air barrier manufacturer.

G. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with liquid flashing.

H. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.8 FIELD QUALITY CONTROL

A. Owner’s Inspection and Testing: Cooperate with Owner’s testing agency, where applicable. Allow access to work areas and staging. Notify Owner’s testing agency in writing of schedule

for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work of this Section until testing and inspection is accepted.

3.9 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Insulation and/or protection products may be installed after all membranes have cured.
2. Protect air barrier from prolonged exposure to UV light and harmful weather exposure as required by manufacturer.
3. Protect air barrier from contact with creosote, uncured coal-tar products, TPO, EPDM, flexible PVC membranes, and sealants not approved by air barrier manufacturer.
4. Schedule work so air barrier system is covered as soon as possible after installation (not to exceed exposure limitations set by Manufacturer).

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove any masking materials after installation.

END OF SECTION 072715

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SECTION 07 27 26 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section includes, but is not limited to, the following:

1. Materials and installation methods for fluid applied air 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, masonry ties, piping and other penetrations through the wall assembly.

B. Related Sections include the following:

1. Section 014100 – Air Barrier System
2. Section 033000 – Cast-In-Place Concrete
3. Section 042000 - Unit Masonry
4. Section 042731 – Reinforced Unit Masonry
5. Section 061000 - Rough Carpentry for wall sheathings, wall sheathing joint-and-penetration treatments, building paper.
6. Section 071113 – Bituminous Damp proofing
7. Section 071410 – Fluid Applied Waterproofing
8. Section 072100 - Thermal Insulation for foam-plastic board insulation.
9. Section 076200 - Sheet Metal Flashing and Trim for sheet metal flashings.
10. Section 079200 - Joint Sealants for joint-sealant materials and installation.

1.2 DEFINITIONS

A. ABAA: Air Barrier Association of America.

B. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:

1. It shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2178.
2. It shall have an air permeability not to exceed 0.04 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2357.
3. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
4. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep.
5. Adhesion Performance: The membrane shall be fully adhered to the substrate without voids, pinholes, or blisters

C. CONNECTIONS TO ADJACENT MATERIALS
   a. Provide connections to prevent air leakage at the following locations:
      1) Foundation and walls, including penetrations, ties and anchors.
      2) Walls, windows, curtain walls, storefronts, louvers and doors.
      3) Different assemblies and fixed openings within those assemblies.
      4) Wall and roof connections.
      5) Floors over unconditioned space.
      6) Walls, floor and roof across construction, control and expansion joints.
      7) Walls, floors and roof to utility, pipe and duct penetrations.
      8) Seismic and expansion joints.
      9) All other potential air leakage pathways in the building envelope.

1.4 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.

B. Shop Drawing: Submit shop drawings showing the locations and extent of air barrier assemblies and the details of all typical conditions.

   1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to project conditions coordinated with other trades.

   2. Include details for each specific substrate joints and cracks, control and expansion joints, counterflashing strips, inside and outside corners, window and door wraps, terminations, tie-ins with adjoining construction, miscellaneous penetrations, electric boxes, post installed anchors and similar items.

   3. Include details installation method at all types of wall openings in which the transition membrane will extend into the wall return, such as windows, louvers, and doors. Detail and identify the type of compatible sealant/ mastic used to seal the splice joints located within the return.

C. Product Certificates: Letter from primary manufacturer stating materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use. Submit letter from manufacturer stating that cleaning materials used during installation are chemically compatible with adjacent materials proposed for use.

D. Letter of Compatibility: Provide a letter signed by the manufacturer, verifying the compatibility of materials coming in contact with the air barrier.

E. Include manufacturer's written instructions for the installation of the air/moisture barrier and all accessories.

F. Qualification Data: For Applicator.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers.

H. Field Test Results of Mock-Up: Submit test results of air leakage test and water leakage test of mock-up in accordance with the specified standards, including retesting if initial results are not satisfactory.

I. Mock-Ups: Build mock-up representative of primary air barrier assemblies and glazing assemblies including backup wall and typical penetrations as acceptable to the Architect. Mock-up shall be dimensioned no less than eight (8) feet long by eight (8) feet high [2.50 meters long by 2.50 meters high] and include the air barrier materials and air barrier accessories proposed for use in the exterior wall assembly. Mock-ups shall be suitable for testing as noted below:

1. Mock-Up Test for Air and Water Infiltration: The third party testing agency shall test the mock-up for air and water infiltration in accordance with ASTM E1186, ASTM E783 at a pressure differential of 1.57 lb/ft^2 and ASTM E1105. Use smoke tracer to locate sources of air leakage. If deficiencies are found, the air barrier Contractor shall reconstruct mock-up at their cost for retesting until satisfactory results are obtained.

2. Mock-Up Test for Fluid Applied Air Barrier Adhesion: The third party testing agency shall test the mock-up for membrane adhesions in accordance with ASTM D4541 (modified), using a Type II pull tester, except that membrane shall be cut through to separate the material attached to the disc from the surrounding material. Perform test after curing period recommended by the manufacturer. Record mode of failure and where the material failed in accordance with ASTM D4541.

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications:

1. Manufacturer that has produced fluid applied air/moisture barriers available and marketed for their intended use in the last 5 years.

B. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance and that is an ABAA-licensed contractor, employs certified and registered installers, and complies with ABAA's Quality Assurance Program.

C. 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.

D. Third Party Inspection and Testing:
1. Inspection and testing services are required to verify compliance with the requirements specified or indicated, as specified in 01 41 00 Air Barrier System.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Sequence deliveries to avoid delays, and to minimize on-site storage

B. Remove and replace liquid materials that cannot be applied within their stated shelf life. Remove damaged material from site and dispose of in accordance with applicable regulations.

C. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by material manufacturer. Protect stored materials from direct sunlight and other sources of ultra-violet light.

D. Handle materials in accordance with material manufacturer's recommendations.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air barrier manufacturer.

B. Protect substrates prior and after installation from environmental conditions that affect performance of air barrier.

C. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

D. Sequencing:

1. Do not install air barrier material before the roof, wall openings and parapet walls have been sufficiently protected to prevent a buildup of water in the interior of the building or within the back-up wall.
2. Sequence the installation of the wall insulation and cladding in such a manner to protect the membrane from UV deterioration. Membrane shall not be exposed longer than manufacturer's written instructions.

1.8 Warranty

A. Material Warranty: Provide manufacturer's standard warranty for all products installed as part of the air barrier system.

B. Installation Warranty: Contractor shall warrant the installation of air barrier systems for two years from the date of installation against failures including loss of air tight seal, loss of water tight seal, loss of attachment, loss of adhesion, and failure to cure properly.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Subject to compliance with requirements, provide products from the following manufacturer: Basis of Design Manufacturer: GCP Applied Technologies Inc., 62 Whittemore Avenue, Cambridge, MA.

B. Contractor may submit equal products by other manufacturers listed below, complying with all requirements listed in this Section and complying the procedures as described in Section 016200 - Product Options.

1. Carlisle Coatings & Waterproofing
2. W. R. Meadows, Inc.
3. Tremco Commercial Sealants & Waterproofing

2.2 FLUID APPLIED MEMBRANE VAPOR IMPERMEABLE AIR BARRIER

A. Basis of Design Product: Perm-A-Barrier® NPL 10, as manufactured by GCP Applied Technologies, 62 Whittemore Avenue, Cambridge, MA; a fluid-applied, vapor impermeable membrane that cures to form a resilient, monolithic, fully bonded elastomeric membrane when applied to construction surfaces. Product shall meet the following requirements:

1. Membrane Air Permeance: ASTM E2178: Not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa)
2. Assembly Air Permeance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.04 cfm/sq. ft. of surface area under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. of surface area at 75 Pa) when tested in accordance with ASTM E2357.
3. Water Resistance: ASTM E331: Pass.
4. Water Vapor Permeance: ASTM E96, Method A: < 1 perm
5. Water Vapor Permeance: ASTM E96, Method B: < 1 perm
6. Pull Adhesion: ASTM D4541: minimum 20 psi or substrate failure to glass faced wall board (failure occurs when glass facing pulls away from gypsum core), and minimum 50 psi to concrete/CMU
7. Elongation: ASTM D412-Die C: minimum 300%
8. Low temperature flexibility and crack bridging: ASTM C1305: Pass at minus 15 degrees Fahrenheit (at minus 26 degrees Celsius).
9. Nail sealability: ASTM D1970: Pass
10. Fire Resistance: Evaluated to NFPA 285 as part of various wall assemblies

2.3 FLUID-APPLIED MEMBRANE VAPOR PERMEABLE AIR BARRIER

A. Basis of Design Product: Perm-A-Barrier® VPL 50, as manufactured by GCP Applied Technologies, 62 Whittemore Avenue, Cambridge, MA; a fluid-applied, vapor permeable, silyl terminated polyether (STPE) membrane that cures to form a resilient, monolithic, fully bonded elastomeric membrane when applied to construction surfaces. Product shall meet the following requirements:

1. Membrane Air Permeance: ASTM E2178: Not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa)
2. Assembly Air Permeance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.04 cfm/sq. ft. of surface area under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. of surface area at 75 Pa) when tested in accordance with ASTM E2357.
3. Water Vapor Permeance: ASTM E96, Method B: Greater than 16 perms
4. Pull Adhesion: ASTM D4541: minimum 20 psi or substrate failure to glass faced wall board, minimum 100 psi to concrete/CMU
5. Low temperature flexibility: ASTM D1970: Pass at minus 20 degrees Fahrenheit (at minus 29 degrees Celsius).
6. Water resistance of in-place membrane: ASTM E331: Pass. No water penetration after 90 minutes @ 718.2 Pa (15 psf) tested over OSB and gypsum sheathing.
7. Nail sealability: ASTM D1970: Pass
8. UV Exposure Limit: Equal to or greater than 180 calendar days

9. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly:

2.4 ACCESSORIES

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. Primer: Liquid primer recommended for substrate by manufacturer of air barrier material.

C. Transition Membrane: 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.

1. Performance Requirements:
   a. Water Vapor Transmission: ASTM E 96, Method B: 2.9 ng/m2sPa (0.05 perms) max.
   b. Air Permeance at 75Pa (0.3 in. water) pressure difference: 0.0006 L/(s.m2) (0.00012 cfm/ft2) max.
   c. Puncture Resistance: ASTM E 154: 178 N (40 lbs.) min.
   d. Lap Adhesion at –4°C (25°F), ASTM D 1876: 880 N/m (5.0 lbs./in.) of width min.
   e. Low Temperature Flexibility, ASTM D 1970: Unaffected to –43°C (-45°F).
   f. Tensile Strength, ASTM D 412, Die C Modified: min. 2.7 MPa (400 psi)
   g. Elongation, Ultimate Failure of Rubberized Asphalt, ASTM D 412 Die C: min. 200%
2. Basis of design product: Perm-A-Barrier Detail Membrane manufactured by GCP Applied Technologies Inc.

D. Flexible Membrane Wall Flashing: 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.

1. Performance Requirements:
   a. Water Vapor Transmission, ASTM E 96, Method B: 2.9 ng/m2sPa (0.05 perms) max.
   b. Water Absorption, ASTM D 570: max. 0.1% by weight
   c. Puncture Resistance, ASTM E 154: 356 N (80 lbs.) min.
   d. Tear Resistance:
      1) Initiation ASTM D 1004: min. 58 N (13.0 lbs.) M.D.
      2) Propagation ASTM D 1938: min. 40 N (9.0 lbs.) M.D.
   e. Lap Adhesion at -4ºC (25ºF), ASTM D 1876: 880 N/m (5.0 lbs./in.) of width
   f. Low Temperature Flexibility, ASTM D 1970: Unaffected to -43ºC (-45ºF)
   g. Tensile Strength, ASTM D 412, Die C Modified: min. 5.5 MPa (800 psi)
   h. Elongation, Ultimate Failure of Rubberized Asphalt, ASTM D412, Die C: min. 200%
2. Basis of design product: Perm-A-Barrier Wall Flashing manufactured by GCP Applied Technologies Inc

E. Flexible Membrane Aluminum Flashing: 0.9 mm (35 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (5 mil) of aluminum film to provide a min. 1.0 mm (40 mil) thick

membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed.

1. Performance Requirements:
    a. Water Absorption, ASTM D570: max 0.1% by weight
    b. Puncture Resistance, ASTM E154: 355N (80 lbs) min.
    c. Lap Adhesion at -4ºC (25ºF), ASTM D1876 Modified: 880 N/m (5.0 lbs./in.) of width
    d. Low Temperature Flexibility, ASTM D1970 Modified: Unaffected to -26ºC (-15ºF)
    e. Tensile Strength, ASTM D412, Die C Modified: min. 4.1 MPa (600 Psi)
    f. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C Modified: min. 200%
2. Basis of design product: Perm-A-Barrier Aluminum Flashing manufactured by GCP Applied Technologies Inc.

F. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

G. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

H. Liquid Membrane for Details and Terminations and Substrate Patching: Bituthene Liquid Membrane manufactured by GCP Applied Technologies; a two-part, elastomeric, trowel grade material designed for use with fluid-applied membranes, self-adhered membranes and tapes. 10 g/L maximum VOC content.

I. Sealant for Details, Final Terminations and Sheathing Joint Treatment: GCP Applied Technologies S100 Sealant manufactured by GCP Applied Technologies: a one-part, neutral curing, ultra-low modulus material designed for use with fluid-applied membranes, self-adhered membrane and tapes. 98 g/L maximum VOC content.

J. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, [0.0187 inch (0.5 mm)] thick, and Series 300 stainless-steel fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.

1. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
    a. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
    b. Inspect substrates to be smooth without large voids or sharp protrusions. Inform General Contractor if substrates are not acceptable and need to be repaired by the concrete sub-trade.
    c. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.
    d. Inspect masonry joints to be reasonably flush and completely filled, and ensure all excess mortar sitting on masonry ties has been removed. Inform General Contractor is masonry joints are not acceptable and need to be repaired by the masonry subcontractor.

e. Verify that all new concrete and patched has cured and aged for minimum time period recommended by air barrier manufacturer.

f. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263 and take suitable measures until substrate passes moisture test as required by the Manufacturer.

2. Verify sealants are compatible with membrane proposed for use. Perform field peel-adhesion test on materials to which sealants are adhered.

3. Notify Architect in writing of anticipated problems using fluid-applied membrane over substrate prior to proceeding.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

B. Ensure that penetrating work by other trades is in place and complete.

C. Protection from spray-applied materials:

1. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction such as curtain wall surroundings. Masking shall be material that is readily removable without producing residue that will negativity affect the adhesion of the curtain walls primary sealant joint.

2. Ensure any required foam stop or back up materials are in place to prevent over-spray and achieve complete seal.

D. Prepare surfaces by brushing, scrubbing, scraping, grinding or compressed air to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion of the fluid-applied membrane.

E. Wipe down metal surfaces to remove release agents or other non-compatible coatings using clean sponges or with a material chemically compatible with the primary air material.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

H. Bridge isolation and expansion joints and minor discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details

3.3 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.

1. Prime substrate and apply a single thickness of preparation coat strip extending a minimum of 3 inches (75 mm) along each side of joints and cracks. Apply a double thickness of air barrier membrane and embed a joint reinforcing strip in preparation coat.

3.4 SURFACE PRIMING

A. Prime substrate for installation of sheet membrane transition strips and as follows:

1. Prime masonry, concrete substrates with conditioning primers.

2. Prime glass-fiber surfaced gypsum sheathing an adequate number of coats to achieve required bond, with adequate drying time between coats.
3. Prime wood, metal, and painted substrates with primer.
4. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air barrier at protrusions.
5. Clean, prime, treat and seal all seams any transitions membranes that have been installed to the liquid applied membrane after it has cured in accordance with the manufacturer’s requirements
6. Apply primer for transition and self-adhering materials at all porous substrates at the rate instructed by the air barrier material Manufacturer for 1 inch beyond terminating edge of transition membrane. Allow primer to set/cure completely before transition strip application.

B. Prime substrate for installation of fluid-applied air barrier if recommended by material manufacturer based on project conditions

3.5 TRANSITION STRIP INSTALLATION

A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
2. Install [modified bituminous] strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates.

B. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials [as indicated].

C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

D. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

E. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames with not less than 1 inch (25 mm) of full contact.

F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.

G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

H. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

I. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.6 AIR BARRIER MEMBRANE INSTALLATION

A. Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.

B. Apply air barrier membrane within manufacturer's recommended application temperature ranges above 40 degrees F. Product must be maintained at 50 degrees F.

C. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.

1. Vapor-Retarding Membrane Air Barrier: [60-mil (1.5-mm)] wet film thickness.

D. Apply strip and transition strip over cured air membrane overlapping 3 inches (75 mm) onto each surface according to air barrier manufacturer's written instructions.

E. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

F. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.7 FIELD QUALITY CONTROL

A. Owner’s Inspection and Testing: Cooperate with Owner’s testing agency. Allow access to work areas and staging. Notify Owner’s testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work of this Section until testing and inspection is accepted.

3.8 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Insulation and/or protection products may be installed after all membranes have cured and are firm and dry to touch.
2. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer.
3. Protect air barrier from contact with creosote, uncured coal-tar products, TPO, EPDM, flexible PVC membranes, and sealants not approved by air barrier manufacturer.
4. Schedule work so air barrier system is covered as soon as possible after installation (30 day maximum).

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION 072726

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SECTION 074213 - METAL WALL PANELS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:

2. Aluminum-zinc alloy-coated steel sheet, concealed fastener, profiled wall panels to be used as exterior wall cladding.
2. Titanium Zinc Alloy flat-lock panels to be used as exterior wall cladding.
3. Alloy-coated Copper flat-lock panels to be used as exterior wall cladding.
4. Corten Steel flat lock panels to be used as exterior wall cladding.
5. Metal Plate Wall Panel Assemblies to be used as exterior wall cladding.
6. Metal soffit Panels.
7. Standing seam metal wall panels to be used as exterior wall cladding.
8. Associated flashings, foam closures, formed metal trim, extruded metal trim, sub-girts, sealants and fasteners as required to complete the installation of the wall panel system.

B. Related Sections include the following:

1. Section 054000 – Cold-Formed Metal Framing: Wall panel substrates support framing.
2. Section 061000 – Rough Carpentry: Substrate wall sheathing.
3. Section 072100 - Thermal Insulation for continuous insulation installed below metal panel systems
4. 072726 Fluid-Applied Membrane Air Barrier for continuous air barrier systems.
5. 076200 Sheet Metal Flashing & Trim for flashing and other sheet metal work that is not part of metal wall panel assemblies.

1.3 REFERENCES

A. AAMA - American Architectural Manufacturers Association (www.aamanet.org)

1. AAMA CW-RS-1 – The Rain Screen Principle and Pressure Equalized Wall Design; 2012
2. AAMA 501.1 – Standard Test Method for Water Penetration of Windows, Curtain Walls, and Doors Using Dynamic Pressure; 2005
3. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2009
4. AAMA 508 – Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems; 2014 [Testing based on 2007 Edition]
5. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014

6. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013 [Testing based on 2005 Edition]

B. ASTM International (American Society for Testing and Materials; www.astm.org)

1. ASTM A 653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
2. ASTM A 792 – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
3. ASTM A 1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
4. ASTM B69-16 (or latest edition) – Architectural Rolled Zinc - Types 1 and 2 – Standard Specification for rolled zinc
5. ASTM D 2244 – Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
6. ASTM D 4214 – Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
7. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials

C. NAAMM – National Association of Architectural Metal Manufacturers

D. SMACNA – Architectural Sheet Metal Manual; latest edition; Chapter 7 as a minimum standard or these specification and details where they exceed.

E. Copper Development Association (CDA)

F. Underwriters Laboratories (UL):

1. UL 263 - Fire Tests of Building Construction and Materials

1.4 PERFORMANCE REQUIREMENTS

A. Structural performance: provide exterior wall cladding assemblies capable of withstanding the effects of load and stresses from dead loads, wind loads, snow loads and normal thermal movement without evidence of permanent defects of assemblies or components.

1. Dead load: As required by applicable building code.
2. Live Load: As required by applicable building code.
3. Wind Loads: Determine loads based on the following minimum design wind pressures:
   a. Uniform pressure of 20 lbf/sq. ft. (957 Pa), acting inward or outward.
4. Wind Uplift Resistance: UL 580; Class 90.
5. Thermal Movements: Provide assemblies that allow for thermal movements resulting from the following maximum changes (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components and other detrimental effects:
   a. Temperature Change (range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
6. Uniform Load Deflection Test: Provide panel system which has been tested in accordance with ASTM E330 at a design pressure of at least 60 psf without deformation or failures of structural members. Maximum allowable deflection of span: L/180.

7. Panels shall be tested in accordance with ASTM E1592 structural testing at load span of at least 5'-0" o.c. and shall perform at a design pressure of pressure of no less than 35 psf without deformation or failures of structural members

B. Sealed joints shall allow free and silent movement of panels during expansion and contraction while preventing uncontrolled penetration of moisture.

C. Manufacturing and installation shall prevent deformation of exposed surfaces.

D. Design panel system to accommodate substructure tolerance of +0 to -1/8 inch.

E. Not Permitted: Vibration harmonics; wind whistles; noises caused by thermal movement; thermal movement transmitted to other building elements; loosening, weakening, or fracturing of attachments or components of system.

H. Air Infiltration: Panel system shall not have air infiltration rate more than 0.06 cfm per sq. ft. of fixed wall area when tested in accordance with ASTM E283 at static air pressure differential of 6.24 psf

I. Static Water Penetration: Panel system shall have no water penetration as defined by in test method when tested in accordance with ASTM E331. The ASTM E331 test shall be conducted at inward static pressure differential of not less than 15.0 psf

J. Dynamic Water Penetration: Panel system shall have been tested in accordance with AAMA 501 and shall have passed with no uncontrolled water leakage at 15.00 psf dynamic pressure differential, with water application rate of 5 gallons/hr./sq ft.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of wall panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of aluminum wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish among factory-, shop-, and field-assembled work.

1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):

a. Flashing and trim.
b. Anchorage systems.

C. Certificates: Product certificates signed by manufacturer certifying materials comply with the specified performance characteristics and criteria, and physical requirements.

D. Samples for initial selections: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

E. Samples for verification: Provide color samples of selected finish color applied to the metal panel material, at least 2 inch by 3 inch. Samples shall involve normal color and texture variations, include sample sets showing the full range of variations expected.

F. Test and Inspection Reports: Submit test and inspection reports on each type of wall panel system provided for project based on evaluation of comprehensive tests performed by qualified testing agency.

G. Qualifications Statements: For manufacturer and installer.

H. Close-out Submittals:

2. Maintenance Data: For installed products including maintenance methods and precautions against cleaning materials and methods detrimental to finishes and performance.

3. Warranty: Warranty documents required in this section.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum of 5 years' experience in manufacturing flat-lock panel systems similar to those specified.

B. Installer Qualifications: Acceptable to manufacturer.

C. Anodized Finish Applicator: Provide either caustic (traditional) or eco-friendly (acid) etching technologies.

1. Use fully automated, computer-controlled process lines for consistency of finish throughout project.

2. Use documented production line quality control protocols in accordance with AAMA 611 test procedures.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mock-up of sufficient size and scope to show typical pattern of joints, panel width, edge construction, a sample of anchorage, joinery, or soldering and finish texture and color. Mockup shall be full thickness, including insulation, supports, attachments, and accessories. Mockup shall show all perimeter conditions, intersections, and terminations.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, wall panels, and other manufactured items so as not to be damaged or deformed. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Unload, store, and erect wall panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Handle panels in strict compliance with manufacturer's instructions and recommendations, and in a manner to prevent bending, warping, twisting, and surface damage

D. Store wall panels vertically, covered with suitable weather-tight and ventilated covering. Store wall panels to ensure dryness, with a positive slope for drainage of water. Do not store wall panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 deg F (49 deg C).

E. Retain strippable protective covering on wall panel for period of panel installation.

1. Require all personnel to wear clean white cotton gloves when handling and installing zinc panels and accessories when no strippable film is present

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, wall panels, and other manufactured items so as not to be damaged or deformed. Package wall panels for protection during transportation and handling.

B. Unload, store, and erect wall panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Store wall panels vertically, covered with suitable weather-tight and ventilated covering. Store wall panels to ensure dryness, with a positive slope for drainage of water. Do not store wall panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 deg F (49 deg C).

D. Retain strippable protective covering on wall panel for period of panel installation.

1.9 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of wall panels to be performed according to manufacturer's written instructions and warranty requirements

B. Field Measurements: Verify actual supporting and adjoining construction by field measurements before fabrication and indicate recorded measurements on final shop drawings. Coordinate construction to ensure that flat-lock panels fit properly to supporting and adjoining construction and coordinate schedule with construction progress to avoid delaying the work.

1. Established dimensions: where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with fabrication of flat-lock panels corresponding to the established dimensions.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of wall panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

2. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

3. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FACTORY FORMED, CONCEALLED FASTENER, METAL WALL PANELS

A. Wall Panel Type: Provide factory-formed metal wall panels designed to be field assembled and mechanically attaching panels to supports using concealed fasteners in interlocking side laps. Include accessories required for weathertight installation.

2. Manufacturer, Basis of Design: Metal Sales Manufacturing Corporation. Telephone: (800) 406-7387. www.metalsales.us.com

3. Subject to compliance with requirements, provide named product or comparable product by one of the following:

   a. Firestone Metal Products
   b. Petersen Aluminum Corp.
   c. ATAS International, Inc.
   d. Metal-Tech USA.
   e. Quality Metal Crafts, LLC.

B. Basis of Design Product: Subject to compliance with requirements provide Metal Sales Manufacturing Corporation; XXXXXX Series.

2. Material: Aluminum-zinc alloy-coated steel sheet, ASTM A 792, AZ50 coating designation, structural quality, Grade 50, 0.0356 inch (0.904 mm) minimum thickness.

3. Configuration: 90-degree vertical box ribs.

4. Panel Fasteners: Concealed clip fastened panel.

5. Metal Panel Schedule:

   a. MP-1: XXXXXX.

      1) Panel Coverage: XX”
      2) Rib Height: X”
      3) Rib Configuration: XXXXX
      4) Color: XXXXX
      5) Panel orientation: XXXXX

6. Exterior Finish: High-performance organic; two-coat fluoropolymer system complying with AAMA 2604, with finish coats containing at least 70 percent PVDF resin by weight.

   a. Pencil Hardness – ASTM D3352-74
   b. Impact Adhesion – ASTM D294-84

      1) Coating shall show no cracking and no loss of adhesion

   c. Cure Test – NCCA 11-18
   d. Coating shall withstand 50+ double rubs of MEK.
   e. Humidity Resistance – ASTM D2247-87

      1) Coating shall show no blisters after 3000 hours of 100% humidity at 95`F.

   f. Weatherometer Test – ASTM D882-86/G23-88 Coating shall show no cracking, peeling, blistering or loss of adhesion after 2000 hours.

      1) Chalking Resistance – ASTM D659-86
      2) Color Change – ASTM D2244-74
      3) After 5000 hours in Atlas Weatherometer coating shall show no objectionable chalking or color change.

   g. Abrasion Resistance – ASTM D968-81 Coating shall resist 65+/- 15 liters/mil minimum of falling sand.

7. Concealed Finish: Manufacturer's standard white or light-colored acrylic or polyester backer finish.

C. Flashing and Trim:

2. Formed from the same material and gauge as for panel where exposed. Provide flashing and trim as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal wall panels.

3. See Drawings for locations of required profiles, closure panels and drip edges. Use manufacturer standard profiles where indicated, otherwise provide custom fabricated profiles as required by the Drawings.

D. Accessories:

2. All fasteners shall be non-corrosive type, as recommended by the panel manufacturer. Provide self-tapping screws and other suitable fasteners designed to withstand building design loads.
3. Weather Resistant Membrane: Use of air and water barrier is required with wall panel system, as specified in section 072726 Fluid-Applied Membrane Air Barriers, and where indicated on the Drawings.
4. Panel Sealants: Provide sealants as recommended by the manufacturer for each installation and location for a warranted installation.
    a. Hidden Sealant Tape: Pressure-sensitive, gray isobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, non-toxic, non-staining tape 1/8" (3mm) thick and 1" (25mm) wide.
    b. Hidden Joint Sealant: ASTM C90; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacture.
    c. Non-Skinning Butyl Sealant: ASTM C734 Non-hardening, non-drying, non-oxidizing butyl rubber-based sealant.
    d. Accessory Attachment Tape: Pressure-sensitive 1/8" (3mm) thick and 1" (25mm) wide VHB tape.
5. Foam Closure Strips: Provide manufacturer's standard type for each installation. Closed-cell, expanded, cellular, rubber or cross-linked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1 inch (25mm) thick, flexible closure strips; cut or pre-molded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
6. Metal Closure Strips: Unless noted otherwise, shall be same material and gauge as for panel

E. Provide components required for a complete wall panel assembly, including trim, copings, fasciae, mullions, sills, corner units, clips, seam covers, flashings, louvers, sealants, gaskets, fillers, closure strips, and similar items.

F. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

G. Source Quality Control:

2. Source: Obtain metal wall panels, trim and other accessories from a single manufacturer.

H. Quality Control: Obtain metal wall panels, trim and other accessories from a manufacturer capable of providing on-site technical support and installation assistance

2.2 ZINC FLAT-LOCK WALL PANELS

A. Wall Panel Type: Concealed-fastener, flat-lock panel system.

1. Manufacturer, Basis of Design: RHEINZINK America, Inc., Woburn, MA 01801, ph.: (781) 729.0812

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

a. VM Building Solutions, VMZINC.
b. Metal Tech USA
c. Other manufacturers meeting all requirements listed in this section, subject to Section 016200 Product Options in this specification.

B. Zinc Alloy Sheet Coils:

2. Titanium Zinc Alloy whose base is electrolytic high grade with a 99.995 % Zn degree of purity and alloying additives of 0.08% - 1.0% copper and 0.07% - .12% titanium, .001% - .015% aluminum in accordance with ASTM B69-16 (or latest edition) – Architectural Rolled Zinc - Type 1 and Type 2.

a. CLASSIC Bright Rolled

3. Metal Thickness:

a. Minimum Panel Thickness: 1.0 mm (20 ga.).
b. Minimum Flashing Thickness: 0.7 mm (24 ga.)

C. Panel Fabricator or System Manufacturer:

1. Local / Regional Sheet Metal Fabrication Shop:

a. Select wall panel fabricator that has the equipment and personnel capable of providing quality zinc wall panel profiles as indicated on the drawings.

b. Installer’s option to purchase prefabricated wall panels as provided by an approved and experience RHEINZINK system partner or fabricator.

D. Accessories:

2. Provide all components necessary for a complete, functional, weatherproof assembly including, but not limited to, trims, copings, fascias, sills, flashings, counter flashings, door frame trim, corner units, clips, wall caps, copings, sealants, closures and fillers. Metal materials shall match panels and be zinc compatible

a. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated

3. Clips & Fasteners: Provide stainless steel concealed clips and stainless-steel fasteners; supplied in accordance with manufacturer’s recommendations and to meet the load requirements as specified by architect and confirmed by engineering calculations. Attachment clips shall permit expansion and contraction of the panel system throughout the specified temperature range. When permeable air barrier sheets are used and as required by the architect to resist liquid water penetration at the fastener penetration, provide fasteners with watertight washer gaskets (such as self-adhered membrane).
4. Solder: Lead solder containing 50% tin and 50% lead in accordance with ASTM B32 – 08 (or latest edition) or lead-free solder. Flux: Felder ZD-Pro or equal.
5. Self-adhered Waterproof Underlayment: non-permeable self-adhering, high-temperature composite, butyl rubber-based, polyethylene-backed membrane such as GRACE Ultra™ or other high-temperature rubberized-asphalt sheet.
6. Sealants:

a. Seam Sealing Tape: pressure-sensitive 100 per cent solid polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, non-sag, non-toxic non-staining tape.
b. Joint Sealant: DOW 795 or other documented pH neutral sealant.
c. Backer rod shall be extruded polyethylene foam as DOW ETHAFOAM SB or equal.

2.3 COPPER FLAT-LOCK WALL PANELS

A. Wall Panel Type: Concealed-fastener, flat-lock panel system:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering metal wall panel materials that may be incorporated in the work include but are not limited to:

   a. CENTRIA Architectural Systems.
   b. Copper Sales, Inc.
   c. Petersen Aluminum Corporation

B. Panel Materials:

1. Tin-Zinc Alloy Coated Copper Sheet: Basis of Design Product: Revere Copper Products, Inc.; FreedomGray. ASTM B 370, cold-rolled copper sheet, H00 temper

   a. Copper sheet shall be coated both sides with zinc/tin alloy 0.5 mils thick.
   b. Composition of alloy shall be 50% zinc and 50% tin with trace elements controlled for durability, corrosion resistance and color.
   c. Zinc/tin alloy shall be applied by the hot-dip process.

2. Material: Alloy Coated Copper Sheet, 20 oz., 0.027 inch thick.

3. Seams: Flat Lock

4. Seam Width: Minimum ¾”

5. Finished Exposed Panel Coverage: XX inches.

6. Finished Exposed Panel Height: XX inches.

C. Solder:

1. Solder shall conform to ASTM B32 and shall be pure tin or lead-free, high tin.

2. Johnson Manufacturing, #497 or equal.

D. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2-inch-wide and 1/8 inch thick.

2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacturer

E. Miscellaneous Metal Framing:

1. Miscellaneous Metal Framing, General: Provide stainless steel C and Z shaped subgirt sections, zee clips, hat-shaped rigid furring channels and other miscellaneous framing as required for a complete installation.

2.4 CORTEN STEEL FLAT LOCK WALL PANELS

A. Wall Panel Type: Concealed-fastener, flat-lock panel system.

B. Corten Steel Sheet Coils: A606-4 Corten coil, 18-gauge thickness, unrusted.

1. Panel Fabricator or System Manufacturer:

   a. Local / Regional Sheet Metal Fabrication Shop: Select wall panel fabricator that has the equipment and personnel capable of providing quality steel wall panel profiles as indicated on the drawings.

C. Accessories:

2. Provide all components necessary for a complete, functional, weatherproof assembly including, but not limited to, trims, copings, fascias, sills, flashings, counter flashings, door frame trim, corner units, clips, wall caps, copings, sealants, closures and fillers.

a. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated

b. Clips & Fasteners: Provide stainless-steel concealed clips and stainless-steel fasteners; supplied in accordance with manufacturer's recommendations and to meet the load requirements as specified by architect and confirmed by engineering calculations. Galvanized fasteners shall not be used. Attachment clips shall permit expansion and contraction of the panel system throughout the specified temperature range. When permeable air barrier sheets are used and as required by the architect to resist liquid water penetration at the fastener penetration, provide fasteners with watertight washer gaskets (such as self-adhered membrane).

c. Provide membrane underlayment and other rubber or neoprene separation devices as required to create a separation between dissimilar metals with Corten Steel. Corten steel should not be in direct contact with galvanized metal or zinc.

2.3 METAL PLATE WALL PANEL SYSTEM

A. Manufacturers:

1. Basis of Design Manufacturer: Dri-Design – Aluminum Wall Panel System, 12480 Superior Ct., Holland, Michigan 49424, Phone: (616) 355-2970; Fax: (616) 355-2972; Website: www.dri-design.com
2. Other manufacturers meeting all requirements listed in this section, subject to Section 016200 Product Options in this specification.

B. Metal Plate Wall Panel Performance Requirements:

1. Metal Plate Wall Panel Assemblies: Comply with performance requirements without failure due to defective manufacturing, fabrication, installation, or other construction defects.

3. Design, fabricate, and erect a dry joint, pressure equalized rainscreen aluminum wall panel system without use of sealants, gaskets, or butyl tape, tested as installed in compliance with AAMA 508, and as follows:

a. Cyclic Static Air Pressure Differential: Pass cycled pressure loading at 25 psf in 100 three-second cycles in accordance with ASTM E1233/E1233M.
b. Air Infiltration: Pass when tested at 1.57 psf (25 mph) in accordance with ASTM E283.
c. Water Penetration:

1) Static: Pass water penetration test under 25.0 psf positive static air pressure difference for at least 15 minutes with 5 gallons per sf per hour of water applied in accordance with ASTM E331.

2) Dynamic: Pass water penetration test under 15.0 psf dynamic pressure difference for at least 15 minutes with 5 gallons per sf per hour of water applied in accordance with AAMA 501.1.

d. Structural: Provide systems tested in accordance with ASTM E330/E330M and certified to be without permanent deformation or failure of structural members.

C. Materials:

1. Aluminum Plate: Alloy and temper as recommended by manufacturer for application and in compliance with manufacturers design requirements.
    a. Thickness: 0.080 inch.
    b. Weight: Less than 2 lbs. per sf.
2. Panel Depth: 1-1/4-inch, nominal.
3. Panel Size: As indicated on Drawings.
4. Panel Joints: As indicated on Drawings

D. Fabrication:

1. Fabricate and finish wall panels within manufacturer's facilities and fulfill indicated performance requirements demonstrated by laboratory testing.
    a. Comply with indicated profiles and with dimensional and structural requirements
2. Provide post-finishing of panels, paint aluminum wall panels only after completion of panel fabrication and ensure exposed edges are coated.

E. Finishes:

1. Comply with NAAMM's - Metal Finishes Manual for Architectural and Metal Products, for recommendations of designating finishes.
2. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride (PVDF) resin system.
    a. Three-Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' installation instructions.
3. Clear Anodized Finish: AAMA 611, Architectural Class I, clear anodized coating of 0.0007 inch (0.7 mils) minimum thickness.
4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

F. Accessories:

1. Metal Plate Wall Panel Accessories: Provide components required for a complete metal plate wall panel assembly including trim, copings, fascia, mullions, sills, corner units, flashings, and similar items. Match material and finish of panels unless otherwise indicated.
2. Provide integral drainage system and manufactures standard extrusions at termination of dissimilar materials.
3. Flashing and Trim: Match material, finish, and color of adjacent wall panels.
    a. Thickness: At least 0.040 inch.
    b. Refer to Section 07 6200
4. Panel Fasteners: Designed to withstand design loads, with at least 7/16-inch diameter head and neoprene washer.
    a. Aluminum Wall Panel Material: Provide stainless steel fasteners, or coated fastener approved by panel manufacturer.

5. Sealants: As recommended by metal panel manufacturer for openings within wall panels and perimeter conditions.

    a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
    b. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacturer.

2.4 METAL SOFFIT PANELS

A. Soffit Panel Type: Provide factory-formed metal wall panels designed to be field assembled and mechanically attaching panels to supports using concealed fasteners in interlocking side laps. Include accessories required for weathertight installation.

1. Manufacturer, Basis of Design: Metal Sales Manufacturing Corporation. Telephone: (800) 406-7387. www.metalsales.us.com

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

    a. Firestone Metal Products
    b. Petersen Aluminum Corp.
    c. ATAS International, Inc.
    d. Metal-Tech USA.
    e. Quality Metal Crafts, LLC.

B. Basis of Design Product: Subject to compliance with requirements provide Metal Sales Manufacturing Corporation; Soffit Panel, Tongue-and-groove side lap, Flat pan, Concealed fastener.

1. Material: Aluminum-zinc alloy-coated steel sheet, ASTM A 792, AZ50 coating designation, 22 ga.

2. Panel Depth: 1 inch.

3. Panel coverage 12 inches.

4. Exterior Finish: High-performance organic; two-coat fluoropolymer system complying with AAMA 2604, with finish coats containing at least 70 percent PVDF resin by weight.

    a. Pencil Hardness – ASTM D3352-74
    b. Impact Adhesion – ASTM D294-84

        1) Coating shall show no cracking and no loss of adhesion

    c. Cure Test – NCCA 11-18
    d. Coating shall withstand 50+ double rubs of MEK.
    e. Humidity Resistance – ASTM D2247-87

        1) Coating shall show no blisters after 3000 hours of 100% humidity at 95`F.

    f. Weatherometer Test – ASTM D882-86/G23-88 Coating shall show no cracking, peeling, blistering or loss of adhesion after 2000 hours.

        1) Chalking Resistance – ASTM D659-86
        2) Color Change – ASTM D2244-74
        3) After 5000 hours in Atlas Weatherometer coating shall show no objectionable chalking or color change.

g. Abrasion Resistance – ASTM D968-81 Coating shall resist 65+/- 15 liters/mil minimum of falling sand

5. Concealed Finish: Manufacturer's standard white or light-colored acrylic or polyester backer finish.

6. Flashing and Trim: Formed from the same material and gauge as for panel where exposed. Provide flashing and trim as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal wall panels.

C. Accessories:

1. All fasteners shall be non-corrosive type, as recommended by the panel manufacturer. Provide self-tapping screws and other suitable fasteners designed to withstand building design loads.
2. Panel Sealants: Provide sealants as recommended by the manufacturer for each installation and location for a warranted installation.
3. Provide components required for a complete panel assembly, including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items.

2.5 METAL STANDING SEAM CLADDING

A. Standing Seam Panel Type: Provide factory-formed standing seam panels designed to be field assembled and mechanically attaching panels to supports using a fixed concealed clip system. Include accessories required for weathertight installation.

1. Manufacturer, Basis of Design: Metal Sales Manufacturing Corporation. Telephone: (800) 406-7387. www.metalsales.us.com

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

a. Firestone Metal Products
b. Petersen Aluminum Corp.
c. ATAS International, Inc.
d. Metal-Tech USA.
e. Quality Metal Crafts, LLC.

B. Basis of Design Product: Subject to compliance with requirements provide Metal Sales Manufacturing Corporation; Vertical Seam.

1. Panel Coverage: 12 inches (304.8 mm)

2. Rib Height: 1-3/4 inches (44.5 mm)

3. Material: Aluminum-zinc alloy-coated steel sheet, ASTM A 792, AZ50 coating designation, structural quality, Grade 50, 0.0236-inch (0.60-mm) minimum thickness.

4. Roof slope: 2:12 over solid substrate.

5. Sealant: Factory-applied side lap sealant.

6. Side Lap: Snap seamed

7. Attachment: Concealed clip designed for thermal movement.

8. Surface Finish: PVDF (Kynar 500 or Hylar 5000).

9. Color: As selected by Architect from manufacturer's standard colors.

10. Fire Resistance Rating: Comply with UL 263 and UL 790 Class A Fire Resistance Ratings.

11. Impact Resistance: Comply with UL 2218 Class 4.

12. Air Infiltration: Tested according to ASTM E 1680.

13. Water Infiltration: No leakage when tested according to ASTM E 1646 and ASTM E 2140.

14. Wind Uplift Resistance: Tested according to ASTM E 1592 and in compliance with UL 580, Class 90 Wind Uplift, Construction #254, 255, 261, 303, 342, 343, 364, 436, 445, 446, 447, 448, 508 and 508A.

C. Flashing and Trim:

2. Formed from the same material and gauge as for panel where exposed. Provide flashing and trim as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal wall panels.

3. See Drawings for locations of required profiles, closure panels and drip edges. Use manufacturer standard profiles where indicated, otherwise provide custom fabricated profiles as required by the Drawings.

D. Accessories:

2. All fasteners shall be non-corrosive type, as recommended by the panel manufacturer. Provide self-tapping screws and other suitable fasteners designed to withstand building design loads.

3. Self-Adhered Membrane Underlayment: ASTM D1 970; self-adhering polymer modified bituminous sheet material, slip resistant surface, 40 mils thick, 36 inches wide, with strippable release paper to expose adhesive surface; Provide a continuous layer under entire expanse of areas to receive metal roofing.

4. Panel Sealants: Provide sealants as recommended by the manufacturer for each installation and location for a warranted installation.

   a. Hidden Sealant Tape: Pressure-sensitive, gray isobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, non-toxic, non-staining tape 1/8” (3mm) thick and 1” (25mm) wide.
   b. Hidden Joint Sealant: ASTM C90; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacture.
   c. Non-Skinning Butyl Sealant: ASTM C734 Non-hardening, non-drying, non-oxidizing butyl rubber-based sealant.
   d. Accessory Attachment Tape: Pressure-sensitive 1/8” (3mm) thick and 1” (25mm) wide VHB tape.

5. Provide components required for a complete roof assembly, including trim, copings, fasciae, clips, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

6. Fabricate cleats of same material as sheet, to interlock with sheet.

7. Fabricate starter strips of same material as sheet, continuous, to interlock with sheet.

8. Hem exposed edges on underside 1/2 inch; miter and seam corners.

9. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

E. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

2.5 FABRICATION, GENERAL

A. Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal wall panels with joints between panels designed to form weathertight seals.

C. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

2. Seams: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

3. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal wall panel manufacturer.

D. Provide post-finishing of panels, paint aluminum wall panels only after completion of panel fabrication and ensure exposed edges are coated.

E. Provide post anodizing of panels, anodize aluminum wall panels only after completion of panel fabrication and ensure exposed edges are anodic coated without crazing of surface at formed edges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Contractor shall inspect all surfaces, areas, and other contingent construction in or to which his work is to be installed and insure himself that they are in proper condition to receive the work to be performed under this Section.

2. Examine wall framing to verify that structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.

B. Verify that sheathing surfaces are sound, dry, properly secured and that provision has been made for flashings, anchorage, and all other interface items attaching to or penetrating through the Work of this Section.

C. The Contractor shall notify the Architect in writing, before any work is installed, of any condition requiring correction. Failure to make such a report shall be construed as acceptance of the existing conditions and the responsibility to provide an acceptable installation.

D. Examine rough-in for components and systems penetrating wall panels to coordinate actual penetration locations relative to wall panel joint locations prior to installation.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION - PANELS

A. General: Install meal wall panels according to manufacturer's written instructions in orientation, sizes and locations indicated on drawings

2. Miscellaneous Framing: Install furring, angles, sub-purlins, and other miscellaneous wall panel support members and anchorage according to metal wall panel manufacturer's recommendations.

3. Erect panel level and plumb, in proper alignment in relation to substructure framing and established lines; follow SMACNA Architectural Sheet Metal manual and standard practices.

4. Fabricate and install work with lines and corners of exposed units true and accurate.

5. Shim and align panel units within installed tolerance of ¼ inch in 20' –0".

6. Panels shall be erected in accordance with approved shop drawings.

7. Panel anchorage shall be structurally sound and per engineering recommendations.

8. Where wall panel materials come in contact with dissimilar materials, an isolation shim or tape shall be installed at fastening locations

9. Completed system shall be free from over bending, deforming, stretching, distortion, waves, and buckles.

10. Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of wall panel assemblies. Provide types of gaskets, fillers, and sealants as indicated or as recommended by panel manufacturer.

a. Seal side joints where recommended by metal wall panel manufacturer.
b. Prepare joints and apply sealants to comply with the requirements in Division 07 Section "Joint Sealants".

B. Flat lock Panel Installation:

2. Erect flat-lock panel level and plumb, in proper alignment in relation to substructure framing and established lines; follow SMACNA Architectural Sheet Metal manual and standard practices.

3. Flat-Lock Tile panels are installed from the bottom up.

4. Form exposed faces free of avoidable tool marks considering temper and reflectivity of metal.

5. All seams shall be of uniform appearance and dimensions, straight and level with minimum exposure of solder and sealant.

6. Except as otherwise shown, fold back sheet metal to form a hem on concealed side of exposed edges.

7. Anchor panels securely in place, with provisions for thermal and structural movement.

8. Field-cutting exterior panels by torch is not permitted.

9. Conceal fasteners and expansion provision where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

10. Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of wall panel assemblies. Provide types of gaskets, fillers, and sealants as indicated or as recommended by panel manufacturer.

11. Separate dissimilar metals and metal panels from contact with wood or cementitious materials by painting each metal surface in area of contact with a rubberized asphalt underlayment.

C. Metal Plate Wall Panel System:

2. Install wall panels in accordance with manufacturer's installation instructions, including pressure equalized rainscreen installation method and installation guidelines.
    a. Wall panels consist of single sheets of metal formed with interlocking gutter and drainage system integral to the panel with single horizontal attachment for dry-joint rainscreen assembly.
    b. Use of secondary drainage channels, brackets, support pins, joint sealants, or gaskets to manage the drainage of wall panel system is not permitted.
    c. Attach wall panels using progressive interlocking method, engaging bottom of panel in top of previous panel working bottom up, and left to right.
    d. Install wall panels with single top attachment in pre-punched holes to allow individual panels to move due to thermal expansion.
    e. Do not compromise internal gutter.
3. Install wall panels for orientation, sizes, and locations as indicated on Drawings.
4. Install wall panels with proper anchorage and other components for this Work securely in place.
5. Install wall panels with provisions for thermal and structural movement.
6. Install shims to plumb substrates as necessary for installation of wall panels.
7. Install weather tight seals at perimeter of wall panel openings.
    a. Test for proper adhesion on small unexposed area of solid surfacing prior to use.
    b. Refer to Section 07 9200.
8. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA - Architectural Sheet Metal Manual.
    a. Provide concealed fasteners where possible and set units true to line and level as indicated.
    b. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
    c. Install flashing and trim as wall panel Work proceeds.
9. Install weather tight escutcheons for pipe and conduit penetrating exterior walls.
10. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by wall panel manufacturer.
11. Install attachment system to support wall panels and with provisions to provide a complete weather tight wall system, including sub girts, extrusions, flashings, and trim.
    a. Include attachment to supports and trims at locations using dissimilar materials.
    b. Do not apply sealants to joints, unless noted otherwise on Drawings or Shop Drawings.
    c. Install starter extrusion at base course and at cut panel locations.
12. Install accessories with positive anchorage to building and weather tight mounting and provisions for thermal expansion, and coordinate installation with flashings and other components.

a. Install components required for a complete wall panel assembly including trim, copings, flashings, and other accessory items.

12. Tolerances: Shim and align wall panel units with installed tolerances of 1/4 inch in 20 feet, non-cumulative, on level, plumb, and location lines as indicated

3.3 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints

3.4 CLEANING AND PROTECTION

A. Protect flat-lock panels from damage during construction. Use temporary protective coverings where needed as approved by the metal panel manufacturer.

B. Remove panels damaged beyond repair and replace with new panels to match adjacent undamaged panels

C. Remove protective films immediately after installation

D. Clean exposed surfaces as directed by metal panel manufacturer’s written instructions.

E. Clean exposed surfaces of flat-lock panels that are not protected by temporary covering to remove fingerprints and soil during construction period.

F. Clean and touch up minor abrasions in finishes with air-dried coating that matches color and gloss, and is compatible with, factory–applied finish coating.

G. Upon completion of wall panel installation, clear weep holes and drainage channels of obstructions and dirt.

H. Ensure that cleaning by other trades working in proximity to zinc and corten steel installation is in accordance with the recommendations of the manufacturers.

END OF SECTION 074213

SECTION 075323 - ETHYLENE PROPYLENE DIENNE MONOMER (EPDM) MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Installation shall be fully adhered EDPM membrane system.

B. Section Includes:

1. Roof Vapor Retarder
2. Roof Insulation
3. Elastomeric EDPM membrane roofing.
4. Associated membrane flashings and accessories as provided by the roofing manufacturer as part of a roofing system.

C. Related Sections:

1. Section 061005 - Roof Related Rough Carpentry for wood nailers, cants, curbs, and blocking.
2. Section 072100 - Thermal Insulation for insulation beneath the roof deck.
3. Section 076200 – Sheet Metal Flashing and Trim for metal flashings in contact with roofing system.
4. Section 077200 - Roof Accessories: Roof hatches, vents, and manufactured curbs
5. Section 079500 - Joint Sealants for joint sealants, joint fillers, and joint preparation.
6. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 DESCRIPTION OF WORK

A. Provide new roof, insulation and associated construction at new roofs as identified on roof plans.

B. Patching is required at tie-ins where additions abut existing roofs.

1.4 REFERENCES

A. Referenced Standards: These standards form part of this specification only to the extent they are referenced as specification requirements.

1. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
2. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
3. ASTM D 4637 - Standard Specification for EPDM Sheet used in Single-Ply Roof Membrane
4. ASTM D 4811 - Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing
5. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
6. FM 1-28 - Design Wind Loads; Factory Mutual System
7. FM 1-29 - Roof Deck Securement and Above Deck Roof Components; Factory Mutual System.

8. FM 4470 - Approval Standard - Class I Roof Covers; current version.

1.5 SUBMITTALS

A. Product Data:

1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.

2. Where UL or FM requirements are specified, provide documentation that shows that the roofing system to be installed is UL-Classified or FM-approved, as applicable; include data itemizing the components of the classified or approved system.

3. Installation Instructions: Provide manufacturer's instructions to installer, marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used.

B. Shop Drawings: Include plans, sections, details, and attachments to other Work. Provide the roof membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains.

1. Submit to the roof system manufacturer for approval – Shop drawings that include a complete roof plan, including membrane sheet layout, tapered insulation layout, details, and a bill of materials. Submit a copy to the Engineer/Architect for approval of tapered insulation layout. Send documentation of all other information to the Owner.

C. Contractor’s Qualifications:

1. Each Contractor shall be prepared to submit, within 5 days of Owner’s request, written evidence that he/she:

a. Maintains a permanent place of business.
b. Has adequate equipment to do work properly and expeditiously within established schedules.
c. Has suitable financial status to meet obligations incident to the work including a financial statement and credit references.
d. Has a satisfactory experience record with work of this type and scope: and, if requested by the owner, can provide five references for projects of a size exceeding 75 percent of the area included in this Project that are at least five years old. These references shall include project schedules, including bid date, start and completion dates, Owner and/or Engineer contacts including names, addresses and telephone numbers, and the specific components existing and installed on each referenced project.
e. Can submit an anticipated construction schedule and staffing plan.
f. Can submit “Contractor’s Qualification Statement” AIA Document A305.
g. Can show evidence of authority to conduct business in the jurisdiction where the Project is located.

D. Manufacturer Certificates: Signed by roofing manufacturer certifying that the EDPM roofing complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

E. Maintenance Data: For EDPM roofing to include in maintenance manuals.

F. Warranties: Executed Warranty as a requirement of project close-out.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1. Firm that is acceptable to roofing system manufacturer.

B. Source Limitations: Obtain components for membrane roofing system from same manufacturer as roofing membrane or approved by roofing membrane manufacturer.

C. Fire-Test-Response Characteristics: Provide membrane roofing materials with fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Exterior Fire-Test Exposure: Class A; ASTM E108, for application and roof slopes indicated.

D. Wind Uplift Requirements: Provide roof assembly meeting or exceeding Factory Mutual Global Guidelines for Minimum ballast per respective wind zone, building height, deck type, parapet height, and ground roughness qualification.

1. Wind Zone: 90 mph.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials between 60°and 80°F (15° and 27°C). When ambient temperatures fall below 60°F (15°), Contractor is responsible for providing heated storage areas for materials. Heat storage area in a manner which does not pose a fire hazard.

B. Apply adhesives and sealants at room temperature 60°and 80°F (15° and 27°C). Expose only enough materials to colder temperatures that can be applied within limits. Restore to room temperature when exposed to lower temperatures prior to use.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Provide continuous protection of materials against wetting and moisture absorption.

E. Heed manufacturer’s cautions regarding safe handling, use and storage of materials.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed per manufacturer's written instructions and warranty requirements.

B. Environmental Requirements: Wind velocity and temperature limitations shall be based on the Contractor’s ability to apply materials in the specified manner. Splicing and seaming work shall not be conducted when ambient temperature is below 0°F (-18°C) or when wind chill factor is below -20°F (-29°C).

C. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage

D. Provide protection, as specified, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.

E. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.

F. New roofing shall be complete and weathertight at the end of the workday

G. Protection:

1. Install temporary insulation seal-offs at completion of each day's work and completely remove upon resumption of work.
2. Coordinate application of membrane to provide protection of underlying materials from wetting or other damage by the elements on a continuous basis.
3. Completely install sheet metals sleeves, caps, or enclosures daily.
4. Torches are not permitted on the roof.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
   1. Warranty Period: 15 years from date of Substantial Completion.
   2. Prior to acceptance of the Work, furnish written one-year watertight warranty.

PART 2 - PRODUCTS

2.1 VAPOR RETARDER

A. 40 mil minimum composite self-adhering sheet product consisting of a layer of rubberized asphalt membrane with a 5 mil Provide new roof, insulation and associated construction at existing roofs as shown on roof plans UV resistant poly film with skid resistant surface.
   1. Recognized as a by Class l vapor retarder the International Building Code with a perm rating of 0.02.
   2. Compatible with all components of EDPM roofing system used.

2.2 ROOF INSULATION

A. Roof sheathing at metal deck: Fiberglass matt reinforced gypsum roof sheathing board.
   1. Basis of design product: GP Gypsum; DensDeck® Prime Roof Board or comparable product.
   2. 5/8" thickness.
   3. Fire-Resistance Rating: Class A in accordance with UL 790 and ASTM E108.
   4. Combustibility: Noncombustible in accordance with ASTM E136.
   5. Flame Spread and Smoke Development: Zero and zero in accordance with ASTM E84.
   6. Water Absorption (Percent of Weight): 5 percent or less in accordance with ASTM C473
   7. Surface Water Absorption: Nominal 0.035 oz. in accordance with ASTM C473
   8. Compressive Strength: 900 lbf/sq. in. in accordance with ASTM C473
   9. Mold Resistance: 10 in accordance with ASTM D3273

B. Polyisocyanurate Board Insulation: Felt or glass-fiber mat facer on both major surfaces, rigid, cellular, polyisocyanurate thermal insulation. ASTM C1289, Type II, Class 1, Grade II, with maximum flame-spread of 75 and smoke-developed of 450 based on tests performed on unfaced core on thicknesses up to 4 inches.
   1. Approved Manufacturers:
      a. Atlas
      b. Certain Teed
      c. Firestone
      d. GAF
      e. Johns Manville
      f. Hunter Panels

2. Maximum board size: 48 inches (1220 mm) by 96 inches (2440 mm). Insulation to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.

3. Maximum board thickness: 2". Use as many layers as required to achieve specified R-values, stagger joints in adjacent layers. See roof plans for required insulation thicknesses.

4. Edges: Square.

5. R-Value (LTTR): 1.0-inch (25 mm) Thickness: 5.7, minimum.

6. Compressive Strength: Minimum 20 psi (138 kPa) when tested in accordance with ASTM C 1289.

7. Density: 2 pcf.

C. Tapered Insulation: Provide factory-tapered polyisocyanurate insulation boards fabricated to slopes as indicated on roof plans. See roofing plan for extent of each slope. Direction changes shall use mitered boards. Provide slopes to maintain code compliant roof drainage to roof drainage system. ASTM C1289, Type II, Class 1, Grade II, with maximum flame-spread of 75 and smoke-developed of 450 based on tests performed on unfaced core on thicknesses up to 4 inches.

1. Manufacturer: same manufacturer as providing non-tapered insulation.

2. Maximum board size: 48 inches (1220 mm) by 96 inches (2440 mm). Insulation to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.

3. Minimum Board thickness 1/2", maximum board thickness 2".

4. R-Value (LTTR): 1.0-inch (25 mm) Thickness: 5.7, minimum.

5. Compressive Strength: Minimum 20 psi (138 kPa) when tested in accordance with ASTM C 1289.

6. Density: 2 pcf.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated or as required to maintain code compliant roof drainage.

E. Insulation Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

F. Adhesive for Insulation Attachment: Type as required by roof membrane manufacturer for roofing system and warranty to be provided; use only adhesives furnished by roof membrane manufacturer.

2.3 ELASTOMERIC ROOFING MEMBRANE

A. EPDM Roofing Membrane: ASTM D4637, Type II, scrim or fabric internally reinforced uniform, flexible sheet made from EPDM, and as follows:

1. Subject to compliance with requirements, provide products by the manufacturers specified.

   a. Carlisle SynTec Incorporated.
   b. Firestone Building Products Company.
   c. GenFlex Roofing Systems.
   d. Johns Manville International, Inc.
   e. Versico Inc.

2. Thickness: 60 mils, nominal.

3. Reinforcement: Polyester weft inserted scrim; membrane complying with ASTM D 4637 Type II
4. Exposed Face Color:
   a. Black.

2.4 FASTENERS

A. Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

1. Membrane securement strip to wood or masonry: Coated screws as recommended by the manufacturer, with minimum 1-inch penetration into substrate. Install screws with the manufacturer's approved screw guns.
2. Flashing to lumber: Galvanized 1-½" barbed roofing nails through 1-inch metal discs.
3. All fasteners that come into contact with pressure treated lumber shall be stainless steel.

2.5 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

B. Flashing Membrane: Self-curing, non-reinforced membrane composed of nonvulcanized EPDM rubber, complying with ASTM D 4811 Type II, and with the following properties:

1. Thickness: 0.055 inch (1.4 mm).
2. Color: Same as field membrane

C. Self-Adhesive Flashing Membrane: Semi-cured 45 mil EPDM membrane laminated to 35 mil (0.9 mm) EPDM tape adhesive.

D. Pre-Molded Pipe Flashings: EPDM, molded for quick adaptation to different sized pipes

E. Bonding Adhesives, sealants, and surface cleaners: As recommended by Membrane manufacturer.

F. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, per application.

G. Seaming Tape: Self-Adhesive Lap Splice Tape: 35 mil (0.9 mm) EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer, minimum 6" wide. Provide manufacturer's recommended primer.

H. Mastic: One-part, low viscosity, self-wetting butyl mastic.

I. Membrane securement strip: Reinforced EPDM fastening strip, with 2-inch diameter metal plates.

J. Membrane Protection:

1. 45-mil EPDM membrane, laid loose
2. 1" expanded polystyrene insulation
3. ¾" plywood
4. Sandbag ballast

K. Miscellaneous Accessories: Provide lap sealant, water cutoff mastic, metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck
2. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
3. Replace all existing wood blocking shown to remain with new if existing is found to be damaged or rotted and not sound to receive roofing materials.
4. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected

3.2 PREPARATION

A. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.

B. Surfaces to receive new materials shall be free of all dirt, debris, loose materials, and free from moisture in any form. Mechanically scrape exposed surface as necessary to remove projections.

C. Verify that surfaces to receive new materials have no defects or errors that would result in poor application or cause latent defects in workmanship.

D. Reset or replace existing fasteners for materials exposed but left in place that are loose, deformed, damaged, or corroded.

E. All new fasteners that are to be used with existing preservative treated wood blocking are to be stainless steel.

F. Covering deck gaps:

1. Gaps less than 2”: Install backer rod in joint and cover with 6” wide uncured flashing in compatible adhesive.
2. Gaps 2” or greater: Install 24-gauge sheet metal plate, fastened to one side of joint and covered with No 30 felt (back-mopped) to the deck (over the joint).

G. Torches will not be permitted on the roof.

3.3 VAPOR RETARDER

A. The surface to which vapor retarder is to be applied shall have a smooth finish and be free of voids, spalled areas, sharp protrusions, loose aggregate, and other surface imperfections.

B. Adhere to existing construction with minimum 3-inch (76.2 mm) edge laps and 6-inch end laps.

C. Install in straight lines, flat, free of wrinkles, and fishmouths.

D. Roll in with a 75 lb. (34 kg) roller to fully mate each roll to substrate, including all lap areas.

E. Take special precautions to hold in place until remainder of roof system is installed.

3.4 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at end of workday.

B. Maximum moisture content of insulation at time of application shall be 4 percent of dry weight.

C. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

D. Install tapered insulation under area of roofing to conform to existing slopes.

E. Insulation shall be laid loose.

F. Maximum ¼" joint width allowed. Fill gaps greater than 1/4 inch (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch (6 mm).

G. Install 1 or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inchesor greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inchesin each direction.

3.5 EDPM INSTALLATION

A. Install EPDM sheet according to roofing system manufacturer's written instructions and as follows:

1. Adhered Sheet Installation: Apply bonding adhesive to substrate and underside of sheet and allow to partially dry. Do not apply bonding adhesive to splice area of sheet.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates per membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings per roof system manufacturer's requirements.

F. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.

1. Follow roofing manufacturer's instructions.

2. Remove protective plastic surface film immediately before installation.

3. Install water block sealant under the membrane anchorage leg.

4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.

5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.

6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.

G. Scuppers: Set in sealant and secure to structure; flash as recommended by manufacturer.

H. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing manufacturer.

I. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weathertight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the

roofing membrane abuts to; extend flashing at least 8 inches (200 mm) high above membrane surface.

1. Use the longest practical flashing pieces.
2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.
3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
4. Provide termination directly to the vertical substrate as shown on roof drawings.

J. Roof Drains:

1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.
2. Position membrane, then cut a hole for roof drain to allow 1/2 to 3/4 inch (12 to 19 mm) of membrane to extend inside clamping ring past drain bolts.
3. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes.
4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.

K. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.

1. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
2. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2 inches (50 mm) deep, with at least 1-inch (25 mm) clearance from penetration, sloped to shed water.
3. Structural Steel Tubing: If corner radii are greater than 1/4 inch (6 mm) and longest side of tube does not exceed 12 inches (305 mm), flash as for pipes; otherwise, provide a standard curb with flashing.
4. Flexible and Moving Penetrations: Provide weathertight gooseneck set in sealant and secured to deck, flashed as recommended by manufacturer

3.7 FIELD QUALITY CONTROL

A. Withdrawal tests of fasteners and nailers may be required if attachment is in question.

B. Samples of the flashing may be taken to determine the degree to which it has cured prior to installation.

C. A sample of the completed splice may be required if in question, at a location selected by the Architect/Engineer. Patching the test opening shall be by the Contractor using the standard splicing methods.

D. Field tests may be performed by Architect/Engineer to evaluate moisture content of installed materials.

E. Application of the roof system may be checked by Architect/Engineer.

F. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

G. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

3.8 PROTECTION AND CLEANING

A. Protect roofing systems from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.

C. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

D. Remove all roofing materials from surfaces not specified to receive these materials such as walls, walkways, metal flashings, etc.

E. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

END OF SECTION 075323

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following sheet metal flashing and trim:

1. Sheet metal flashing
2. Metal fascias and flashings.
3. Gutters and downspouts
4. Miscellaneous sheet metal trim and cladding as noted on the Drawings.

B. Products Furnished But Not Installed Under This Section:

1. Caps, sleeves, and umbrella hoods

C. Related Sections include the following:

1. Section 061000 - Rough Carpentry
2. Section 061005 – Roof-related Rough Carpentry
3. Section 074113 - Metal Roof Panels
4. Section 074213 - Metal Wall Panels
5. Section 075323 - EPDM Membrane Roofing
6. Section 079200 "Joint Sealants" for field-applied sheet metal flashing and trim sealants.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Perimeter edge metal and parapet cap (coping) for low slope roofs shall comply with IBC 2012 ANSI/SPRI ES-1.

C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sheet metal manufacturer’s standard color chart for initial selection

C. Samples: For each type of exposed finish required, provide Samples of size indicated below:

1. Sheet metal manufacturer's standard color chart.

2. Samples for Verification: Minimum 2” x 3” sample of finish applied to metal substrate specified.

1.5 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

B. Manufacturer to provide factory applied protection for finished color-coated sheet metal by means of a strippable plastic film.

C. Sheet metal items not specifically noted on the Drawings or in the specification shall be in accordance with recommendations of The Architectural Sheet Metal Manual published by Sheet Metal and Air-Conditioning Contractors National Association, Inc. (SMACNA).

D. Conduct welding in accordance with standard practices outlined in American Welding Society Code for Welding in Building Construction. All welds shall he completed by an AWS certified welder. Submit certification including date qualified, and the name of the firm and individual certifying the qualification tests.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Store color-coated sheet metal in manner that will protect it from exposure to the sun up until the time of installation.

D. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

E. Exercise care during fabrication and erection to avoid damage to the finished surface.

1.7 PROJECT CONDITIONS

A. Protection:

1. Prevent damage to new or existing materials, including protection from damage by ladders and other equipment. Potentially damaging materials such as metal scraps, acid flux, and other debris shall not be permitted to come into contact with the roof surface.

2. Suitable fire extinguishing equipment shall be immediately available at all locations where soldering, welding, or cutting equipment is used.

3. Maintain a fire watch wherever soldering, welding, or cutting is performed.

B. Construction Schedule:

1. Install sheet metal as soon as possible after membrane work has been completed. Sheet metal work shall be fully complete by the given completion date.

C. Coordination:

1. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leak-proof, secure, and noncorrosive installation

1.8 WARRANTY

A. Manufacturer's Warranty: Provide a 20-year, written manufacturer's warranty, starting from date of Substantial Completion, for color-coated sheet metal covering color fade, chalk, and film.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. Color-coated steel: Kynar 500 fluoropolymer coating factory applied to 24-gauge galvanized steel, ASTM A653. Touch-up paint for color-coated sheet metal shall be color match as recommended and supplied by the sheet metal manufacturer.

1. Flashings shall be color coated steel at all locations unless noted otherwise on the Drawings.

a. Color of roof flashing shall match existing from manufacturer's standard colors. Verify with Architect prior to installation.
b. Color of trim and flashing at other locations shall be selected by the Architect from the Manufacturer's full line of standard colors.
c. Color to trim at metal wall panels and at metal roofing shall match color of metal panels and/or roofing.

2. Acceptable materials:

a. ColorKlad by Ryerson.
b. Pac-Clad by Petersen Aluminum Corporation.
c. Una-Clad by Firestone Metal Products.
d. Ultra-Clad by Coated Metals Group
e. Carlisle Metal Products
f. Berridge Manufacturing Company

3. Galvanized steel: ASTM A653, commercial quality, G90 coating designation, for use at locations noted on drawings.

4. Aluminum: ASTM B209, Alloy 3003-H14, mill finish, for use at locations noted on drawings

2.2 FASTENERS

A. General: Fasteners shall be of same material as flashings on which they are used and shall be of type and size as shown on Drawings or specified herein unless noted otherwise exposed fasteners through sheet metal shall match new sheet metal color.

1. Zinc or cadmium plated for galvanized steel

2. Stainless steel for aluminum

B. Fasteners exposed to the weather shall have EPDM washers under heads to ensure water-tightness.

1. EPDM washers: EPDM laminated to metal washer, Weath-R-Seal manufactured by Fab-Lok

C. Sheet metal to wood:

1. Where exposed: No. 8 minimum size steel hex head screw, 1-112" long. Minimum 150 lbs. per screw installed withdrawal resistance.
2. Where not exposed: Minimum #14 flat head wood screw.

D. Sheet metal to sheet metal: Self-tapping screws of 112" length and a minimum #3-diameter.

E. Sheet metal to concrete or masonry: Tapcon or Gripcon, specially threaded anchors, 1-1/4" minimum diameter, length to penetrate masonry minimum 1 inch. Minimum 300 lb. per anchor installed withdrawal resistance.

F. Keeper strips to wood: Galvanized ring shank nail, 1-114" long, with minimum 3/16" diameter head.

2.3 MISCELLANEOUS

A. Solder: ASTM B32, alloy grade Sn50,50% tin, 50% lead.

B. Soldering flux: Use least corrosive flux suitable for specific application. Use materials and methods to neutralize as recommended by the flux manufacturer and American Welding Society (AWS).

1. Fed. Spec. 0-F-506C, Type I, Form A or B

C. Self-Adhering, High-Temperature Sheet Underlayment: Butyl or SBS-modified asphalt; slip-resisting-polyethylene surfaced; with release paper backing; cold applied. Stable after testing at 240 deg F (116 deg C) and passes after testing at minus 20 deg F (29 deg C); ASTM D 1970

D. Slip Sheet: Rosin-sized building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum.

E. Butyl Sealant: ASTM C 1311, solvent-release butyl rubber sealant.

F. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187

2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

B. Fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to the design, dimensions, geometry, metal thickness, and other characteristics of item indicated.

C. Shop fabricate all items requiring soldering or welding unless noted otherwise.

D. Re-coat soldered joints of color-coated sheet metal with material and in manner specified by manufacturer.

E. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

F. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

1. Seam for Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

G. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

H. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

I. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

J. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

K. Do not use graphite pencils to mark metal surfaces.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.

1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, securely anchored, and have no free water present in any form.

2. Verify that nailers to receive sheet metal are properly placed.

3. Verify shapes and dimension of surface to be covered before fabrication of sheet metal.

4. Cut, clean, and prime reglets to receive new reglet insert flashing.

5. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Sheet metal installation shall as a minimum, be in accordance with recommendations of Factory Mutual Loss Prevention Data Sheet 1-49, September 2000

B. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods,

protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Torch cutting of sheet metal flashing and trim is not permitted.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

1. Coat side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

2. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.

D. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

E. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

F. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

G. Screw fasteners shall be turned into place rather than driven

H. Clean, grind and otherwise prepare surfaces to be welded to provide the best weld possible in accordance with American Welding Society Code for Welding in Building Construction. Membrane shall be completely protected during welding

I. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

J. Seal joints with elastomeric sealant as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

2. Use elastomeric sealant at reglets and scuppers as necessary to make a watertight installation including foam backer rod as necessary to make a good sealant joint.

3. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

3.3 SOLDERING

A. Clean all surfaces to be soldered, remove oils and foreign matter.

B. Pre-tin edges of sheet metal before soldering is begun.

C. Apply flux and begin soldering immediately.

D. Soldering shall be done slowly with well-heated soldering irons until the seams are thoroughly heated and the solder has been completely sweated through the full width of the seam.

E. Remove acid flux residue as recommended by the manufacturer. As a minimum, use a solution of washing soda in water

3.4 CAP AND FASCIA FLASHING, COUNTERFLASHING, AND KEEPER STRIPS

A. Provide preformed cap flashing with drive cleat joinery extending out two to four feet maximum in each direction at corners and intersections of new sheet metal cap flashings.

B. Space cap flashing sections so cover plate locations will be balanced between corners of roof edge.

C. Align cover plates for cap flashing and fascia flashing along roof edges.

D. Lap intersecting counterflashings, except fascia counterflashings, minimum 3", and securely fasten.

E. Sheet metal flashing (not including fascia flashing) exceeding 24" high shall be a vertical flat single-lock wall panel consisting of:

1. Panels shall not exceed 16" in width unless noted otherwise
2. Fabricate and space seams accurately. Seams shall be 1/2" high, straight, and uniform. Bends shall be rounded and not sharp.
3. Fasten sides of panels with cleats spaced 12" on-center and locked into panel seam. Fasten cleats to plywood with two annular thread nails, and to concrete with one flat or pan head masonry anchor. Install fastener 3/4" from end and turn end of cleat to cover fastener head.
4. Fasten top edge of panel with a minimum of two screws through neoprene washers. Locate screws just below drip edge of overlying flashing.
5. Fasten lower edge of panel with a continuous keeper strip

F. Fasten at center of cover plates along inside face with screws through neoprene washers and field crimp inside edge over cap flashing. Nail fasten S-cleat cover plates at 6" on-center. No fasteners will be allowed in outside face of cover plate.

G. Screw fasten cap flashing on roof edges at 18" on-center. Screw fasten cap flashings (non- roof edge related) and counterflashing to wood blocking with screws through neoprene washers at 30" on-center

H. For perimeter edge metal with 12" maximum width, fasten outer edge of cap flashing with continuous keeper strip fastened to blocking at 6" on-center. Do not field crimp cap flashing to keeper strip. For perimeter edge metal over 12" in width, fasten outer and inner edge of cap flashing with continuous keeper strip fastened to blocking. Crimp inside face of cap flashing to keeper strip only. When cap/fascia flashing fascia flashing is present, allow additional break in keeper strip to maintain plumb installation of cap/fascia flashing

I. Fasten counterflashing corners with pop rivets or screws and seal with sealant.

3.5 FIELD QUALITY CONTROL

A. Alignment and elevation of installed sheet metal will be checked by Contractor and may be checked by Architect/Engineer.

B. Withdrawal tests of installed fasteners may be required if attachment is in question.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants. Potentially damaging materials shall not contact the roof surface

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Roof Curbs and Equipment supports.
2. Factory-fabricated thermally broken roof hatches with integral curbs.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s product data.

B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.

C. Warranty: Submit executed copy of manufacturer’s standard warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer: A minimum of 5 years experience manufacturing similar products.

B. Installer: A minimum of 2 years experience installing similar products.

C. Manufacturer’s Quality System: Registered to ISO 9001:2008 Quality Standards including in-house engineering for product design activities.

D. Regulatory Requirements: OSHA Compliance

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer’s original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier’s freight bill of lading.

1.6 WARRANTY

A. Manufacturer’s Warranty: Provide manufacturer’s standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL.

A. Manufacturers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers listed in other Part 2 articles.

B. Metal materials:

1. Galvanized Steel Sheet:

a. ASTM A 653/A 653M, G90 (Z275) coated for exposed finish
b. Mill phosphatized for items to be field painted.

2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 (AZM150) coated.

3. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755/A 755M.

a. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coated.
b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 (Class AZM150) coated.
c. Exposed Finishes: High-Performance Organic Finish (2-Coat Fluoropolymer): Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1) Fluoropolymer 2-Coat System: Manufacturer’s standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements in AAMA 2604.

4. Aluminum Sheet: ASTM B 209 alloy and temper recommended by manufacturer for type of use and finish.

5. Aluminum Extrusions and Tubes: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use, mill finished.

6. Stainless-Steel Shapes or Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304 or Type 316, No. 2D finish.

7. Steel Shapes: ASTM A 36/A 36M, hot dip galvanized to comply with ASTM A 123/A 123M, unless otherwise indicated.

8. Steel Tube: ASTM A 500, round tube, baked-enamel finish.

9. Galvanized Steel Tube: ASTM A 500, round tube, hot dip galvanized to comply with ASTM A 123/A 123M.

10. Galvanized Steel Pipe: ASTM A 53/A 53M.

C. Miscellaneous Materials:

1. Cellulosic-Fiber Board Insulation: ASTM C 208, Type II, Grade 1, 1 inch (25 mm) thick.

2. Glass-Fiber Board Insulation: ASTM C 726, 1 inch (25 mm) thick.

3. Polyisocyanurate Board Insulation: ASTM C 1289, 1 inch (25 mm) thick

4. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

5. Polyethylene Sheet: 6-mil- (0.15-mm-) thick, polyethylene sheet complying with ASTM D 4397.

6. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

7. Slip Sheet: Rosin-sized paper, minimum 3 lb./100 sq. ft. (0.16 kg/sq. m)

8. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

9. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

2.2 ROOF CURBS AND EQUIPMENT SUPPORTS

A. Internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Fabricate with welded or sealed mechanical corner joints, with stepped integral metal cant raised the thickness of roof insulation and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

B. Manufacturers

1. Commodity Products Company, Inc.
2. Conn-Fab Sales, Inc.
3. Curbs Plus Inc.
4. Custom Curb, Inc.
5. Custom Solution Metal Roof Products.
6. LM Curbs.
7. Loren Cook Company.
8. Metallic Products Corporation.
9. Pate Company (The).
10. Roof Products & Systems Corporation.
11. Roof Products, Inc.
12. Thaler Metal Industries Ltd.
13. ThyCurb; Div. of Thybar Corporation.
14. Uni-Curb, Inc.
15. Vent Products Company, Inc.

C. Materials:

1. Galvanized or Aluminum-zinc alloy-coated steel sheet, min. 0.079 inch (2.0 mm) thick.

2. Aluminum sheet, 0.090 inch (2.28 mm) thick.

3. Stainless-steel sheet, 0.078 inch (1.98 mm) thick.

   a. Finish for steel sheet: Powder coat.
   b. Finish for aluminum: Clear anodic.

4. Liner: Same material as curb, of manufacturer's standard thickness and finish.

5. Factory install wood nailers at tops of curbs.

6. Factory insulate curbs with 1-1/2-inch- (38-mm-) thick, glass fiber board insulation.

7. Curb height may be determined by adding thickness of roof insulation and minimum base flashing height recommended by roofing membrane manufacturer. Fabricate units to minimum height of 12 inches (300 mm) above highest adjacent roof insulation level.

8. Metal Counterflashing: Manufacturer's standard removable counterflashing, fabricated of same metal and finish as equipment support.

2.3 THERMALLY BROKEN ROOF HATCH WITH INTEGRAL CURB

A. Manufacturer:

1. Basis-of-Design Manufacturer: The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-535-1582, Web: www.bilco.com.
2. Subject to compliance with requirements, other acceptable manufacturers offering acceptable products are:

    a. Acudor Products, Inc.

    a. Nystrom Building Products.

    b. Precision Ladder, LLC

B. Basis of design product: Bilco Type L-50TB

1. Size width: 30" (762mm) x length: 96" (2438mm). Length denotes hinge side. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.
2. Performance characteristics:

    a. Cover and curb shall be thermally broken to prevent heat transfer between interior and exterior surfaces.
    b. Cover shall be reinforced to support a minimum live load of 40 psf with a maximum deflection of 1/150th of the span or 20 psf wind uplift.
    c. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
    d. Operation of the cover shall not be affected by temperature.
    e. Entire hatch shall be weather-tight with fully welded corner joints on cover and curb.

3. Cover: Shall be 11-gauge (2.3mm) aluminum with a 5” (127mm) beaded flange with formed reinforcing members. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
4. Cover insulation: Shall be 3” (75mm) thick polyisocyanurate with an R-value = 20.3 (U=0.279 W/m^2K), fully covered and protected by an 18-gauge (1mm) aluminum liner.
5. Curb: Shall be 12” (305mm) in height and of 11-gauge (2.3mm) aluminum. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. The curb shall be formed with a 5-1/2” (140mm) flange with 7/16” (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, including stamped tabs, 6” (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place
6. Curb insulation: Shall be 3” (75mm) thick polyisocyanurate with an R-value = 20.3 (U=0.279 W/m^2K).
7. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.
8. Hardware

    a. Heavy stainless steel pintle hinges shall be provided
    b. Cover shall be equipped with an enclosed two-point spring latch with interior and exterior turn handles

c. Roof hatch shall be equipped with interior and exterior padlock hasps.
d. The latch strike shall be a stamped component bolted to the curb assembly.
e. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" diameter red vinyl grip handle to permit easy release for closing.
f. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed.
g. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.

C. Examine rough opening in roof for opening size and squareness.

3.2 INSTALLATION

A. Install products in strict accordance with manufacturer's instructions and approved submittals.

1. Locate units level, plumb, and in proper alignment with adjacent work.
2. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation
3. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.
4. Install roof accessories to fit substrates and to result in watertight performance.
5. Test units for proper function and adjust until proper operation is achieved.
6. Repair finishes damaged during installation.
7. Restore finishes so no evidence remains of corrective work.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum or stainless-steel roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
3. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.

3.3 ADJUSTING AND CLEANING

A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF SECTION 077200

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in fire-resistance-rated horizontal assemblies.
3. Penetrations in smoke barriers.

B. Related Sections include the following:

1. Section 072100 - Building Insulation for safing insulation and accessories.
2. Section 079000 - Joint Sealants for fire resistive joint sealants.
3. Division 21 Sections specifying fire suppression system penetrations
4. Division 22 Sections specifying plumbing penetrations.
5. Division 23 Sections specifying HVAC piping and ductwork penetrations.
6. Division 16 Sections specifying cable and conduit penetrations.

1.3 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between, fire rated wall and floor assemblies

1.4 SYSTEM DESCRIPTION

A. Only tested firestop systems shall be used in specific locations as follows:

1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways, and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
2. Safing slot gaps between edge of floor slabs and curtain walls.
3. Openings between structurally separate sections of wall or floors.
4. Gaps between the top of walls and ceilings or roof assemblies.
5. Expansion joints in walls and floors
6. Openings and penetrations in fire-rated partitions or walls containing fire doors.
7. Openings around structural members which penetrate floors or walls.

1.5 REFERENCES

A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops".

B. Test Requirements: UL 1479, “Fire Tests of Through-Penetration Firestops”

C. Test Requirements: UL 2079, “Tests for Fire Resistance of Building Joint Systems”

D. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:

a. Firestop Devices (XHJI)
b. Fire Resistance Ratings (BXRH)
c. Through-Penetration Firestop Systems (XHEZ)
d. Fill, Voids, or Cavity Material (XHHW)
e. Forming Materials (XHKU)
f. Joint Systems (XHBN)
g. Perimeter Fire Containment Systems (XHDG)
h. Continuity Head-of-Wall Joint Systems (XHBO)
i. Wall Opening Protective Materials (CLIV)

2. Alternate Systems: “Omega Point Laboratories Directory” (updated annually).

E. Test Requirements: ASTM E 1966, “Standard Test Method for Fire Resistive Joint Systems”

F. Test Requirements: ASTM E 2307, “Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus”

G. Inspection Requirements: ASTM E 2174, “Standard Practice for On-site Inspection of Installed Fire Stops”

H. ASTM E 84, “Standard Test Method for Surface Burning Characteristics of Building Materials”

I. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

J. NFPA 101 - Life Safety Code

K. NFPA 70 - National Electric Code

1.6 SUBMITTALS

A. Product Data: For each type of product indicated, submit data on product characteristics, performance, and limitation criteria.

B. Design Data: Provide a schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer's engineering judgment identification number and document details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor’s name who will install firestop system as described in document.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer’s products per specified requirements. A supplier’s willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1. Installation Responsibility: assign installation of through-penetration firestop system and fire-resistive joint systems in Project to a single sole source firestop specialty contractor.

B. Provide firestopping systems that comply with the following requirements and those specified in “Performance Criteria” Article:

1. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

2. Firestopping products bear classification marking of qualified testing and inspection agency.

C. Firestop System installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

D. Proposed fire stop materials and methods shall conform to applicable governing codes having local jurisdiction.

E. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

F. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at jobsite.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

C. Do not use materials that contain flammable solvents.

1.10 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 PENETRATION FIRESTOPPING

A. Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, those systems indicated in the Through-Penetration Firestop System Schedule at the end of Part 3.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. A/D Fire Protection Systems Inc.
2. Dow Corning Group
3. Hilti, Inc.
4. Nelson Firestop Products.
5. RectorSeal Corporation.
6. Specified Technologies Inc.
7. 3M; Fire Protection Products
8. Tremco, Inc; Tremco Fire Protection Systems Group.

2.2 FIRESTOPPING, GENERAL

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Provide penetration firestopping materials that are compatible with one another, substrates, and penetrating items if any.

B. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience

C. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

D. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

E. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls, and fire partitions.

2. F-Rating at Fire-Resistance-Rated Walls: Not less than that of construction penetrated.

F. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. Horizontal assemblies include floors, floor/ceiling assemblies.

2. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.

3. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated

G. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479 or ASTM E 814.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30-inch wg (74.7 Pa) at both ambient and elevated temperatures.

H. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.

I. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

J. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion, and other normal building movement without damage to the seal.

K. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.

L. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur. Such devices shall be:

1. Capable of retrofit around existing cables
2. Designed such that two or more devices can be ganged together
3. Maintenance free such that no action is required to activate the smoke and fire sealing mechanism

M. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.
4. Follow more stringent local, regional, state, and federal requirements where applicable

N. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency.

1. Permanent forming/damming/backing materials, including the following:

a. Slag-wool-fiber or rock-wool-fiber insulation.
b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
c. Fire-rated form board.
d. Fillers for sealants.

2. Temporary forming materials.

3. Substrate primers.
4. Provide T-Rating Collar Devices tested in accordance with ASTM E814 or ANSI/UL1479 for metallic pipe penetrations requiring T-Ratings per the applicable building code.
5. Steel sleeves.

2.3 MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material capable of expanding a minimum 30 times, sized to fit specific diameter of penetrant.

C. Fire-Rated T Rating Collar Device: Louvered steel collar system with synthetic aluminized polymer coolant wrap installed on metallic pipes where T Ratings are required by applicable building code requirements.

D. Fire Rated Cable Pathways: Gangable device modules capable of being retrofitted around existing cables and comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill and requiring no additional action in the form of plugs, twisting closure, putty, pillow, or sealant to achieve fire and leakage ratings.

E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

G. Intumescent Wrap Strips: Single component intumescent elastomeric strips faced on both sides with a plastic film and capable of expanding a minimum 30 times.

H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

K. Intumescent Sealants: Single component intumescent latex formulations containing no water-soluble intumescent ingredients capable of expanding a minimum 8 times.

L. Endothermic Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture.

M. Elastomeric Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture and accommodate minimum ±25 percent movement.

N. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.3 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.

1. Verify penetrations are properly sized and in suitable condition for application of materials.

2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.

3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping

5. Proceed with installation only after unsatisfactory conditions have been corrected

3.2 PREPARATION

A. Coordinate construction of openings, penetrations, and construction joints to ensure that the fire stop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

C. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form-release agents from concrete.

D. Priming: Prime substrates where recommended in writing by manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

E. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping’s seal with substrates

3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping

C. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.

2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

D. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Designation of applicable testing and inspecting agency.
3. Manufacturer's name.
4. Installer's name.

3.4 PENETRATION FIRESTOPPING SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Firestopping with No Penetrating Items

1. UL-Classified Systems: C-BJ-, C-BK-, F-A-, F-B-, F-C-, F-E-, W-J-, W-K-, W-L-, and W-N-10011999.
2. Type of Fill Materials: As required to achieve rating:

C. Firestopping for Metallic Pipes, Conduit, or Tubing

1. UL-Classified Systems: C-BJ-, C-BK-, F-A-, F-B-, F-C-, F-E-, W-J-, W-K-, W-L-, and W-N-10011999.
2. Type of Fill Materials: As required to achieve rating

D. Firestopping for Nonmetallic Pipe, Conduit, or Tubing

1. UL-Classified Systems: C-AJ-, C-BJ-, C-BK-, F-A-, F-B-, F-C-, F-E-, W-J-, W-K-, W-L-, and WN-2001-2999.
2. Type of Fill Materials: As required to achieve rating:

E. Firestopping for Electrical Cables

1. UL-Classified Systems: C-AJ-, C-BJ-, C-BK-, F-A-, F-B-, F-C-, F-E-, W-J-, W-K-, W-L-, and WN-3001-3999.
2. Type of Fill Materials: As required to achieve rating.

F. Firestopping for Cable Trays with Electric Cables

1. UL-Classified Systems: C-AJ-, C-BJ-, F-A-, F-B-, F-C-, W-J-, W-K-, and W-L-4001-4999.
2. Type of Fill Materials: As required to achieve rating

G. Firestopping for Insulated Pipes

1. UL-Classified Systems: C-AJ-, C-BJ-, C-BK-, F-A-, F-B-, F-C-, F-E-, W-J-, W-K-, W-L-, and WN-5001-5999.
2. Type of Fill Materials: As required to achieve rating.

H. Firestopping for Miscellaneous Electrical Penetrants

1. UL-Classified Systems: C-AJ-, C-BJ-, F-A-, W-L-, and W-J-6001-6999.
2. Type of Fill Materials: As required to achieve rating.

I. Firestopping for Miscellaneous Mechanical Penetrants

1. UL-Classified Systems: C-AJ-, C-BJ-, F-A-, F-B-, F-C-, F-E-, W-J-, W-L-, and W-N-7001-7999.
2. Type of Fill Materials: As required to achieve rating

J. Firestopping for Groupings of Penetrants

1. UL-Classified Systems: C-AJ-, C-BJ-, F-A-, F-B-, F-C-, F-E-, W-J-, and W-L-8001-8999.
2. Type of Fill Materials: As required to achieve rating

END OF SECTION 078413

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SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Preparing substrate surfaces to receive joint sealers and joint backing materials.
2. Exterior and interior joint sealers as indicated on Drawings and specified herein, including joint backing material and accessories.

B. Related Sections include the following:

1. Section 078413 Penetration Firestopping: for fire rated sealants for use at penetrations and openings in fire-rated assemblies.
2. Section 088000 Glazing: for glazing sealants.
3. Section 099290 Gypsum Board Assemblies: for sealing perimeter joints of gypsum board partitions to reduce sound transmission.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements:

1. Use joint sealers to establish and maintain waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging indicated for each application.
2. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer’s data indicating joint sealer chemical characteristics, performance criteria, substrate preparation, limitations, and color availability for each joint sealer product required, including instructions for joint preparation and joint sealer application.

B. Samples:

1. Initial Selection Purposes: For each product exposed to view, manufacturer's standard bead Samples consisting of strips of actual products showing full range of colors available.
2. Verification: 2 sets of each type and color of joint sealer required. Install joint sealer Samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealers.

C. Compatibility and Adhesion Test Reports: from elastomeric joint sealer manufacturer indicating that materials forming joint substrates and joint sealer backings have been tested for compatibility and adhesion with joint sealer. Include joint sealer manufacturer's interpretation of test results relative to joint sealer performance and recommendations for primers and substrate preparation needed to obtain adhesion.

D. Product test reports for each type of joint sealers indicated, evidencing compliance with requirements specified.

1.5 QUALITY ASSURANCE

A. Comply with the recommendations of ASTM C 1193 “Standard Guide for the Use of Joint Sealants”.

B. Installer Qualifications: Installer who has 5 years experience specializing in installing joint sealer applications similar in type and size to that of this Project.

C. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

D. Product Testing: Provide comprehensive test data for each type of joint sealer based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal or test results to Architect.

1. Test elastomeric joint sealer for compliance with requirements specified by reference to ASTM C920. Include test results for hardness, stain resistance, adhesion, and cohesion under cyclic movement (per ASTM C719), low-temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging, and effects of accelerated weathering.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original unopened containers of bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and, for multi-component materials, mixing instructions.

B. Store and handle materials per manufacturers' recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

C. Immediately remove damaged or otherwise unsuitable materials from job site and replace with new material at no additional cost to Owner.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealers and/or primers under the following conditions:

1. When ambient and substrate temperature conditions are 40 degrees F or below.

2. When joint substrates are wet due to rain, frost, condensation, or other causes.

B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates. Concrete and masonry surfaces to receive sealant are to be primed after other preparations are completed. The primer shall be as recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 MANUFACTURER

A. Joint Sealers:

1. Basis of Design: Design is based on products of Tremco, Beachwood, OH www.tremcosealants.com, unless noted otherwise.
2. Subject to compliance with requirements, provide named product or comparable product by one of the following:
   a. Bostic, Inc.
   b. Pecora Corporation
   c. Sika Corporation
   d. Sonneborn by Degussa ChemRex
   e. W.R.Meadows, Inc.
   f. USG

2.3 JOINT SEALANTS

A. Low-Emitting Materials: Sealants shall comply with the following limits for VOC content:

1. Architectural Sealants: 250 g/L.
2. Other Sealants: 420 g/L.
3. Sealant Primers for Nonporous Substrates: 250 g/L.
4. Sealant Primers for Porous Substrates: 775 g/L.
5. Modified Bituminous Sealant Primers: 500 g/L.

6. Other Sealant Primers: 750 g/L.

B. Low-Emitting Materials:

1. Exterior reactive sealants shall have a VOC content of not more than 50 g/L or 4 percent by weight, whichever is greater.

2. Other exterior caulks and sealants shall have a VOC content of not more than 30 g/L or 2 percent by weight, whichever is greater.

3. Interior sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.

D. Sealant for Aluminum sheet metal, glass, glazing and aluminum frame joints:

1. Neutral cure, one-part, high performance, medium modulus, silicone sealant, meeting ASTM C920, types M, Grade NS, Class 50

2. Non-staining to porous surfaces per ASTM C1248

3. Product:

a. Sprectrum 2 by Tremco

E. [For use with MN State Curtain Wall Projects] Silicone Glazing and Curtain Wall Sealant: FS TT-S-00227E; ASTM C920, Type M, Grade NS; neutral, multiple component silicone glazing and curtain wall adhesive/joint sealer, high modulus, non-sag, gun-grade.

1. Use for glazing and anodized aluminum curtain wall adhesive/joint sealer.

2. Colors: Selected by Architect from manufacturer’s standard colors.

3. Products: As recommended by curtain wall manufacturer

F. Sealant for General Exterior Use Where Another Type Is Not Specified:

1. Single component epoxidized polyurethane polymer, meeting ASTM C920, Type S, Grade NS, Class 25.

2. Product:

a. Dymonic 100 by Tremco

G. [For exterior use on MN State Projects] Polyurethane Sealant: ASTM C920, Type M, Grade NS, Class 25; Use M., non-sag, medium-modulus, chemical curing, non-staining, multi-component polyurethane joint sealer.

1. Use for exterior joints exposed to view where normal movement is anticipated, such as masonry control joints, window and door perimeters, louvers, relief angles, slip joints, copings, joints in wall sheathing, etc.

2. Depth: maximum-1/2”, minimum-1/4”

3. Width: maximum – 2”

4. Movement: Plus or minus 25 percent.

5. Colors: Selected by Architect from manufacturer’s standard colors.

6. Products:

a. Tremco: Dymeric 240FC.

H. Paintable Latex Sealant for Interior Use:

1. Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade -18 °C.

2. Tremflex 834 White by Tremco

I. Acoustical Sealant

1. Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission as demonstrated by testing according to ASTM E 90.

a. USG Sheetrock Brand Acoustical Sealant.

J. Fire-Resistant Sealant:

1. Sealants used at penetrations of fire-rated walls and ceiling assemblies shall be UL listed as meeting UL 1479

a. Flame Spread ASTM E-84 15
b. Smoke Develop ASTM E-84 0
c. TremStop Acrylic by Tremco

K. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and around Plumbing Fixtures:

1. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use NT; formulated with fungicide.

2. Tremsil 200 by Tremco

2.4 MISCELLANEOUS MATERIALS

A. Joint Cleaner: Non-corrosive and non-staining type, as recommended by joint sealer manufacturer; compatible with joint forming materials.

B. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints

C. Provide sealant backings of materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

D. Joint Backer Rod: ASTM C 1330, Type B, Non-oily, non-gassing, non-absorbent, non-staining polyolefin foam with a bi-cellular structure and/or acceptable material as recommended or accepted by the sealant manufacturer. Provide backer rod of size required for joint design. No substitutions.

1. Construction Foam Products, Inc.: Sofrod

2. Industrial Thermo Polymer.: ITP Soft Type Backer Rod 104

3. Sonneborn: Sonolastic Soft Backer Rod

E. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

F. Primer: Non-staining type, recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joints sealer manufacturers and the following requirements:

1. Remove foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust, old joint sealers, oil, grease, waterproofing, water repellents, water, surface dirt, frost, and paints, except for permanent, protective coatings tested and approved for joint sealer adhesion and compatibility by joint sealer manufacturer.

2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrates, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods, to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particle remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form release agents from concrete.

4. Clean metal, glass, porcelain enamel, glazed surfaces, or ceramic tile and other nonporous surfaces by chemical cleaners or other means that are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on pre-construction joint sealer-substrate tests or prior experience. All concrete and masonry exterior joints to receive sealant shall be primed after other preparations are completed. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond. Do not allow spillage or migration onto adjoining surfaces.

C. Masking tape: Use masking tape where required to prevent contact of joint sealer with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove joint sealer smears. Remove tape immediately after tooling without disturbing joint seal.

D. Back-Up Material:

1. Verify compatibility of back-up material with joint sealer before installation.

2. Use back-up material 25 percent wider than width of joint to provide substantial resistance to displacement.

E. Release Agent: Apply release agent or bond breaker strip to joint to be sealed on top of back-up material to prevent adhesion of joint sealer to back-up material per manufacturer’s recommendations.

3.3 INSTALLATION

A. General: Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply. All of construction document Section 079200 shall have written approval(s) by the joint sealant

manufacturer(s) and written approval(s) be received by the A/E for approval(s) prior to start of sealant work.

B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C962 for use of joint sealer as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Solvent-Release-Curing Sealant Installation Standard: Comply with requirements of ASTM C804 for use of solvent-release-curing joint sealer.

E. Installation of Sealant Backings: Install joint sealer backings to comply with the following requirements:

1. Install joint-fillers of type indicated to provide support of joint sealer during application and at position required to produce cross-sectional shapes and depths of installed joint sealer relative to joint widths which allow optimum joint sealer movement capability

   a. Do not leave gaps between ends of joint fillers.
   b. Do not stretch, twist, puncture, or tear joint fillers.
   c. Remove absorbent joint-fillers that have become wet prior to joint sealer application and replace with dry material.

2. Install bond breaker tape between joint sealer and joint fillers, compression seals, or back of joints where adhesion of joint sealer to surfaces at back of joints would result in joint sealer failure.

F. Installation of Joint Sealer: Install joint sealer by proven techniques that result in joint sealer directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum joint sealer movement capability.

G. Tooling of Non-Sag Sealant: Immediately after joint sealer application and prior to time skinning or curing begins, tool joint sealer to form smooth, uniform beads of concave configuration, to eliminate air pockets, and to ensure contact and adhesion of joint sealer with sides of joint.

1. Remove excess joint sealer from surfaces adjacent to joint.

2. Do not use tooling agents that discolor joint sealer or adjacent surfaces or are not approved by joint sealer manufacturer.

3. Provide concave joint configuration per Figure 6A in ASTM C962, unless otherwise indicated.

3.4 CLEANING

A. Clean off excess joint sealer or joint sealer smears adjacent to joints as Work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealer immediately

and reseal joints with new materials to produce joint sealer with repaired areas indistinguishable from original Work.

END OF SECTION 079200

SECTION 079500 - EXPANSION JOINT ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Exterior architectural expansion joint systems.
2. Exterior architectural expansion joint system

B. Related Sections include the following:

1. Section 033000 – “Cast-In-Place Concrete” for cast-in architectural-joint-system frames furnished, but not installed, in this Section.
2. Division 04 Section "Unit Masonry" for masonry wall joint systems.
3. Section 076200 - Section "Sheet Metal Flashing and Trim" for sheet metal wall joint systems.
4. Section 079000 - “Joint Sealants” for liquid-applied joint sealants.

1.3 DEFINITIONS

A. Nominal Joint Width: The width of the linear opening specified in practice and in which the joint system is installed

B. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.

C. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.

D. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage (plus or minus) of nominal value of joint width.

E. Lateral Shear: Movement horizontally and parallel to the expansion joint

F. Vertical Shear: Movement vertically and parallel to the expansion joint

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM B221, “Standard Specifications for Aluminum and Aluminum-Alloy Extrusions.”
2. ASTM B209, “Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
3. ASTM E1399 “Cyclic Movement and Measuring of Minimum/Maximum Joint Widths of Architectural Joint Systems.”
4. ANSI/U.L. No. 263, UL2079 and ULCS115 Fire Rated Testing including hose stream test at full rated period. Underwriter’s Laboratories shall classify adjacent substrate assemblies.
5. ASTM E1612, Standard Specification for Preformed Architectural Compression Seals for Buildings and Parking Structures.
6. EN 1366-4 and BS 476 part 20 compliant fire rated linear expansion joints

1.5 SYSTEM DESCRIPTION

A. Joint systems shall permit daily thermal expansion and contraction of building elements, minor foundation settlement, and common wind-sway movements of the structure without disengagement.

1. Joint system details shall clearly indicate X-axis joint movement capabilities (horizontal contraction/ expansion). Y-axis joint movement (in-plane shear), and Z-axis movement (vertical shear) may be requested of the Manufacturer if applicable.

2. Movement capabilities shall be clearly defined as a percentage of the nominal joint width or with distinct dimensions defined on product details.

B. Fire Rated Assemblies shall be tested by registered Third Party Testing Agencies in accordance with UL2079, ULC S115, or BS 476 classified systems. Expansion joint assembly fire rating shall match or exceed the fire rating of adjacent construction

1.6 SUBMITTALS

A. Shop Drawings: Provide the following for each joint system specified:

1. Placement Drawings: Include line diagrams showing plans, elevations, sections, details, splices, block out requirement, entire route of each joint system, and attachments to other work. Where joint systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

B. Architectural Joint System Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each joint system.

2. Joint system location cross-referenced to Drawings.

3. Nominal joint width.

4. Movement capability.

5. Classification as thermal or seismic.

6. Materials, colors, and finishes.

7. Product options

8. Fire-resistance ratings

C. Samples for Initial Selection: For each type of joint system indicated.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for current products.

E. Listings/ Certifications of all Fire Rated Assemblies secured through Registered Third-Party Testing Agency.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain architectural joint systems through one source from a single manufacturer.

C. Fire Rated Assembly Manufacturer: Furnish horizontal and vertical rated systems from a single Manufacturer to ensure compatibility. Intersection of/ or transition between dissimilar systems is not allowed unless reviewed and approved by AHJ.

D. Fire-Test-Response Characteristics: Where indicated, provide architectural joint system and fire-barrier assemblies identical to those of assemblies tested for fire resistance per UL 2079 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies shall be subjected to hose stream testing

E. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Refer to Division 01 Section "Product Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

F. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines ADAAG" and ICC A117.1.

1.8 DELIVERY AND STORAGE

A. Manufacturer to provide protective film on all exposed cover plate components.

B. Deliver joint systems to jobsite in new, clean, unopened cartons or crates of sufficient size and strength to protect materials during transit.

C. Inspect materials upon arrival. Store components in original containers in a clean, dry location. Ensure temperature or moisture sensitive components are stored in a tempered location.

D. Contractor to provide temporary protective covers on all installed finished surfaces. Protection is required to guard against both surface abrasions as well as overloading of horizontal deck components by construction traffic

1.9 COORDINATION

A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful and proper installation.

B. Coordinate installation of exterior wall joint systems with roof expansion assemblies to ensure that wall transitions are watertight.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL JOINT SYSTEMS, GENERAL

A. General: Provide architectural joint systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where joint changes direction or abuts other materials.
2. Include factory-fabricated closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.

B. Design architectural joint systems for the following size and movement characteristics:

1. Nominal Joint Width: As indicated on Drawings
2. Movement Capability: Plus or minus 50 percent

2.2 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements, provide the products specified in individual subparagraphs below as basis-of-design products or a comparable product by one of the following:

1. Balco, Inc.
2. Construction Specialties, Inc.
3. InPro Corporation.
4. MM Systems Corporation.
5. Nystrom, Inc

2.3 MATERIALS

A. Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
2. Floor systems: Mill finish standard
3. Interior Walls and Ceilings: Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
4. Exterior Wall and roofs: AA-M10

B. Stainless Steel: ASTM A 666, Type 304 for plates, sheet, and strips.

1. Remove tool and die marks and stretch lines or blend into finish.
2. Brushed #4 surface finish standard

C. Elastomeric Seals: Preformed elastomeric membranes or extrusions to be installed in metal frames.

D. Compression Seals: ASTM E 1612; preformed rectangular elastomeric extrusions having internal baffle system and designed to function under compression.

E. Strip Seals: ASTM E 1783; preformed elastomeric membrane or tubular extrusions having an internal baffle system and secured in or over a joint by a metal locking rail.

F. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.

G. PVC Vinyl: 90 Shore A, ASTM D2240

H. Silicone: ASTM D 2000 4GE 709 M

I. Santoprene

1. 75 shore A durometer, 15 sec, ISO 868
2. Face seals to be installed in exterior conditions shall be UV resistant.

J. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required rating period.

K. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.4 ARCHITECTURAL JOINT SYSTEMS, GENERAL

A. General: Provide architectural joint systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where joint changes direction or abuts other materials.
2. Include factory-fabricated closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.

2.5 EXTERIOR JOINT COMPRESSION SEAL SYSTEMS

A. Joint Compression Seal Systems at exterior walls: masonry to existing masonry, aluminum to existing masonry: exterior soffits, EIFS to existing masonry wall:

1. Basis-of-Design Product: Nystrom Building Products, “EJ-SAN” Series Santoprene, horizontal and vertical systems.
2. Type: Thermoplastic rubber compound compression seal.
   a. The grade of thermoplastic rubber material shall be UV and ozone resistant
   b. Color to be selected from manufacturer’s full line of standard colors
   c. Sizes as indicated on Drawings or as required by as-built joint sizes.

2.6 INTERIOR FLOOR JOINT SYSTEM

A. Single Seal joint systems; Manufacturer Basis of Design: InPro 106 Series – Surface Mounted

1. Recessed and Surface Mount systems
2. Joint range applications 1-3” [25-75mm]
3. Joint operating range 25%+- of total nominal joint width\
4. New and existing construction applications
5. Santoprene Seal traits:
   a. Dual durometer extruded Santoprene with Shore Hardnesses of 60
   b. Shore A and 40 Shore D to ensure longevity of installation. Single durometer seals shall not be allowed.
   c. Flat seal must maintain inherent dimensional stability and include structural spine inserts (where applicable) allowing for additional load resistance.
6. Frames adaptable to multiple floor finishes.

2.7 ACCESSORIES

A. Fasteners, lubricant adhesive, accessories, and other materials required for complete installation in accordance with the manufacturer’s installation instructions.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

2.9 FABRICATION

A. Field assemble components provided in standard lengths with pre-packaged fasteners and accessories whenever possible.

B. Fabricate special transitions and corner fittings as required. Miter and heat weld elastomeric seals for monolithic splices and transitions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, verify that structural gap and block-out dimensions are in conformance with manufacturer's submittal data. Do not begin work until all unsatisfactory substrate conditions are resolved. See manufacturer for recommended tolerances.

B. Carefully inspect installed work of other Trades and verify that such work is complete to allow the work of this section to commence.

3.2 PREPARATION

A. Prepare substrates according to architectural joint system manufacturer's written instructions.

B. Repair concrete slabs and blockouts using manufacturer's recommended repair grout of compressive strength adequate for anticipated structural loadings.

C. Coordinate and furnish setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

D. Cast-In Frames: Coordinate and furnish frames to be cast into concrete.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing architectural joint assemblies and materials unless more stringent requirements are indicated.

B. Coordinate with work of other Sections.

C. Align work plumb, level and flush with adjacent surfaces. Mechanically anchor to substrate. Allowances should be made where actual structural gap at time of installation varies from nominal design gap. No shimming of frames is permitted.

D. If concrete blockouts (rebates) are required, ensure continuous support equal to surrounding substrate structural values.

E. Metal Frames: Perform cutting, drilling, and fitting required to install joint systems.

1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.

2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper joint installation and performance.

3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.

4. Locate in continuous contact with adjacent surfaces.

5. Standard-Duty Systems: Shim to level where required. Support underside of frames continuously to prevent vertical deflection when in service.

6. Heavy-Duty Systems: Repair or grout blockout as required for continuous frame support and to bring frame to proper level. Shimming is not allowed.

7. Locate anchors at interval recommended by manufacturer, but not less than 3 inches (75 mm) from each end and not more than 24 inches (600 mm) o.c.

F. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.

2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field spliced joints as recommended by manufacturer.

3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure sensitive tape as recommended by manufacturer.

G. Compression Seals:

1. Apply adhesive or lubricant adhesive as recommended by manufacturer to both frame interfaces before installing compression seals.

2. Seals shall be cut to length on jobsite where required. Miter cut in the field to conform to directional changes utilizing adhesives and primer as recommended by expansion joint manufacturer.

H. Foam Seals: Install with adhesive recommended by manufacturer.

I. Epoxy-Bonded Seals: Pressurize seal for the time period and to pressure recommended by manufacturer. Do not over pressurize.

J. Terminate exposed ends of joint assemblies with field- or factory-fabricated termination devices.

K. Fire-Resistance-Rated Assemblies: Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

L. Water Barrier: Provide water barrier at exterior joints and where called for on Drawings. Provide drainage fittings where indicated

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete.

B. Clean all exposed surfaces with a cleaner as recommended by the Manufacturer of the expansion joint assembly.

C. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of the Work.

D. Protect from environmental factors required throughout installation process until Project Closeout. Protection includes but is not limited to rain events, moisture protection, exposure to temperature fluctuations or direct sunlight for temperature sensitive product offerings.

END OF SECTION

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SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames.
2. Fire-rated hollow metal doors and frames.
3. Exterior insulated hollow metal doors.
4. FEMA package doors and frames for tornado shelters.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
3. Division 09 Section "Painting" for field painting hollow metal frames.
4. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.3 SUBMITTALS

A. Preparation of submittals and shop drawings shall be started immediately following the Contract Notice to Proceed to ensure early frame delivery. Shop drawing door and frame numbers shall be numbered the same as on the Drawings and Door Schedule.

B. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing

D. Door hardware supplier shall furnish templates, template reference number and/or physical hardware to the steel door and frame supplier to prepare the doors and frames to receive the finish hardware items.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames"

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled per ASTM E152 "Standard Methods of Fire Tests of Door Assemblies" by a qualified testing agency, for fire-protection ratings indicated.

1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated.

E. Smoke-Control Door Assemblies: Comply with NFPA 105.

1. Smoke "S" Label: Doors to bear “S” label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions

C. Inspect hollow metal Work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new Work and are acceptable to Architect; otherwise, remove damaged items and replace with new materials

D. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS (Confirm ICC 500 vs regular).

A. Manufacturers: Subject to compliance with requirements, available products from the listed Manufacturers that may be incorporated into the Work include the following, or other approved equal:

1. CECO Door Products; an Assa Abloy Group company.
2. Curries Company; an Assa Abloy Group company.
3. Steelcraft; an Allegion company.
4. West Central Manufacturing.
5. Other approved manufacturer meeting all requirements of this Section.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 metallic coating.

D. Frame Anchors: ASTM A 879/A 879M, 4Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot dip galvanized according to ASTM A 153/A 153M.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Division 08 Section "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. Design: Type and size indicated on Door Schedule.

C. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.

1. Fire Door Core: As required to provide fire-protection ratings indicated.

2. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 14.

   a. Locations: Exterior doors and interior doors where indicated.

3. Vertical Edges for Single-Acting Doors:

   a. Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled, and dressed smooth. Beveled Edge, 1/8 inch in 2 inches (3 mm in 50 mm).

4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gage, extending the full width of the door and welded to the face sheet.

   a. All exterior doors or partial height interior doors where the top of the door is visible at eye height which have an inverted top channel to include a steel closure top plate welded in place with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

D. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.

E. Exterior Doors: Face sheets fabricated from commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Constructed from a steel sheet of a minimum thickness of 14 gauge.

2. Level 4 and Physical Performance Level A (Maximum Duty), Model 1 (Full Flush).

F. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Typical:

   a. Constructed from a steel sheet of a minimum thickness of 18 gauge.
   b. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush).

2. High abuse locations (at locations as noted on Opening Schedule in Drawings):

   a. Constructed from a steel sheet of a minimum thickness of 14 gauge.
   b. Level 4 and Physical Performance Level A (Maximum Duty), Model 1 (Full Flush).

G. Hinge Reinforcement: Minimum 7 gage (3/16") plate 1-1/4" x 9" or minimum 14 gage continuous channel with pierced holes, drilled and tapped.

H. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets. Both door models in subparagraph below are available in 1-3/4-inch (44.5-mm) thickness and have 0.067-inch- (1.7-mm-) thick faces.

I. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Frames: ANSI A250.8; conceal fastenings unless otherwise indicated.

1. Steel Sheet for Interior Frames: 0.063-inch, 16-gauge minimum thickness.

2. Steel Sheet for Exterior Frames: 0.079-inch, 14-gauge minimum thickness.
3. Double rabbet frame face profile as indicated on Drawings, unless noted otherwise.
4. Fabricate frames with mitered or coped corners.
5. Frame Construction: Full profile welded.
6. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.
7. Frame Anchors: Not less than 0.042 inch (1.0 mm) thick.
8. Mullions and Transom Bars: Join to adjacent members by welding.

C. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

D. Glazing Stops: Non-removable stops on outside of exterior doors and on secure side of interior doors; screw-applied, removable, glazing stops on inside, fabricated from same material as door face sheet in which they are installed.

E. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

F. Door Silencers: Except on weather-stripped or gasketed doors provide three on strike jambs of single-door frames and two on heads of double-door frames.

G. Prepare doors and frames to receive mortised and concealed hardware according to SDI A250.6 and BHMA A156.115.

1. Mortise, reinforce, drill, and tap frames at the factory for fully template mortised hardware only, per approved hardware schedule and templates provided by the hardware supplier.

H. Reinforce doors and frames to receive surface-applied hardware.

I. Prime Finish: Manufacturer's standard, factory-applied coat of lead- and chromate-free primer complying with SDI A250.10 acceptance criteria.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.6 STOPS AND MOLDINGS

A. Provide removeable moldings on doors and frames on the secure side of the door or frame.

B. Moldings for Glazed Lites in Doors: Minimum 0.032-inch-thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.

D. Loose Stops for Glazed Lites in Frames: Minimum 0.032-inch-thick, fabricated from same material as frames in which they are installed

E. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

F. Prime Finish: Manufacturer's standard, factory-applied coat of lead- and chromate-free primer complying with SDI A250.10 acceptance criteria.

2.7 FRAME ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.8 FEMA PACKAGE DOORS AND FRAMES FOR TORNADO SHELTERS.

A. Basis of Design Product: Paladin Series door system, PW14 Paladin Series door with FP14 Paladin Series frame.

1. Subject to compliance with requirements and approval by Architect, other manufacturers may supply similar products provided they comply with all the performance requirements of this specification and submit evidence thereof.

B. Door system shall be specifically designed and tested to conform to the Federal Emergency Management Agency (FEMA) 320 and 361 guidelines and ANSI ICC500 standards providing security and safety for tornado shelters and severe storm areas of refuge.

1. Manufacturer shall provide independent laboratory testing results certifying conformance with these standards.

2. The Authority Having Jurisdiction shall be the final authority in issues related to the installation and use of these products.

C. Door:

1. Door construction shall meet the requirements of ANSI A250.8-2014 (SDI 100).

2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115.

3. Provide ICC500-2014 / FEMA COMPLIANCE LABEL.

4. Material Gauge: 14 Gauge [0.067" (1.7 mm)] for Extra Heavy Commercial and Institutional applications with extremely high use.

5. Steel Stiffened core construction with stiffeners welded to one face sheet and attached with epoxy to the opposite face sheet

6. Full Height, Epoxy Filled Mechanical Interlock Edges at lock and hinge edges with edge seams welded, filled, and dressed smooth.

7. Full Height Lock Side Reinforcement Channel

8. 14 Gauge (0.067") Inverted Top and Bottom Channels with additional 12 Gauge (0.105") flush channel top cap

9. Beveled Hinge and Lock Edges

10. Factory Applied Baked-On Rust Inhibiting Primer paint in accordance with ANSI A250.10-2011

D. Frame:

1. Frames shall be designed to meet requirements of ICC500-2014 code, FEMA 361/320 guidelines, and ANSI compliance to protect the general public from the extreme effects of tornados.
2. Overall frame construction for frames shall meet the requirements of ANSI A250.8-2014 (SDI 100). Frames shall include the ICC500-2014 / FEMA 361/320 Label.
3. Hardware preparations and reinforcements shall be in accordance with ANSI A250.6-2003 (R2009). Locations shall be in accordance with ANSI/DHI A115.
4. Frames shall be 14 Gauge [0.067" (1.7 mm)].
5. Frames are to be factory mitered and welded. The miters shall be welded in accordance with ANSI A250.8-2014 [SDI 100].
6. Adjustable base anchors allow for installation adjustment when the floor is not level.
7. Factory prepared for field installed silencers
8. Factory applied baked on rust inhibiting.

2.9 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/NAAMM-HMMA 861.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape.
2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicted.
3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
    a. Welded frames shall be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening
2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops require wider dimensions on glass side of frame.

4. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
5. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
6. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor
7. Jamb Anchors: Provide number and spacing of anchors as follows:
    a. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
    b. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Three anchors per jamb from 60 to 90 inches high.
        2) Four anchors per jamb from 90 to 120 inches high.
8. Door Silencers: Except on weather-stripped or gasketed doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
9. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
    a. Locate hardware as indicated, or if not indicated, according to ANSI/NAAMM-HMMA 861.
    b. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
    c. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware
10. Steel Finish
    a. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
        1) Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    a. Where frames are fabricated in sections because of shipping or handling at fire-protection-rated openings, install frames according to NFPA 80
    b. limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install door silencers in frames before grouting.
    d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    e. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    f. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
2. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with Portland cement grout.
3. Concrete Walls: Solidly fill space between frames and concrete with Portland cement grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.

4. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

5. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

    a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

3. Smoke-Control Doors: Install doors according to NFPA 105

D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Install hollow metal frames to comply with SDI A250.11.

E. Install doors to provide clearances between doors and frames as indicated in SDI A250.11.

END OF SECTION

SECTION 081400 - WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.
2. Fire-rated mineral core doors with wood-veneer faces.
3. Factory machining for hardware.

B. Related Sections:

1. Section 081113 Hollow Metal Doors and Frames – for door frame for wood doors.
2. Section 087100 Door Hardware
3. Section 088000 Glazing - for glass view panels in flush wood doors.
4. Section 099000 Painting - for field finishing doors

1.3 REFERENCES

A. Architectural Woodwork Standards 2nd Edition 2014, published jointly by the Architectural Woodwork Institute (AWI), and the Woodwork Institute (WI).

B. ANSI/WDMA I.S. 1A-13 Industry Standard for Architectural Wood Flush Doors.

C. NFPA 80-13 Standard for Fire Doors and Other Opening Protectives

D. NFPA 252-12 Standard Method of Fire Tests of Door Assemblies

E. American National Standards Institute (ANSI)

1. ANSI Z97.1: Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test

1.4 SUBMITTALS

A. Product Data: For each type of door indicated. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire-protection ratings for fire-rated doors.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:

1. Finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish

E. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Comply with requirements of WDMA I.S.1 and WIC. Where conflicts occur, the more stringent shall apply.

C. Perform work to Premium Grade in accordance with the Grade requirements specified in the Architectural Woodwork Standards 2nd Edition 2014, or as herein otherwise specified

D. Source Limitations: Obtain flush wood doors from single manufacturer.

E. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252

1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

F. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784

1. Smoke Gasketing: Apply smoke gasketing around frame perimeter and between door and pairs to meet Smoke (S) rating.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Deliver materials only when the project is ready for installation and the general contractor has provided a clean storage area.

C. Package doors individually in plastic bags or cardboard cartons.

D. Mark each door on bottom rail with opening number used on Shop Drawings.

E. Accept doors on site in manufacturer’s standard packaging. Inspect for damage.

F. Storage:

1. Store doors in accordance with manufacturer’s instructions.

2. Store doors in clean, dry area indoors, protected from damage and direct sunlight.

3. Store doors flat on level surface.

4. Do not store doors directly on concrete.

5. Keep doors completely covered. Use covering which allows air circulation and does not permit light to penetrate.

6. Store doors between 50- to 90-degrees F (10 and 32 degrees C) and 30 to 50 percent relative humidity.

G. Handling:

1. Handle doors in accordance with manufacturer’s instructions.

2. Protect doors and finish during handling and installation to prevent damage.
3. Handle doors with clean hands or clean gloves.
4. Lift and carry doors. Do not drag doors across other doors or surfaces

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.8 WARRANTY

A. Flush Door Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty Period for Solid-Core Interior Doors: Life of installation

PART 2 - PRODUCTS

2.1 FLUSH WOOD DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Doormerica.
2. Graham; an Assa Abloy Group company.
3. Masonite Architectural.
4. Oshkosh Architectural Door Company.
5. VT Industries Inc.
6. Other approved manufacturers meet all requirements of this Section

2.2 DOOR CONSTRUCTION GENERAL

A. Quality Standard: WDMA I.S.1-A.

B. WDMA I.S.1-A Performance Grade:

1. Heavy duty unless otherwise indicated

C. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

D. All wood door adhesives shall be 100% waterproof.

E. Stave Lumber Core Compliance: Blocks and strips not more than 2-1/2 inches wide, one species of wood.

F. Particleboard Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-2. Urea-Formaldehyde Free.

2. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering

3. Provide doors with either glued-block or structural composite lumber cores instead of particleboard cores at locations where exit devices are indicated.

G. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges

H. Veneer-Faced Doors for Transparent Finish:

1. Grade: Premium, with Grade A faces.
2. Species: XXXXXX.
3. Cut: Plain Sliced.
4. Match between Veneer Leaves: Slip.
5. Assembly of Veneer Leaves on Door Faces: Balance.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Room Match: Provide door faces of compatible color and grain within each separate room or area of building
8. Edges for veneered doors: AWI Type A, constructed with 1” (25mm) of structural composite lumber laminated to 7/16” (11mm) of hardwood of the same species as face veneer. AWI Type B, wood veneer edges are not permitted.
9. Exposed Vertical and Top Edges: Same species as faces.
10. Transparent Finish:
    a. Grade: Premium
    b. Stain color: XXXXXX.
    c. Finish: AWI catalyzed polyurethane system
    d. Sheen: Satin.

I. Doors for Opaque Finish:

1. Grade: Premium.
2. Faces: Medium-density overlay.
    a. Apply medium-density overlay to standard-thickness, closed-grain, hardwood face veneers.
    b. Hardboard Faces: AHA A135.4, Class 1 (tempered) or Class 2 (standard).
    c. MDF Faces: ANSI A208.2, Grade 150 or 160.
3. Edges for doors for Opaque finish: AWI Type A, constructed with 1” (25mm) of structural composite lumber laminated to 7/16” (11mm) of wood of a species compatible with face veneer.
4. Shop Priming: Shop prime doors with one coat of manufacturer’s standard shop applied wood primer. Seal all four edges, edges of cutouts, and mortises with primer.
5. Opaque finish:

a. Grade: Premium.
b. Finish: AWI conversion varnish system.
c. Finish: WDMA OP-4 conversion varnish.
d. Finish: WI System 4 conversion varnish.
e. Color: As selected by Architect from manufacturer's full range.
f. Sheen: Semigloss.

J. Fire-Rated Wood Doors:

1. Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.

2. Core for 20-minute fire-rated doors: Particleboard.

3. Core for 45-minute fire-rated doors: Mineral Core or Structural Composite Lumber Core.

4. Core for 60-minute fire-rated doors and 90-minute fire rated doors: Mineral Core.

5. Stiles and rails for fire-rated wood doors: manufacturer’s standard, conforming to the requirements of the manufacturer’s labelling agency.

6. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.

7. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

2.3 GLAZING STOPS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows unless otherwise indicated.

1. Wood Species: Same species as door faces.

2. Profile: Flush rectangular beads

3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire protection rating indicated. Include concealed metal glazing clips where required for opening size and fire protection rating indicated.

2.4 FABRICATION AND FINISHING

A. Factory-fit doors to suit frame-opening sizes indicated and to comply with clearances specified.

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

B. Assemble doors using AWS Type 1 adhesive that does not contain added urea-formaldehyde resins

C. Rails for doors minimum 1-7/6 (36mm) of structural composite lumber.

D. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

E. Cut and trim openings to comply with referenced standards.

1. Cut and trim openings through doors in factory.
2. Trim light openings with moldings indicated.
3. Factory-install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."
4. Factory-install louvers in prepared openings.

F. Wood Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

G. Factory Finishing:

1. General: Comply with AWI's "Architectural Woodwork Quality Standards".
2. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   a. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
   b. All edges of wood doors shall be sealed.
3. Finish doors at factory.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected

3.2 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."

B. Install doors to comply with manufacturer's written instructions and WDMA I.S.1-A, and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
2. Install smoke- and draft-control doors according to NFPA 105.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
    a. Comply with NFPA 80 for fire-rated doors.
2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
4. Trim door height by cutting bottom edges to a maximum 3/4" (19mm).
5. Trim fire door heights at bottom edge only in accordance with fire rating requirements.
6. Do not trim fire rated door widths.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Adjust doors to swing freely, without binding in frame. Rehang or replace doors that do not swing or operate freely.

B. Adjust hardware to operate properly.

C. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

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SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Work Included:

1. Wall and Ceiling Access Panels.

B. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for blocking out openings for access doors and frames in concrete.
2. Division 04 Section "Unit Masonry" for anchoring and grouting access door frames set in masonry construction.
3. Division 09 Section "Acoustical Tile Ceilings" for suspended acoustical tile ceilings.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s product data for each type of access door and frame indicated.

1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

1.4 QUALITY ASSURANCE

A. Provide all access panels for the project by the same manufacturer.

B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 for vertical access doors and frames.
2. ASTM E 119 for horizontal access doors and frames.

C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION & RESPONSIBILITY FOR ACCESS PANELS ON SITE

A. Determine specific locations and sizes for access panels needed to gain access to concealed equipment & indicate on schedule specified under “submittals” article.

B. Access panels to gain access to equipment specified in Division 22, 23 & 26 and where panels are not shown on drawings are to be provided by the applicable subcontractor and in compliance with requirements listed in these sections.

1.6 DELIVERY, STORAGE AND HANDLING

A. Package and ship in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store indoors in a dry area out of direct sunlight in compliance to manufacturer's instructions.

C. Protect materials and finishes from damage during handling and installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or Interek - Warnock Hersey, both testing and inspecting agencies acceptable to authorities having jurisdiction:

1. Vertical Access Doors: NFPA 252 or UL 10B.
2. Horizontal Access Doors and Frames: NFPA 288.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Manufacturer:

1. Basis-of-Design Manufacturer: Cendrex, Inc, Sizes as indicated on Drawings.
2. Subject to compliance with requirements, other acceptable manufacturers offering acceptable products are:
    a. Access Panel Solutions
    b. Acudor Products, Inc.
    c. JL Industries, Inc.
    d. Milcor; Commercial Products Group of Hart & Cooley, Inc
    e. Nystrom Building Products.

B. Flush Access Doors with Exposed Flanges: (Non-Rated General-Purpose Access Doors) Prime-painted steel units.

1. Basis-of-Design Product: Cendrex; AHD, Non-Rated General-Purpose Access Doors.
2. Assembly Description: Fabricate door to fit flush to frame. Provide manufacturer's standard-width exposed flange, proportional to door size.
3. Locations: Wall and ceiling, in gypsum board.
4. Door: Powder-Coated Steel Sheet for Door, 16-gauge cold rolled steel with 90-degree 3/8-inch (9.5 mm) fold on all four sides for structural rigidity.
    a. See plan for required sizes
5. Frame Material: Standard, 1 ½" deep, 16-gauge cold rolled sheet steel with 1/4 inch (6 mm) mounting holes.
6. Hinges: Concealed cold rolled steel pin hinges (standard continuous hinges for doors over 24 inches (610 mm) in height or width, and doors with gaskets).
7. Hardware:
    a. Latch: Standard, screwdriver operated cam latch. Quantity varies with size of door.
    b. Locks: Flush to finished surface, screwdriver operated.
8. Finish: Steel finish, phosphate dipped steel with DuPont white powder coat primer.

C. Fire-Rated, Uninsulated Flush Access Doors with Exposed Flanges.

1. Basis-of-Design Product: Cendrex, Inc.; PFN Fire Rated Uninsulated Access Door.
2. Assembly Description: Fabricate door to fit flush to frame, uninsulated. Provide self-latching door with automatic closer and interior latch release. Provide manufacturer's standard-width exposed flange, proportional to door size.
3. Locations: Wall, in gypsum board.
4. Fire-Resistance Rating: Not less than that of adjacent construction, unless noted otherwise.
5. Powder-Coated Steel Sheet for Door: Nominal 0.064 inch (1.63 mm), 16 gauge.
    a. Finish: Steel finish, phosphate dipped steel with DuPont white powder coat primer.
6. Doors: 16 gauge cold rolled sheet steel with 1-inch (25.4 mm) return fold around perimeters.
7. Frame Material: 16 gauge cold rolled steel of 2 1/2-inch (64 mm) depth with 1-inch (25.4 mm) flange at perimeter and 1/4 inch (6 mm) mounting holes.
8. Hinges: Flush continuous piano hinge.
9. Latching/Locking Devices:
    a. Latch: Standard, self-latching tool-key operated slam latch and/or ring operated slam latch, both included. Quantity varies with size of door.
    b. Automatic Closure Devices: Spring operated automatic closure devices for each door. Number of springs varies with size of door.
    c. Interior Latch Release: Mechanisms to allow panels to open from inside on all doors over 12 inches x 12 inches.

2.3 MATERIALS

A. Steel Sheets: ASTM A 1008/A 1008M or ASTM A 591/A 591M.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

D. Flush door edges shall be bent on all sides to prevent bending and sagging of the panel when installed in ceilings.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead-free and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces

C. Comply with manufacturer's written instructions for installing access doors and frames. Authorities Having Jurisdiction should be consulted in all cases as to the requirements covering the installation and use of fire rated access doors.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 083300 - TORNADO AND HURRICANE RESISTANT FIRE RATED OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrication

B. Section 06 10 00 - Rough Carpentry

C. Section 07 84 00 “Firestopping:” Firestops between work of this section and other fire resistive assemblies.

D. Section 08 31 00 - Access Panels & Doors

E. Section 09 91 00 - Painting

F. Division 26 - Electrical

1.3 REQUIREMENTS INCLUDED

Provide all materials, labor, equipment and services necessary to furnish, deliver and install all work for rolling steel storm shelter doors under this section as shown on the contract documents, specified herein, and as specified by the job conditions.

1.4 REFERENCE STANDARDS

A. ANSI/DASMA 108 - American National Standards Institute Standard Method For Testing Sectional Garage Doors and Rolling Doors: Determination Of Structural Performance Under Uniform Static Air Pressure Difference.

B. NFRC 102 - Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.

C. ASTM A-653/A-653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM A-36 – Standard Specification for Carbon Structural Steel, Hot Rolled Steel.

E. ASTM A-123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

F. ASTM A-312 – Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.

G. ASTM A-240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

H. ASTM A 276 – Standard Specification for Stainless Steel Bars and Shapes.

I. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

J. ASTM B 221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

K. ASTM D 4549 – Standard Specification for Polystyrene and Rubber-Modified Polystyrene Molding and Extruding Materials (PS).

L. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

M. NEMA MG 1 - Motors and Generators.

N. NIJ Standard 0108.01 - Ballistic Resistant Protective Materials

O. National Fire Protection Association (NFPA):

1. NFPA 80: Standard for Fire Doors and Windows.
2. NFPA 251: Standard of Methods of Fire Tests of Building Construction & Materials
3. NFPA 252 - Fire Tests of Fire Door Assemblies.

P. Underwriters Laboratories, Inc. (UL):

1. UL 10 B - Fire Tests of Fire Door Assemblies.
2. UL 263: Fire tests of Building Construction and Materials

1.5 SUBMITTALS

A. Procedures: Furnish submittals in accordance with the general requirements specified.

B. Shop Drawing: Furnish shop drawings for architect's approval. Include elevations, sections, and details indicating dimensions, materials, finishes, conditions for anchorage and support of each door.

C. Listings and Certifications:

1. Submit manufacturer’s Underwriters Laboratories or Intertek laboratory listing report verifying product compliance in accordance with the required fire and smoke ratings.
2. Submit manufacturer’s Code Compliance Research Report published by an IAS accredited nationally recognized independent agency confirming compliance of the fire door assembly in accordance with the International Building Code.
3. Listed, labeled and certified by Underwriters Laboratories or Intertek testing laboratory for product compliance with FEMA P-361 Safe Rooms for Tornadoes and Hurricanes.
4. Listed, labeled and certified by Underwriters Laboratories or Intertek testing laboratory to ICC 500-2020 Standard for Design and Construction of Storm Shelters.
5. Listed, labeled and certified by Underwriters Laboratories or Intertek testing laboratory for a wind pressure rating of +/-252 psf for tornado shelters and +/-201 psf for hurricane shelters in accordance with ICC 500-2020.
6. Listed, labeled and certified by Underwriters Laboratories or Intertek testing laboratory for missile impact rating of 15 lbs. at 100 mph in accordance with the requirements of ICC 500-2020.
7. Provide assemblies that have been tested, certified and labeled for a minimum 3-hour fire rating.

D. 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. Details of construction and fabrication.
4. Installation instructions.
5. Warranty.

E. Maintenance and Operating Manuals: Furnish complete manuals describing the materials, devices and procedures to be followed in operating and maintaining all doors under this section. Include manufacturer's brochures and parts lists describing the actual materials used in the product.

F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.

1.6 DESIGN / PERFORMANCE REQUIREMENTS

A. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.7 QUALITY ASSURANCE

A. Fire & Smoke Rated Assemblies: Provide all doors with fire and smoke resistance rating required to comply with governing regulations which are inspected, tested, listed and labeled by UL or Intertek complying with NFPA 80 for class of opening. Provide units tested in accordance with the requirements of UL 10 B, UL 1784, NFPA 252, ASTM E-152. Provide testing laboratory label permanently fastened to each fire and smoke door assembly.

B. Regulatory Requirements:

1. Comply with applicable FEMA requirements as well as laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.
2. Listed under a certified Code Compliance Research Report in accordance with the applicable sections of the International Building Code.

C. Manufacturer Requirements: Door manufacturer shall have been in the business of and have experience in manufacturing the type of product covered under this specification section as well as giving credible service for a minimum of five (5) years. Provide a list of at least ten (10) completed projects which include the products covered under this section.

D. Operational Cycle Life: Tornado and hurricane resistant coiling doors shall be designed and constructed for a minimum 10,000 operating cycles for the life of the door assembly. Cycles shall be verifiable by a non-resettable cycle counter located within the door’s motor operator control panel.

E. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years’ experience in the fabrication and installation of security closures.

F. Installer Qualifications: Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store materials in a protected dry location off the ground.

C. Protect materials from exposure to moisture and sunlight.

D. Store materials in a warm, ventilated, weather-tight location.

E. Conform to manufacturer's written instructions for storage, delivery, and handling.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 COORDINATION

A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.11 WARRANTY REQUIREMENTS

A. Manufacturer's Warranty: Manufacturer's Provide a Two (2) Year, 10,000 Cycle Warranty, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 2 years.

B. Powdercoat Warranty: Finish warranty for 3 years.

PART 2 - PRODUCTS

2.1 TORNADO AND HURRICANE RESISTANT FIRE RATED COILING DOORS

A. Manufacturer/Model - Basis of Design: Tornado and hurricane resistant coiling doors model SafeSpace™ SS500F-PC as manufactured by McKEON. Assembly shall be approved for use in FEMA P-361 safe rooms and ICC 500-2020 storm shelters and provided with a 3-hour fire rating.

1. McKEON, 44 Sawgrass Drive, Bellport, NY 11713, USA, Toll Free: (800) 266-9392, Email: info@mckeondoor.com

B. Subject to meeting performance criteria defined in this Section and within the Contract Documents, equivalent products may be substituted with Approval by Architect, in accordance with provisions of Section 016000 - Product Requirements from the manufacturers below:

1. Overhead Door (tm) Brand, which is located at: 2501 S. State Hwy. 121 Suite 200; Lewisville, TX 75067; Toll Free Tel: 800-275-3290; Tel: 469-549-7100; Fax: 972-906-1499; Email: request info (info@overheaddoor.com); Web: https://www.overheaddoor.com
2. Manufacturer: Alpine Overhead Doors, Inc.; 8 Hulse Road Suite 1S, East Setauket, NY 11733. Telephone 800-257-4634 or 631-473-9300. Fax 631-642-0800.

2.2 MATERIALS

A. Curtain: Shall be assembled of G90 galvanized steel interlocking slats. Curtain shall be formed of slat profile sections of gauge as required to sustain the minimum required design wind pressure.

1. Slat cross section shall not be less than 3" wide by 1-1/2" deep.
2. Galvanized steel, Structural Quality Grade D, as per ASTM A-653/ A-653 M.
3. Finish: Powder Coated.

B. Bottom Bar: Shall consist of a double 2" x 3" structural steel angle assembly formed to fit and engage the curtain assembly.

1. Galvanized Steel as per ASTM A-653/ A-653 M.
2. Finish: Powder Coated.

C. Guides: Each guide assembly shall be fabricated of ASTM A-36 Carbon Structural Steel support angles no greater than 4" x 4" and guide retaining angles of a minimum 6" depth to retain curtain in the guides under the design wind pressure and impact forces specified.

1. Provide internally concealed UL Classified smoke seals located within each guide assembly. Externally mounted smoke seals shall not be acceptable.

D. Mounting Brackets: Fabricated of hot rolled 3/16” minimum steel plates, brackets shall be provided to house ends of the counterbalance barrel assembly.

1. Finish: Powder Coated.

E. Hood: Shall be provided to entirely enclose coiled curtain and counterbalance barrel assembly. Hood shall be fabricated 22-gauge G90 galvanized steel, designed and formed to match brackets. Top and bottom shall be bent and reinforced to provide for proper stiffness.

1. Provide internally concealed UL Classified smoke seals located within the hood assembly. Externally lintel mounted smoke seals shall not be acceptable.
2. Galvanized Steel as per ASTM A-653/ A-653 M.
3. Finish: Powder Coated.

F. Counterbalance Assembly: Coiling door shall be counterbalanced by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks or rings for attachment of curtain. Grease sealed bearings or self-lubricating graphite bearings shall be attached to the spring barrel which shall be fabricated of hot formed structural quality carbon steel seamless pipe.

1. ASTM A-36 Carbon Structural Steel.
2. Galvanized Steel as per ASTM A-653/ A-653 M.

G. Electric Motor Operator: Door shall be provided with a compact power unit designed and laboratory listed by the door manufacturer. Operator shall be equipped with an adjustable screw-type limit switch to break the circuit at termination of travel. High efficiency planetary gearing running in an oil bath, shall be furnished together with a centrifugal governor, magnetic operated brake and a fail-safe magnetic release device, completely housed to protect against damage, dust and moisture. An efficient overload protection device, which will break the power circuit and protect against damage to the motor windings shall be integral with the unit. Operator is to be housed in a NEMA type 1 enclosure.

1. Motor: Shall be intermediate duty, thermally protected, ball bearing type with a class A or better insulation. Horsepower of motor is to be 1/2hp minimum or of manufacturer's recommended size, whichever is greater.
2. Starter: Shall be size "0" magnetic reversing starter, across the line type with mechanical and electrical interlocks, with 10-amp continuous rating and 24 volt control circuit.
3. Reducer: Planetary gear type, 80% efficiency minimum.
4. Cycle Counter: Non-resettable operational cycle counter.
5. Enclosure Material: Steel
6. Enclosure/Housing Finish: Powder Coated.

H. Control Stations: Each fire rated tornado and hurricane storm door shall be provided with flush mount three position push button control station marked open, close and stop that is active during normal conditions and as long as there is no main power failure to the motor operator.

1. Device Housing Material: Steel
2. Housing Finish: Powder Coated.

I. Master Control Station: Provide a single master control station that can simultaneously activate all of the fire rated tornado and hurricane storm doors in the facility to the emergency closed or open positions. The master control station shall remain operable as long as there is no main power failure to the door’s motor operators.

1. Device Housing Material: Steel
2. Housing Finish: Powder Coated.

J. FS Self-Closing Mechanism: The fire rated tornado and hurricane storm door with automatic release mechanism shall be activated by a fusible link, fire alarm, emergency alarm or power

failure. When activated the door shall be released and begin to self-close under gravitational force. The speed of the door shall be governed by a centrifugal governor at a rate of not greater than 9" per second or less than 6" per second.

K. Magnetic Release with 10 Second Time Delay: A fail-safe magnetic release device shall be built into the operator as an integral part of the release mechanism. When power is interrupted to the release mechanism by the facility's smoke detection or fire alarm system, the door shall begin to self-close. In the event of power failure, the time delay shall prevent the fire door from closing for a period of 10 seconds. Once the 10 seconds have lapsed, the fire door shall self-close.

L. Emergency and Fire Alarm Activation: Upon activation by the facility's alarm system the fire rated hurricane and tornado storm door shall immediately self-close to the fully closed position. Once the emergency or fire alarm condition has been cleared and main power has been restored, the door shall automatically power itself back to the fully open position.

M. Emergency Manual Operation: In the event of power failure, a time delay shall prevent the door assembly from closing for a period of 10 seconds. Once the 10 seconds have lapsed, the door assembly shall immediately self-close. The door assembly shall be equipped with an emergency hand chain that shall be operable during main power failure lasting up to six hours, as long as there is no alarm condition present. After the six hours have lapsed, the door shall automatically self-close and remain in the closed position until the main power has been restored. Upon activation of the facility's emergency alarm system the door assembly shall immediately self-close to the fully closed position and the emergency hand chain shall become inoperable. Once the emergency alarm condition has been cleared and main power has been restored, the door shall automatically power itself back to the fully open position and the emergency hand chain will now become operable.

N. Obstruction Sensing Safety Edge: The obstruction sensing safety edge shall be programable to either stop or reverse upon coming in contact with an obstruction during the close cycle of the door. During normal operation the obstruction sensing safety edge shall remain active and operable as long as there is no main power failure to the motor operator. During an alarm condition, the obstruction sensing safety edge shall reverse a maximum of three times and then comes to contact on the obstruction until the obstruction has been removed and the door returns to the fully closed position. During main power failure, if the obstruction sensing safety edge comes in contact with an obstruction during the self-closing mode, the door shall stop and remain in contact with the obstruction until it is removed and the door can continue to the fully closed position.

O. True Test Panel: Fire rated tornado and hurricane storm doors shall be provided with a True Test panel. The test panel shall be designed so that it simulates an actual emergency alarm condition and activates all of the doors to self-close to the fully closed position. Once all of the doors have satisfactorily closed and the test panel has been reset, all of the doors shall automatically power themselves back to the fully open and alarm ready reset condition. Only one test panel shall be required to test all the fire rated tornado and hurricane storm doors on this project simultaneously.

P. Powdercoat Finish: Meeting or exceeding the performance requirements of Tiger Drylac Serious 09 or 89.

1. After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for powder coat adhesion. Provide powder coat finish of color as selected by architect from manufacturer's standard RAL powder coat selection chart.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and field conditions to which this work is to be performed and notify the architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.

B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary.

C. Coordinate and schedule work under this section with the work of other sections so as not to delay job progress.

3.2 INSTALLATION

A. Perform installation using only factory approved and certified representatives of the door manufacturer.

B. Install door assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.

C. Adjust door installation to provide uniform clearances and smooth non-binding operation.

D. Install wiring in accordance with applicable local codes and the National Electrical Code Standard. Materials shall be UL listed.

E. Test door closing sequence when activated by the building's fire alarm system. Reset door after successful test.

3.3 PROTECTION AND CLEANING

A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.

B. Remove, repair or replace materials which have been damaged in any way.

C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

D. Use cleaning products only on the surfaces recommended by the Manufacturer or Supplier which will not damage surfaces.

END OF SECTION

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SECTION 085213 - ALUMINUM-FRAMED ENTRANCES AND WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Extruded exterior and interior aluminum entrances and windows, including tubular aluminum sections thermally broken, shop fabricated, factory prefinished, related flashings, extruded break and panning metal, prefinished metal sills, anchorage and attachment devices, and hardware.

B. Related Work

1. Section 072726 “Fluid-Applied Membrane Air Barriers”.
2. Section 079100 "Joint Sealants" for field-applied sealants.
3. Section 087100 “Door Hardware” for hardware and its installation at door.
4. Section 088000 “Glazing” for insulated glazing to be installed into aluminum framing and entrance doors.

1.3 REFERENCES

A. ANSI/ASHRAE/IES Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings (I-P Edition).

1.4 SUBMITTALS

A. Product Data: Provide component specifications and characteristics, describe components within assembly, anchorage and fasteners, glass and glazing, door hardware reinforcing, and internal drainage details.

B. Shop Drawings:

1. Indicate location of each opening type, component dimensions and field verified openings.
2. Elevations of each unit drawn at a minimum ½” scale. Indicate frame joinery.
3. Full size sections of each member.
4. Anchorage fastener type and location, straps/plates and reinforcing steel as required by structural calculations.
5. Elevations of each door type drawn at a minimum ½” scale. Indicate frame joinery.
6. Glass and glazing.
7. Perimeter sealants.

C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

D. Samples for Verification: For aluminum-framed storefront system and components required.

E. Test reports: The Contractor shall submit test reports on each entrance type. Each report shall be complete, prepared by an independent testing laboratory certified by AAMA, and shall indicate that each entrance type has been tested in accordance with these Specifications and performance criteria established in Part 1 of this Section.

F. Submit manufacturer's installation instructions.

G. Manuals: Submit manufacturer’s operating and maintenance manuals for entrance hardware per requirements of Division 1.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Capable of assuming engineering responsibility and performing Work of this Section and who is acceptable to manufacturer.

1. Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies. Calculations and structural designs shall be completed and signed by a licensed engineer in the State of Minnesota.
2. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.
3. Installer’s Certification: The Installation Subcontractor shall be a firm with a minimum of five years experience specializing in the proper installation of the specified aluminum entrance assemblies.
4. Manufacturer’s Certification: Manufacturer s shall submit written confirmation that the Installation Subcontractors have been approved by then to install their products.

B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Dimensions, arrangements, alignment, and profiles of components and assemblies indicate aesthetic effects as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including pre-construction testing, field-testing, and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

C. Accessible Entrances: Comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Make no deliveries to the Project until ready to install or until approved storage is provided. Where this provision is neglected and materials are delivered to the Project site prior to the Project being ready for installation, such materials shall be properly stored elsewhere at the expense of the Contractor with adequate insurance coverage provided for the off-site storage.

B. Deliver materials in original, un-opened containers with labels intact and legible

C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings

B. Environmental Requirements: Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.8 WARRANTY

A. Total Storefront Installation

1. The Installation Contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total storefront installation. This includes the glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water and structural adequacy as called for in the specifications and approved shop drawings.
2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.

B. Window Material and Workmanship

1. Provide written guarantee against defects in material and workmanship for 2 years the date of substantial completion.

C. Glass

1. Provide written warranty for insulated glass units that they will be free from obstruction of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship.
2. Warranty period shall be for 10 (ten) years the date of substantial completion.

D. Finish

1. Warranty period shall be for 3 years from the date of substantial completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Design, engineer, fabricate, and install aluminum-framed storefronts to withstand structural loads indicated.

1. Limit deflection of framing members normal to wall plane to 1/175 of clear span or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less, when subjected to loads specified in 2018 International Building Code.
2. Limit deflection of framing members parallel to glazing plane to L/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller, when subjected to loads specified in 2018 International Building Code.

B. Project Wind Loads (Service Level Loads in accordance with ASCE 7-10)

1. The system shall be designed to withstand the following loads normal to the plane of the wall:
   a. Positive pressure of 22 psf at non-corner zones.
   b. Negative pressure of 24 psf at non-corner zones.
   c. Negative pressure of 28 psf at corner zones.

C. Structural Testing: Systems tested according to ASTM E 330 at 150 percent of inward and outward wind-load design pressures do not evidence material failures, structural distress,

deflection failures, or permanent deformation of main framing members exceeding 0.2 percent of clear span.

D. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air Leakage rate shall not exceed 0.06 cfm/ft2 (0.3 l/s · m2) at a static air pressure differential of 6.2 psf (300 Pa) with interior seal, or, rate shall not exceed 0.06 cfm/ft2 (0.3 l/s · m2) at a static air pressure differential of 1.6 psf (75 Pa) without interior seal. CSA A440 Fixed Rating.

E. Water Penetration: Systems do not evidence water leakage when tested according to ASTM E 331 at minimum static air pressure differential of 10 psf (479 Pa) as defined in AAMA 501.

1. Maximum Water Leakage: Per AAMA 501.1. Water controlled by flashing and gutters that is drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.

F. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.36 Btu/sq. ft. x h x deg F as determined according to NFRC 100.

G. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 60 when tested per AAMA 1503.

H. Performance Requirements - Swing Doors:

1. Test structural resistance to corner racking by the Dual Moment Load Test as follows:

2. Test section: Standard top door corner assembly. 24 inch long side rail section, 12 inch long top rail section.

3. Anchor top rail positively to test bench so that corner protrudes 3 inches beyond bench edge.

4. Anchor a lever arm positively to side rail at a point 19 inches from inside edge of top rail. Attach weight support pad at a point 19 inches from inner edge of side rail.

5. Withstand a load of 245 pounds on the lever arm before reaching the point of failure, which shall be considered a rotation of the lever arm in excess of 45 degrees.

6. Air infiltration: Test doors per ASTM E283 at the following pressure differentials:

7. 6.24 PSF for single doors: Results for single 3'-0" by 7'-0" entrance door and frame: Do not exceed 0.50 CFM per linear foot of perimeter crack.

8. 1.567 PSF for pairs of doors: Results for pair of 6'-0" by 7'-0" entrance doors and frame: Do not exceed 1.0 CFM per linear foot of perimeter crack.

2.2 ALUMINUM-FRAMED STOREFRONTS

A. Manufacturers:

1. Storefront System Basis-of-Design Product: Shall be Trifab 451UT Framing Thermal Flush-Glazed Screw Spline Storefront for thermally glazed aluminum storefronts and entrances based on 2” x 4½” framing by Kawneer Company, Inc.

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

a. EFCO Corporation
b. Oldcastle Building Envelope.
c. Tubelite
d. US Aluminum Commercial Products Group.
e. Wausau Window

3. Single Source Responsibility: Provide aluminum entrance system and doors produced by a single manufacturer of the units identical to those specified.

B. Materials:

1. Extruded Aluminum prime billet: ASTM B221; 6063T6 alloy, T5 temper.
2. Sheet Aluminum: 5005 H34 (anodic) ASTM B209
3. Steel Sections: ASTM A36; hot dipped galvanized in accordance with ASMT A123, shaped to suit mullion sections.
4. Perimeter Anchors: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
5. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
6. Sills: Extruded aluminum; sloped for positive wash; fit under sash leg 1/2 inch beyond wall face; one piece full width of opening jamb angles to terminate sill end.
7. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.
8. Shop and Touch-Up Primer for Steel Components: SSPC 15, Type 1, red oxide.
9. Glazing Gaskets: Elastomeric or neoprene.
10. Glazing: as specified in Section 088000 “Glazing”.

C. Manufactured Units:

1. Framing: Split vertical in screw-spline system designed to allow frame to be installed from unitized assemblies. Include positive barrier weathering at single acting entrance frames. Incorporate thermal barrier at framing members that eliminates direct contact between interior and exterior aluminum sections.
    a. Drive screws through back of vertical framing members into splines in horizontal framing members.
    b. Snap together individual units to form a complete frame.
    c. Provide for flush glazing on all sides with no projecting stops.
    d. Elastomeric extrusion glazing gaskets.
2. Frames:
    a. Factory prefinished extruded aluminum, minimum 0.125 inch frame wall thickness
    b. Nominal dimensions of 2 inches vertical and horizontal framing members and 4 1/2 inches overall depth
    c. Thermally broken with interior tubular sections insulated from exterior EXCEPT for the jambs of the doors
    d. Hinge jamb shall be reinforced a hot dipped galvanized 1-1/4” by 1-1/4” x 3/16” steel angle which runs continuously full height of the jamb and is mechanically fastened to the jamb. Hinges shall be anchored directly into steel reinforcing.
    e. Intermediate jamb frames shall be screwed to floor mounted, hot-dipped galvanized steel support angles concealed within the frame.

f. Frames shall be shop mortised and reinforced per hardware manufacturer's templates for specified hardware items. Reinforcing shall be hot-dipped galvanized 3/16" thick steel.
g. Flush glazing stops, elastomeric or neoprene extrusion glazing gaskets, drainage holes, internal weep drainage system
h. Weather-stripping shall be polypropylene pile inserted into extruded races in the door stops. Weather-stripping for exterior doors shall be continuous at head and jambs, Door bottoms shall be weather–stripped.
i. Capable of accepting 1 inch thick insulating glass.

3. Thermal Barrier: Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

4. Doors: 1-3/4-inch- (44.5-mm-) thick glazed doors with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods. Provide snap-on, extruded-aluminum glazing stops and preformed gaskets.

a. Door Design: Wide stile; 5-inch (127-mm) nominal width.
b. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.
c. Interior Doors: Provide BHMA A156.16 silencers, three on strike jamb of single-door frames and two on head of double-door frames.
d. Exterior Doors: Provide compression weather stripping at fixed stops. At other locations, provide sliding weather stripping retained in adjustable strip mortised into door edge.
e. Hardware: Provide hardware, except as noted otherwise, and hardware templates for aluminum entrance doors and frames, under Section 087100, and install under this Section.

5. Break metal, sills, and flashings: Factory prefinished extruded aluminum, minimum 0.125 inches thick, and finish to match mullion sections where exposed.

6. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat

7. Glazing: Comply with Section 088000 "Glazing."

8. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

9. Fasteners and Accessories: Compatible with adjacent materials, corrosion resistant, nonstaining, and nonbleeding. Use concealed fasteners except for application of door hardware.

D. Accessories:

1. Sealant Materials:

a. Frame perimeter sealant and backing materials: As specified in Section 079200.
b. Window and frame system sealant: Manufacturer's recommended types to suit application.

2. Shims: PVC horseshoe shims in non-load bearing conditions and Korolath multipolymer plastic bearing shims per structural calculations.

3. Insulation: Batt insulation for shim spaces as specified in Section 072100.

4. Frame Anchors: Anchors, heavy duty sleeve to expansion style, vibration resistant and removable, used to secure frame to concrete or masonry shall be stainless steel. Type, size and spacing shall be per Project's structural requirements.

E. Fabrication:

1. Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory-assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

a. Door Framing: Reinforce to support imposed loads. Factory-assemble door and frame units and factory-install hardware to greatest extent possible. Reinforce door and frame units for hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.

F. Aluminum Finish Schedule:

1. Alum-1: High-performance organic; two-coat fluoropolymer system complying with AAMA 2604, with finish coats containing at least 70 percent PVDF resin by weight; color as selected by Architect from manufacturer's full range of standard colors.

2. Alum-2: Provide exposed surfaces of aluminum curtain wall and entrance door, components and trim with anodized finish. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes:

a. Provide anodic coating continuous, fully sealed, and free from powdery surfaces.
b. AAMA 611
c. Coating Thickness: Minimum of 0.7 mils when tested per ASTM B244. Architectural Class I.
d. Anodic Coating:

1) Clear, AA-M10C22A41.
2) Colored, AA-M12C22A44.

a) Black
b) Dark Bronze
c) Dark Medium Bronze
d) Light Medium Bronze

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight aluminum-framed storefront installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.

2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Do not leave openings uncovered at end of working day, during wind-driven precipitation, or during excessively cold weather.

B. Perform other operations as necessary to prepare openings for proper installation and operation of units.

3.3 INSTALLATION

A. Install aluminum entrance and framing systems, glass and glazing, and hardware per manufacturer's written instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specification Manual.

B. Isolate metal surfaces in contact with incompatible materials, including wood, by painting contact surfaces with bituminous coating or primer or by applying sealant or tape recommended by manufacturer.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Coordinate first paragraph below with manufacturers' written recommendations

E. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

F. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

G. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

H. Install framing components true in alignment with established lines and grades to the following tolerances:

1. Variation from Plane: Limit to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
2. Alignment: For surfaces abutting in line, limit offset to 1/16 inch (1.5 mm). For surfaces meeting at corners, limit offset to 1/32 inch (0.8 mm).
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).
4. Maximum misalignment of 2 adjoining members abutting in plane: 1/32 inch.

I. Install doors without warp or rack. Adjust doors and hardware to provide tight fit at contact points and smooth operation.

3.4 FIELD QUALITY CONTROL

A. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present.

1. Testing: Owner will engage an AAMA certified testing agency laboratory to field test the completed trial installation for compliance with specified performance criteria for air infiltration and water resistance. Testing of the trial installation shall be by AAMA

and ASTM test standards and per additional requirements, definitions and criteria listed in field quality control testing.

2. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.

    a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft^2, whichever is greater.
    b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.2 psf (300 Pa).

3. Testing will occur prior to interior finish Work including interior perimeter sealant joints to allow visual access to areas being tested to check for water leakage.

4. The Contractor shall assist with the trial installation and testing procedures and otherwise cooperate with the Architect, and Owner's Testing Agency to facilitate testing. This includes providing all necessary scaffolding, lifts, enclosures, temporary heat and other equipment and utilities, including 220V single phase power source for blowers, to facilitate scheduled trial installation and testing.

5. If failures develop under testing, the Contractor shall identify reasons for failure and the failures shall be repaired and retested until the installation is completely free of defects. All retests shall be by the Owner's testing agency.

    a. All re-testing and associated costs shall be the responsibility of the Contractor and deducted from the Contract Sum by Change Order

3.5 ADJUSTING, CLEANING AND PROTECTION

A. Adjust operating hardware for smooth operation per hardware manufacturers' written instructions

1. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from latch measured to leading door edge.

2. Lubricate hardware and moving parts.

B. Cleaning

1. Clean aluminum surfaces promptly with a solution of mild detergent in warm water, apply with soft, clean wiping cloths. Remove dirt from corners. Wipe surfaces clean. Exercise care to avoid damage to protection coatings and finishes

2. Remove excess glazing and sealant compounds, dirt, joint sealant, and other substances. Clean glass promptly after installation of windows. Remove strippable coating from aluminum components.

3. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period

END OF SECTION

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SECTION 084123 - FIRE RATED STEEL FRAMED ENTRANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 SUMMARY

A. Section includes:

1. Fire rated glazing and framing systems for installation full vision fire rated doors, sidelights, and windows in interior openings

B. Related Sections:

1. Section 07 84 00 “Firestopping:” Firestops between work of this section and other fire resistive assemblies.
2. Section 08 71 00 “Door Hardware:” Door hardware to be provided for the doors specified in this section.

1.3 REFERENCE STANDARDS

A. American Architectural Manufacturers Association (AAMA)

1. AAMA 2603-2002 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

B. American Society for Testing and Materials (ASTM):

1. Fire safety related:
   a. ASTM E119: Methods for Fire Tests of Building Construction and Materials.
2. Material related
   a. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2007.
   b. ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2006b.

C. American Welding Society (AWS)

1. AWS D1.3 - Structural Welding Code - Sheet Steel; 2007

D. Builders Hardware Manufacturers Association, Inc

1. BHMA A156 - American National Standards for door hardware; 2006 (ANSI/BHMA A156).

E. National Fire Protection Association (NFPA):

1. NFPA 80: Standard for Fire Doors and Windows.
2. NFPA 251: Standard of Methods of Fire Tests of Building Construction & Materials
3. NFPA 252: Standard Methods of Fire Tests of Door Assemblies

4. NFPA 257: Standard for Fire Test of Window Assemblies

F. Underwriters Laboratories, Inc. (UL):

1. UL 9: Fire Tests of Window Assemblies
2. UL 10 B: Fire Tests of Door Assemblies
3. UL 10 C: Positive Pressure Fire Tests of Window & Door Assemblies
4. UL 263: Fire tests of Building Construction and Materials

G. American National Standards Institute (ANSI):

1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings

H. Consumer Product Safety Commission (CPSC):

1. CPSC 16 CFR 120: Safety Standard for Architectural Glazing Materials

1.4 DEFINITIONS

A. Manufacturer: A firm that produces primary glass, fabricated glass or framing as defined in referenced glazing publications.

1.5 SUBMITTALS

A. Product Data:

1. Technical Information: Submit latest edition of manufacturer's product data providing product descriptions, technical data, Underwriters Laboratories, Inc. listings and installation instructions.

B. Shop Drawings:

1. Include plans, elevations and details of product showing component dimensions; framed opening requirements, dimensions, tolerances, and attachment to structure

C. Hardware schedule: list of manufacture supplied hardware and verification of cylinder size complying with Section 087100

D. Samples: For following products:

1. Glass sample-as provided by manufacturer
2. Sample of frame
3. Verification of sample of selected finish

E. Glazing Schedule: Use same designations indicated on drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

F. Warranties: Submit manufacturer's warranty.

G. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements.

1. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to:

1. International Accreditation Service for a Type A Third-Party Inspection Body (Field Services ICC-ES Third-Party Inspections Standard Operating Procedures, 00-BL-S0400 and S0401)
2. International Accreditation Service for Testing Body-Building Materials and Systems
    a. Fire Testing
        1) ASTM Standards E 119
        2) CPSC Standards 16 CFR 1201
        3) NFPA Standards 251, 252, 257
        4) UL Standards 9, 10B, 10C, 1784, UL Subject 63

B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are classified and labeled by UL, for fire ratings indicated, based on testing according to NFPA 252, ASTM E119. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.

E. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are classified and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257, ASTM E119. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.

F. Fire-Rated Wall Assemblies: Assemblies complying with ASTM E119 that are classified and labeled by UL, for fire ratings indicated, based on testing in accordance with UL 263, ASTM E119.

G. Listings and Labels - Fire Rated Assemblies: Under current follow-up service by Underwriters Laboratories® maintaining a current listing or certification. Label assemblies accordance with limits of manufacturer’s listing.

H. Regulatory Requirements: Comply with provisions of the following:
1. NFPA 101: Comply with the following for means of egress doors:
    a. Latches, Locks, and Exit Devices: Not more than 15 lbf (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
    b. Door Closers: Not more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle under provisions specified by manufacturer.

1.8 PROJECT CONDITIONS

A. Obtain field measurements prior to fabrication of frame units. If field measurements will not be available in a timely manner coordinate planned measurements with the work of other sections.
1. Note whether field or planned dimensions were used in the creation of the shop drawings.

B. Coordinate the work of this section with others effected including but not limited to: other interior components and door hardware.

1.9 WARRANTY

A. Provide the Manufacturer's standard five-year manufacturer warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS - FIRE RATED DOOR AND SIDELIGHT AND WINDOW ASSEMBLIES

A. Manufacturer Glazing Material, Subject to compliance with requirements, provide products from the following manufacturer, unless noted otherwise:

1. "Pilkington Pyrostop®" fire-rated glazing as manufactured by the Pilkington Group and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065 phone (800.426.0279) fax (425.396.8300) e-mail sales@fireglass.com, web site http://www.fireglass.com

2. Subject to compliance with all requirements listed in this section and indicated elsewhere in the Documents, other acceptable manufacturers offering acceptable products are:

a. Safti-First
b. Vetrotech Saint-Gobain

B. Frame System, Subject to compliance with requirements, provide products from the following manufacturer, unless noted otherwise:

1. "Fireframes® Heat Barrier Series" fire-rated [steel] frame system as manufactured and supplied by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065 phone (800.426.0279) fax (425.396.8300) e-mail sales@fireglass.com web site http://www.fireglass.com

2. Subject to compliance with all requirements listed in this section and indicated elsewhere in the Documents, other acceptable manufacturers offering acceptable products are:

a. Safti-First
b. Other manufacturer submitted to Architect for approval prior to Bid. See Section 016200 Product Options.

2.2 PERFORMANCE REQUIREMENTS

A. Fire Rating Requirements

1. Duration -- Doors: Capable of providing a fire rating for 90 minutes.

2. Duration-- Windows: Capable of providing a fire rating for 120 minutes.

B. Delegated design: For the performance requirements listed below requiring structural design provide data, calculations and drawings signed and sealed by an engineer licensed in the state [province] where the project is located.

C. Construction: Narrow-profile, roll-formed steel architectural grade specialty fire doors. Conventional break-shape type hollow metal steel fire-rated doors will not be considered an acceptable substitute for the Fireframes Heat Barrier Series doors specified in this section as they do not conform to the project design intent and/or aesthetic and quality standards.

2.3 MATERIALS - GLASS

A. Fire Rated Glazing: Composed of multiple sheets of Pilkington Optiwhite™ low iron, high-visible-light transmission glass laminated with an intumescent interlayer.

B. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).

C. Properties Interior Glazing

Property		
Fire Rating	90 minute	120 minute
Manufacturer's designation	90-102	120-104
Glazing type	single	IGU
Nominal Thickness	1-7/16" (37mm)	2-1/8" (54mm) [with 8 mm spacer, or 2-3/8" (60 mm) with 14 mm spacer]
Weight in lbs/sf	17.61	21.71
Daylight Transmission	84%	75%
Sound Transmission Coefficient	45dB	46dB

D. Logo: Each piece of fire-rated glazing shall be labeled with a permanent logo including name of product, manufacture, testing laboratory (UL), fire rating period, safety glazing standards, and date of manufacture.

E. Glazing Accessories: Manufacturer's standard compression gaskets, spacers, setting blocks and other accessories necessary for a complete installation.

2.4 MATERIALS - STEEL FRAMES AND DOORS

A. Steel Framing System 120 min:

1. Frame: Steel profiled formed tubing permanently joined with steel bolts.
2. Insulation: Insulate framing system against effects of fire, smoke, and heat transfer from either side. Insulate profiled steel tubing using a shell construction that incorporates Promatect-H intermediate interlayer. Firmly pack perimeter of framing system to rough opening with mineral wool fire stop insulation or appropriately rated intumescent sealant.
3. Steel Glazing Beads: Extruded steel beads with dimensions recommended by manufacturer to securely hold glazing material in place.
4. Fasteners: Type recommended by manufacturer
5. Glazing Accessories: Set Pilkington Pyrostop glass using calcium silicate, or setting blocks.
6. Glazing Gaskets, Compounds and tapes: Glaze Pilkington Pyrostop glass with approved EPDM glazing gaskets and closed cell PVC tape, or pure silicone sealant.

B. Steel Door System 90 min:

1. Manufacturer's standard single leaf doors
2. Coordinate door hardware specified in Section 08 71 00 Hardware

2.5 FABRICATION

A. Furnish exterior frame assemblies pre-welded.

1. When necessary, splice frames too large for shop fabrication or shipping or to fit in available building openings.
2. Fit with suitable fasteners.

3. Knock-down door perimeter frames are not permitted

B. Field glaze door and frame assemblies.

C. Factory prepare steel door assemblies and install all hardware.

D. Fabrication Dimensions: Fabricate fire rated assembly to field dimensions.

E. Obtain approved Shop Drawings prior to fabrication.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish frames after assembly.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

2.7 POWDERCOAT FINISHES

A. Finish after fabrication.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

C. Interior Steel Finishes

1. Powder-Coat Finish: Polyester powder coating which meets AAMA 2604 for chalking and fading. Apply manufacturer's standard powder coating finish system applied to factory-assembled frames before shipping, complying with manufacturer's recommended instructions for surface preparation including pretreatment, application, and minimum dry film thickness.

2. Color and Gloss: As selected by Architect from manufacturer's full range.

3. Acceptable manufacturers as approved by Framing Manufacturer

2.8 DOOR HARDWARE

A. Furnish hardware with 90-minute fire door as directed by the door and frame manufacturer. Provide all hardware as directed by the door and frame manufacturer as the specified door assembly has been fire tested using the listed hardware.

1. For doors and frames provided by a manufacturer other than the specified system listed above, Contact the manufacturer and provide the hardware required by that manufacturer to determine maintain the integrity of the fire testing for their product.

2. All hardware BHMA Certified

B. Operating hardware for Fireframes® Heat Barrier Series Single Outswing Doors with Exit Device. Each to have the following.

	Item	Description	Manufacturer	Finish*
3	Hanging Devices	Weld on Pivots	Technical Glass Products	PTM
1	Exit Device	35A-F Rim	Von Duprin	626
1	Lever Trim	360 L Rectangular Lever Handle	Von Duprin	626
1	Cylinder	ANSI Mortise Schlage C Keyway	Technical Glass Products	626
1	Closing Devices	TS 93 Surface Applied Closer	Dorma	689
1	Auto door Bottom	420APKL Smoke Seal	Pemko	MA

1	Weather Seal	Perimeter Gasket	Technical Glass Products

Balance of hardware by others

* FINISH LEGEND:

PTM Painted to match frame
MA Mill Finish Aluminum
689 Aluminum Paint
626 Satin Chrome Plated

2.9 ACCESSORY MATERIALS

A. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for [30-mil] [0.762-mm] thickness per coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and members to which the work of this section attaches or adjoins prior to frame installation.

B. Provide openings plumb, square and within allowable tolerances.

1. The manufacturer recommends 3/8 inch shim space at all walls

C. Notify Architect of any conditions which jeopardize the integrity of the proposed fire wall / door system.

D. Do not proceed until such conditions are corrected.

3.2 INSTALLATION

A. Install all components as directed by manufacturer’s written instructions.

3.3 REPAIR AND TOUCH UP

A. Limited to minor repair of small scratches. Use only manufacturer’s recommended products.

1. Such repairs shall match original finish for quality or material and view.

B. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged.

3.4 ADJUSTING

A. Adjust door function and hardware for smooth operation. Coordinate with other hardware suppliers for function and use of any other attached hardware.

3.5 PROTECTION AND CLEANING

A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

1. Do not clean with astringent cleaners. Use a clean “grit free” cloth and a small amount of mild soap and water or mild detergent.

2. Do not use any of the following:

a. Steam jets
b. Abrasives
c. Strong acidic or alkaline detergents, or surface-reactive agents
d. Detergents not recommended in writing by the manufacturer
e. Do not use any detergent above 77 degrees F
f. Organic solvents including but not limited to those containing ester, ketones, alcohols, aromatic compounds, glycol ether, or halogenated hydrocarbons.
g. Metal or hard parts of cleaning equipment must not touch the glass surface

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION

SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Labor, materials, tools, equipment, and services needed to furnish and install curtain wall.
2. Components furnished with installed curtain wall.
3. Thermally broken curtain wall frames.
4. Non-thermally broken aluminum door.
5. Insulated metal infill panels.
6. Aluminum door hardware.

B. Related Sections include the following:

1. 072100 “Thermal Insulation” for insulation products to be supplied at a part of curtain wall assemblies.
2. 079200 "Joint Sealants" for field-applied sealants, both primary sealant joint and secondary perimeter sealants.
3. 084100 “Aluminum Entrances” for aluminum entry doors and hardware.
4. 088000 “Glazing” for glazing to be installed into curtain wall.

1.3 REFERENCES

A. ANSI/ASHRAE/IES Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings (I-P Edition).

1.4 SYSTEM DESCRIPTION

A. Design Requirements:

1. General: Provide manufacturer's stock curtain wall system, adapted to conditions indicated on Drawings, that comply with performance requirements specified as demonstrated by testing manufacturer's corresponding stock systems according to maximum criteria and test methods indicated.
2. Unitized Pre-Framed Aluminum System: Glazed aluminum curtain wall system consisting of large modular curtain wall units pre-assembled in factory from individual components into nesting or stacking frames for erection to form a continuous unit. Conceal mountings and attachments. Design system to comply with the following requirements:
    a. To accommodate expansion and deflections of joints between units.
    b. For glazing system from the exterior.
    c. To be field glazed.
    d. To fully capture each glass lite via pressure plate attachments on all sides.

3. Verify the following design wind pressure for Project with structural Construction Documents.

    a. ASCE 7-05 Simplified Procedure Parameters
    b. Exposure B
    c. Basic wind speed 90 MPH (3 second gust)
    d. Importance Factor 1.15
    e. Wind Directionality Factor (Kd) 0.85
    f. Topographic Factor (Kzt) 1.0

4. Design structural components including meeting rails and mullions accordingly.

B. Performance Requirements:

1. Definitions:

    a. Framing: Design framing members for each individual glass pane so deflection perpendicular to glass plane does not exceed 1/175 of glass edge length or 3/4 inch, whichever is less, when subjected to loads specified in 2006 International Building Code.
    b. Dead Load: Provide horizontal framing members that support glass, design deflection of those members in direction parallel to plane of wall shall not exceed an amount that will reduce the glass bite below 75 percent of the design dimension, nor an amount that would infringe upon necessary glazing clearances below. Provide at least 1/8-inch minimum clearance between member and top of fixed glazed panel, glass, or other fixed part immediately below. Maintain a minimum clearance of 1/16 inch between operable window or door below.

2. When tested per the AAMA Metal Curtain Wall Manual, system(s) shall meet or exceed performance criteria.

3. Manufacturer's testing shall have been performed within the last 5 years on a representative curtain wall assembly, identical in all appropriate respects to the type proposed for this Project.

4. Air Test Performance Requirements: Curtain wall system; air infiltration maximum of 0.06 CFM per square foot for fixed units at 6.24 PSF pressure differential when tested per ASTM E283. Aluminum-framed entrances; manufacturer's testing shall be in accordance with ASTM Standards E283 for compliance with maximum permissible air infiltration rate of 1.25 cfm/sq.ft. when tested at a minimum pressure differential of 1.567 lbs./sq.ft. based on requirements of the Minnesota Energy Code.

5. Water Resistance: No water leakage at 12 PSF pressure differential when tested per ASTM E331 and where indicated below:

    a. No water penetration through perimeter framing or primary sealant joint.
    b. No water visible on interior surfaces.
    c. No water visible on sub-sill flashing.
    d. No water passing beyond vertical plane intersection innermost framing member.
    e. No water present within or entering wall cavity during water resistance test.

6. Uniform Load Deflection Test: Conduct uniform load deflection test of curtain wall system per ASTM Standards E330.

    a. Results of Test: The deflection of any framing member in a direction normal to the plane of the wall w3hen subjected to the calculated design wind pressure, at both a positive and negative load, shall not exceed L/175 of its clear span except for the following conditions:

        1) When plastered surface or drywall subjected to bending is affected, do not exceed deflection of L/360 of span.

2) When framing member overhangs an anchor point, limit deflection to 2L/175, where L is length of cantilevered member.
3) At perimeter frames, limit deflection to 1/2 perimeter sealant joint width, minus anticipated movement from thermal and other movement, unrelated to deflection related loads, from adjacent materials and the curtain wall
4) For spans greater than 13'-6," limit deflections at design wind pressure to L/240 plus 1/4 inch, but do not exceed maximum deflection of 1 inch.

7. Uniform Load Structural Test: Test unit at 1.5 times design test pressure both positive and negative, acting normal to plane of wall per ASTM E330.

a. Results of Test: No glass breakage, permanent damage to fasteners, hardware parts, doors, or permanent deformation of any main frame or ventilator member in excess of 0.2 percent of its span.

C. Framing: Framing members for each individual glass pane shall be designed so the deflection perpendicular to the glass plane shall no exceed 1/175 of the glass edge length or ¾", whichever is less, when subjected to loads specified in the current Minnesota State Building Code.

D. Condensation Resistance: When tested in accordance with AAMA 1503, the condensation resistance factor for each type of curtain wall shall be not less that the following minimum levels of thermal performance on unit size as required to produce representative areas of framing, vision glass and spandrel glass.

1. CRF Class Requirements

a. Condensation Resistance Factor Requirements (CRF) minimum 68 (frame) and (CRF) minimum 71 (glass).

b. Data from calculations, test results on curtain wall of different size, or unrepresentative framing/glass proportions are not acceptable.

E. Thermal Transmittance Performance Requirements:

1. The thermal performance for each type of curtain wall system shall not exceed what is allowed by the State Energy Code, ANSI/ASHRAE/IES Standard 90.1-2016.

2. U-Value Requirements: Thermal transmittance "U" assembly value maximum of 0.36 BTU per hour per square foot per degree F at 15 mph exterior wind. (2015 Minnesota State Energy Code, IECC 2018, ANSI/ASHRAE/IES Standard 90.1-2016.)

3. The Solar Heat Gain Coefficient (SHGC) Assembly maximum: 0.40. (2015 Minnesota State Energy Code, IECC 2018, ANSI/ASHRAE/IES Standard 90.1-2016.)

4. Curtain wall assemblies shall have a VT of 0.70. Visible Transmittance (VT) shall conform to the Minnesota Energy Code. VT shall be determined in accordance with NFRC 200 by an accredited independent laboratory and certified by the manufacturer.

F. Thermal Movements: Provide glazed curtain wall systems, including anchorage, that accommodates thermal movements of curtain wall system and supporting elements when subjected to a temperature differential from -30 degrees F to +180 degrees F without buckling, damaging stresses on glazing, failure of sealant joints, overstressing of components, damaging loads on fasteners, noise or vibrations, and other detrimental effect.

1.5 SUBMITTALS

A. Provide submittals in a timely manner to meet required construction completion schedule.

B. Product Data: Submit the manufacturer's specifications, technical product data, performance values, standard details of the products specified and the manufacturer's

certification of the Installation Subcontractor and the manufacturer's recommendation for installation.

C. Shop Drawings: Submit Shop Drawings prepared by curtain wall manufacturer for each type of product. Include the following:

1. Indicate layout and location of each curtain wall and door type, component dimensions and field verified openings. Continue the curtain wall designation established in the Architectural Drawings.
2. Elevations of each unit, drawn at 1/2" =1'-0" scale. Indicate frame joinery.
3. Full size section details of every composite member.
4. Anchorage fastener types and locations, clips/straps/plates and reinforcing steel as required by structural calculations.
5. Anodized finish.
6. Installation and glazing Instructions.
7. Glass and glazing.
8. Sealants, including those selected by curtain wall manufacturer. Required if sealant specified within this Section.
9. Vapor containment systems.
10. Submit a final, complete, Shop Drawing set to Architect, and the Owner prior to start of fabrication. Incorporate review comments and notations from previous Shop Drawing submittals into Final Shop Drawing set. Provide in electronic PDF format.

D. Test Reports / Calculations: Test reports on each curtain wall type, complete, prepared by an independent testing laboratory certified by AAMA, and indicating that each curtain wall has been tested per these Specifications and performance criteria established in Part 1 of this Section.

E. Structural Calculations: Submit structural calculations and anchorage details prepared by independent structural engineer registered in the stat3e of Minnesota, indicating adequacy of all installed materials, including glass and glazing, to meet the structural load requirements as required by the uniform load structural test and the uniform load deflection test and dead load and framing criteria.

F. Door manufacturer shall confirm that they have received approved hardware shop drawings and associated cut outs and templates for proper door preparation.

G. Manuals: Submit manufacturer's operating and maintenance manuals for entrance hardware per requirements of Division 1.

H. Contract Closeout Submittals: As-built set of Shop Drawings, prepared by the curtain wall manufacturer, showing final configuration of curtain wall installation per requirements of Division 1.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of specified systems and materials of this Section.

1. Window and curtain wall manufacturer: Submit letter, signed by an officer of manufacturing company, and enforced during all phases of Contract, guaranteeing that materials and components are engineered and fabricated in manufacturer's facility per these Specifications and approved Shop Drawings.
2. Submit manufacturer's written certification that curtain wall meets or exceeds specified criteria, that component parts were properly designed and selected for locale

and intended installation, and that installation was made per manufacturer's written instructions.

3. Certify in writing that installers are approved to install manufacturer's products.

B. Installer Qualifications: Engage an experienced installer, with minimum of 5 years experience, who has successfully completed installation of glazed curtain wall systems similar in material, design, and extent to that indicated for Project.

C. Test reports: Submit test reports that have been performed within last 5 years on current production of specified curtain wall.

D. Structural calculations and anchorage details, prepared by an independent structural engineer licensed in the State of Minnesota, indicating adequacy of all installed materials, including glass and glazing, to meet the structural load requirements as required by the uniform load structural test and the uniform load deflection test and dead load and framing criteria.

E. Field Measurements: Verify actual locations of structural supports for glazed aluminum curtain walls by field measurements before fabrication and indicate measurements on Shop Drawings.

F. Pre-Installation Meetings:

1. Schedule pre-installation meeting for curtain wall Work. Schedule meeting after Shop Drawing review, prior to window installation, and after curtain wall materials are on site.

2. Provide a minimum of 10 working days written notice to required attendees for scheduled and rescheduled conference and testing and to confirm that curtain wall openings are complete and prepared for trial curtain wall installation(s).

3. Attendance: Require attendance of Owner, Contractor, Architect, installing Subcontractors, curtain wall manufacturer's representative, and other representatives directly associated with performance of Work.

4. Objectives: Review Specifications, approved Shop Drawings, and objectives of Trial installation and testing, mock-up test procedures, trial installation size and area, and confirm schedule for curtain wall installation.

   a. Complete trial installation and perform testing on each type of curtain wall unit with Owner retaining right to randomly select units for installation.

5. Trial Installation and Testing: Confirm that trial installation is complete in every detail, conforming to final installation and serves as a test demonstration installation for remaining Work. For mock-up, complete entire wall opening, including through-wall flashing, anchorage system, weeps, primary joint sealant, and exterior perimeter joint sealers, and review for acceptance.

G. Field Quality Control (Trial Installation):

1. Testing: Owner will engage an AAMA certified testing agency laboratory to field test the completed trial installation for compliance with specified performance criteria for air infiltration and water resistance. Testing of the trial installation shall be by AAMA and ASTM test standards and per additional requirements, definitions and criteria listed in field quality control testing.

2. The Contractor shall assist with testing procedures and otherwise cooperate with testing agency to facilitate testing. This includes providing all necessary scaffolding, lifts, enclosures, temporary heat and other equipment and utilities required to perform testing. Owner retains option to waive portions of testing as specified and will select curtain wall to be tested.

3. Testing will be performed prior to completion of interior finish Work, including installation of perimeter joint sealers, to allow visual access to areas being tested to check for water leakage.

4. Do not proceed with remainder of curtain wall installation until trial installations have passed project requirements. Correct failures and retest until installation is completely free of defects. If failures occur during testing, notify Owner and Architect as to when corrective Work will be undertaken. Owner and Architect will determine Owner's and Architect's required presence for such Work. All retests shall be by the Owner's testing agency.

5. All re-observation, re-testing and associated costs shall be the responsibility of the Contractor and deducted from the Contract Sum by Change Order.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Make no deliveries to the Project until ready to install or until approved storage is provided. Where this provision is neglected and materials are delivered to the Project site prior to the Project being ready for installation, such materials shall be properly stored elsewhere at the expense of the Contractor with adequate insurance coverage provided for the off-site storage.

B. Deliver materials in original, un-opened containers with labels intact and legible.

C. Provide above-grade platform storage for materials and that will protect the materials from moisture damage and minimize damage to ground surfaces. Use tarpaulins to provide protection of stored materials. Factory wraps alone are not sufficient.

D. Protect pre-finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

E. Handle Work of this Section per AAMA Curtain Wall Manual #10.

1.8 WARRANTY

A. All-Inclusive Warranty: Prior to final payment, submit to Owner a written, all-inclusive warranty executed by Contractor, window manufacturer, window supplier, window installer, and respective manufacturers of each product and part used under this Section, including glass manufacturer and fabricator, that each material, product, part, workmanship, and installation is free from defects for a period of 10 years from Date of Substantial Completion. Should defects develop during Warranty period, correct such defect by repair, replacement, or other means acceptable to Architect and Owner, at no cost to Owner.

1. Submit all-inclusive warranty dated and notarized by a duly authorized Notary Public of the State of Minnesota.

B. Aluminum Entrance Door:

1. Before final payment is made, provide written all-inclusive warranty to the Owner, executed by the General Contractor, the Installation Subcontractors and the respective manufacturers of each product, that all parts of Work in this Section, including insulating glass units, shall be free from defects in materials, workmanship and installation for a period of (10) ten years from the date of Substantial Completion. Should any defect develop during warranty period, such defects shall, upon request, be repaired or replaced at no additional cost to the Owner. Cost of such Work shall be borne by the Contractor.

C. Bonds: Aluminum Window, and Glass and Glazing Maintenance Bond:

1. When requested, provide a maintenance bond for a period of not less than 5 years for an amount of not less than 10 percent of products delivered price.

D. Financial Responsibility: Upon request, provide window manufacture's financial statement indicating proof of financial responsibility. Provide material, performance, and maintenance bonds for window manufacturers with less than 10 years of experience; or under financial restructuring or bankruptcy protection.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Glazed Aluminum Curtain Wall System Basis-of-Design Product:

1. Wausau Windows and Wall Systems: 8250 Superwall Series 2-piece male/female mullion.

2. Subject to compliance with requirements, available products from the listed manufacturers that may be incorporated into the Work include the following, or other approved equal

a. CMI Architectural Products, Inc.
b. EFCO Corporation
c. F-M Enterprises.
d. Kawneer North America, an Alcoa Company.
e. Modu-Line Windows, Inc.
f. Oldcastle Building Envelope.
g. Tru-Therm/Interclad.
h. Tubelite, Inc.
i. Vistawall International.

B. Aluminum Doors:

1. Subject to compliance with requirements, available products from the listed manufacturers that may be incorporated into the Work include the following, or other approved equal:

a. Tubecraft: 60 M Series Monumental Doors with 5-inch-wide stiles and top rails.
b. Empirehouse: Varsity EM Series.
c. F-M Enterprises: CMS 60 Campus Door Series.
d. Tru-Therm/Interclad: Endura II Series.
e. United States Aluminum: Duracraft 900 Door.
f. Venture/Moduline: VES-500-HWS Door Series with 5-inch-wide stiles.

2.2 MANUFACTURED UNITS

A. Curtain Wall Aluminum Members:

1. Extruded aluminum prime billet 6063-T6 alloy, aluminum sheet 5005 H34 (anodic) per ASTM B209.

2. Steel, conforming to ASTM A36, hot-dipped galvanized in accordance with ASTM A123.

3. Nonferrous, nonmagnetic stainless steel, Type 304.

4. Principal curtain wall member thickness: Minimum 0.125-inch thickness along "X" and "Y" axis. Thickness other than 0.125 inch along either axis will not be accepted.

5. Provide extruded aluminum members with sharp well-defined corners, integral screw splines for frame joinery and flush sightlines.

6. Framing members requiring use of snap-trim for closure are not acceptable.

7. Curtainwall Thermal Separator: Rigid type with minimum 3/8-inch thermal isolator. Thickness other than 3/8 inch will not be accepted. Provide continuous, unbroken isolators in horizontal frame members.

    a. Horizontal framing member intersection to vertical members shall be made air and watertight by installation of manufacturer's standard zone dam members

8. Curtain Wall framing shall fully capture each glass lite via pressure plate attachment on all sides.

9. Glazing gaskets: Minimum 1/4 inch. Gaskets less than 1/4 inch thick will not be accepted.

10. Exterior face dimension: 2-1/2 inches nominal.

11. Minimum system depth: 6-1/4 inch as required to meet structural requirements and as indicated on Architectural Drawings.

B. Aluminum Entrance Doors:

1. Monumental-Type Entrance Doors: Reinforce with stainless steel tie rod of 3/8 inch diameter running full width of top and bottom rails and fixed with stainless steel nuts and lock washers against extruded aluminum lugs. Provide cad-plated steel lock nuts.

    a. Doors: 2 inches deep with minimum wall thickness of 0.187 inch.
    b. Top Rails: 5 inches wide.
    c. Stiles: 5 inches wide.
    d. Bottom Rail: 10 inches wide.

2. Hinge Stile: Reinforce for door hinge anchorage with hot-dipped galvanized, 1-1/4 inch by 1/4-inch-thick steel bar that runs continuously for full height and is mechanically fastened for full height of stile. Anchor hinges directly into steel reinforcing.

3. Hardware: Provide hardware as indicted in Section 087100.

4. Power Actuators: Provide power actuators at doors where scheduled.

5. Base of curtain wall jamb frames receiving door frame inserts/sub-frames shall be anchored to prevent movement.

2.3 COMPONENTS

A. Internal Structural Members and Reinforcement:

1. Hot-dipped structural steel members and shapes to suit curtain wall framing, as required by structural calculations and as recommended and detailed by curtain wall manufacturer.

B. Anchor and Lateral Load Clips:

1. Concealed stainless steel or steel, hot-dipped galvanized. Shape, size and spacing shall be per final shop drawings and submitted structural calculations. Anchor clips and lateral load clips shall not penetrate the primary sealant joint nor inhibit independent frame movement. Profile anchor clips and lateral load anchor clips at sill locations to avoid altering or contracting the stainless-steel drip tray.

C. Glazing: Comply with requirements of Section 088000.

1. Glazing Method: Comply with GANA Glazing Manual for specified glass type.

2. Provide glazing per curtain wall and glass manufacturer's recommendation for sealants, glazing gaskets, and tapes.

3. Non-removable from exterior for safety reasons. Factory-apply steel welds corners of door.

4. Provide setting blocks and edge blocking in material, hardness, and locations per curtain wall and glass manufacturer's recommendations.
5. Setting Blocks/Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual.
6. Expanded Cellular Glazing Tapes: AAMA 800.
7. Glazing Gaskets: AAMA 800:
8. Exterior Glazing Gasket: Extruded sponge EPDM
9. Interior Glazing Gasket: Extruded dense EPDM
10. Interior glazing gaskets corner butt joints shall be sealed per the curtain wall manufacturer's installation instructions.

D. Glazed-In Door Frame Inserts: Provide extruded aluminum door frame insert with applied extruded aluminum stop, 7/8 inch by 4 inch deep. Completely conceal hardware reinforcements on door frame inserts. Fasten in place without method of attachment being visible. Completely conceal hardware attachments to door frame inserts.

1. Weatherstripping: Polypropylene pile insert. Insert into keyway grooves on stops of jambs and head sections of frame. Coordinate door size, hardware locations, and requirements of with aluminum door Shop Drawings and manufacturer.
2. Internal Reinforcement at Door Frame Inserts/Sub-Frames: Door frame inserts/sub-frames shall be reinforced by a hot dipped galvanized 1-1/4" x ¼" thick steel bar which runs continuously full height of the insert and is mechanically fastened to the insert. All fasteners, nuts and washers used to secure reinforcement shall be stainless steel.

E. Vapor Containment Assembly at Spandrel Panel:

1. Provide a 1/8" thick aluminum backpan vapor barrier with formed return legs on all four sides of opening. Verify required metal and configuration of backpan at firestop conditions. Backseal corner joints at return legs to create an air and vapor tight seal.
    a. Rigid Insulation: Provide in conformance with Section 072100, Thermal Insulation.
        1) Provide curtain wall insulation, impaling pins, washer clips, tape, shims, sealants approved by the curtain wall manufacturer.
        2) Provide non-combustible mineral fiber insulation where required per NFPA 285.
        3) The Contractor shall ensure that the spandrel cell insulation is always be kept dry until it is protected by glazing.

F. Joint Sealers:

1. Primary Joint Sealers and Vapor Containment Assembly: Silicone sealants are preferred. As a minimum use a mult-component polyurethane sealant. Curtain wall manufacturer is responsible for selecting the sealant manufacturer whose products can be warranted with sealant products used in conjunction with curtain wall frame assembly, curtain wall frame installation at interlocking male/female stack joints, decorative perimeter joints, cavity wall sealant work, stainless steel drip tray sealant work, and related building sealant work.
    a. Exterior and interior decorative perimeter sealant joints and other related curtain wall sealant Work shall match products selected for use by building sealant subcontractor.
2. Nonworking joints: Comply with AAMA 800.

3. Curtain wall Components: Suitable for application specified and as tested and approved by curtain wall manufacturer.

G. Formed Aluminum Extensions and Sills: Fabricate extensions and sills, as detailed on Drawings, to match curtain wall system. Fabricate these components by the same manufacturer as curtain wall system.

1. Provide 1/8-inch-thick formed aluminum sills in profiles indicated.

2. Provide continuous end caps to facilitate sealant installation and backer rod placement. Back seal for an air and watertight closure.

3. Furnish sill in 1 piece for full width of window opening when permissible.

4. Provide 1/4-inch-wide slotted weep holes in drip profile. Confirm spacing with manufacturer. Install reticulated foam baffles over inner surface of weep.

5. Slope sills to provide positive drainage to the exterior.

6. Provide a 1/16” inch thick formed Type 304 stainless steel continuous keeper, with predrilled holes. Diameter of predrilled holes shall correspond to recommendations and specifications of anchor manufacturer.

7. Anchors for keeper shall be engineered nylon with Type 304 stainless steel nail.

8. Provide 1/8-inch-thick bent aluminum support angle to secure and support top edge of sill.

9. Provide splice joints and expansion joints where shown on Drawings and approved Shop Drawings.

10. At splice and expansion joints, provide 1/16” inch thick, Type 304 stainless steel continuous backer plate, formed to match aluminum sill profile. Create working sealant joint between sill sections and provide bond breaker tape where required.

H. Formed Aluminum Sills at Precast Sills: Fabricate extensions and sills, as detailed on Drawings, to match curtain wall system. Fabricate these components by same manufacturer as curtain wall system.

1. Formed aluminum sills shall be 1/8” thick in profile as shown on the Drawings. Slope sills to provide positive drainage to exterior.

2. Provide splice joints and expansion joints where shown on the Drawings and final approved shop drawings. At splice and expansion joints, provide a 1/16” thick stainless-steel continuous backer plate, formed to match the aluminum sill profile. Create a working sealant joint between sill sections and provide bond breaker tape where required.

I. Interior Aluminum Trim: Fabricate trim as detailed on drawings, to match curtain wall system. Fabricate these components by same manufacturer as curtainwall system.

1. Provide splice joints and expansion joints where shown on Drawings and approved Shop Drawings.

2. At splice and expansion joints, provide 1/16” inch thick, Type 304 stainless steel continuous backer plate, formed to match aluminum profile. Create working sealant joint between sections and provide bond breaker tape where required

J. Fasteners:

1. Completely insulate pressure plate retaining screws from exterior air and pressure plate contact by means of a low conductivity coating on head and shank.

2.4 ACCESSORIES

A. Shims: PVC horseshoe shims in non-bearing locations and multipolymer plastic bearing shims per structural calculations and final Shop Drawing set. Horseshoe shaped multipolymer plastic bearing shims are not acceptable.

B. Curtain Wall Frame Anchorage Fasteners: Stainless steel anchors, heavy duty sleeve style, vibration resistant and removable, used to secure curtain wall and associated anchor clips and lateral load clips to concrete and grout filled concrete block. Type, size, and spacing per structural calculations and approved Shop Drawings.

C. Bond Breaker Tape: Recommended by curtain wall manufacturer.

2.5 FABRICATION

A. Aluminum Curtainwalls:

1. Do not begin fabrication until masonry details and field conditions have been verified and accepted by curtainwall manufacturer, and final review of Shop Drawings has been completed.

2. Finish, fabricate, and shop assemble under responsibility of 1 manufacturer (curtain wall Subcontractor is not the manufacturer).

3. Fabricate framing members into unitized assemblies of largest possible expanse, in curtain wall manufacturer’s plant.

4. Provide grid frame curtain wall members and components with joints neatly made, free of burrs, and assembled using extruded screw spline frame joinery resulting in tight fitting hairline joints fastened or joined in factory to develop full structural value of members and provide permanent air and water-tight joints.

5. Provide major framing members, factory assembled in manufacturer's plant, in basic rectangular units sized for ease of erection and transportation. (Systems using individual field fabrication, installer fabricated, or field assembled members are not acceptable).

6. Provide interlocking male/female type stack joints at adjacent grid frame members to allow for thermal expansion. “Stick Built” systems with 1-piece tubular members will not be accepted.

7. Interlocking joints shall be weather-stripped to provide an air and watertight seal.

8. Provide extruded aluminum mullions with sharp, well-defined corners and flush sightlines.

9. Conceal fasteners at vertical to horizontal main framing connections and at miscellaneous trim wherever possible.

10. Fabricate curtainwall, including, anchorage, to allow for thermal movement of curtainwall system and supporting elements when subjected to temperature differentials from minus 30 degrees F to plus 180 degrees F without buckling, damaging stresses on glazing, failure of sealant joints, overstressing of components, damaging loads on fasteners, noise or vibrations, and other detrimental effects.

11. Design curtain wall system and its anchorages to accommodate differential floor movements of 1/4 inch vertically without damage.

B. Aluminum Entrance Doors:

1. Factory-weld each corner of door inside tubes allowing stiles and rails to be accurately fitted to flush hairline joints. Seal ends of rails prior to abutting stiles for weathertight connection.

2. Shop mortise and reinforce doors per hardware manufacturer's templates for specified hardware items such as pulls, exit devices, closers, and overhead stops.

   a. Reinforcing: Hot-dipped galvanized, 3/16-inch-thick steel.

3. Door Glazing Channel: Snapped in and nonremovable from exterior, without visible fasteners. Size glazing channels accordingly to accommodate 1-inch laminated safety insulating glass units and single pane glass units in thickness specified and where required. Backseal glazing channels butting against door members and butt joints between glazing channel members to prevent air and water intrusion to interior. Allow glazing channel to weep infiltrating water to exterior.

   a. Minimum Wall Thickness: 0.060 inch.

C. Drainage System:

1. Provide Individual glass lites with pressure-equalized weepage.

2. Provide weep slots in pressure plates and weep slots in aluminum trim snap on covers to drain condensation or accumulating water within system to exterior.

D. Thermal Break:

1. Curtain wall assembly shall be thermally broken by manufacturer's standard 3/8" thick isolator, sealing against air and water infiltration. Provide continuous, unbroken isolators in horizontal frame members.

2. Framing intersections shall be made air and watertight by installation of manufacturer's standard zone dam members. Provide profile to ensure proper fit to molded corner of interior glazing gasket and to prevent gapping between frame members. Seal zone dam with manufacturer's approved sealant.

3. Ensure framing intersections are air and watertight by installation of manufacturer's standard zone dam members. Provide profile to ensure proper fit to molded corner of interior glazing gasket and to prevent gapping between frame members. Seal zone dam with manufacturer's approved sealant.

E. End Piece Covers: End piece covers designed to complete curtain wall installation of a sharp, uninterrupted exterior profile. Design end piece covers, as detailed on Drawings, to attach to inside of end of extrusion, not to the exterior of extrusion.

1. Apply end piece covers to pressure plate. Cut to length in factory allowing for a 3/32-inch gap maximum at each end, or minimum necessary for expansion/contraction for a given member. Provide weep areas to facilitate drainage to exterior. Provide end caps on covers at non-weep areas to facilitate exterior perimeter joint sealer installation. Field fabrication of snap covers will not be accepted.

F. Weather-stripping:

1. Closed cell extruded dense neoprene.

2. 2 rows of extruded fin-type weather-strip installed in extruded races at interlocking members to provide air and watertight seal.

2.6 FINISHES

A. Provide exposed surfaces of aluminum curtainwall and entrance door, components and trim with anodized finish conforming to the Aluminum Association Designation, Architectural Class 1, AA-M10C22 and the following:

1. Provide anodic coating continuous, fully sealed, and free from powdery surfaces.

2. Coating Thickness: Minimum of 0.7 mils when tested per ASTM B244.

3. Anodic Coating at Aluminum Frame Types:

a. Aluminum Curtain Wall Systems:

1) Exterior Curtain Wall Frame: Dark Bronze
2) Interior Curtain Wall Frame: A41-Clear

b. Aluminum Entrance Doors: Dark Bronze
c. Interior Curtain Wall Systems:

1) A41-Clear

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions:

1. Verify that openings into which curtain wall will be installed are correct size to permit installation of curtain wall per manufacturer's installation instructions. Installation start-up indicates acceptance of conditions.
2. Do not install curtain wall until this or other unsatisfactory conditions are corrected.
3. Properly prepare and clean each window opening before installation of window system and trim. Confirm that areas indicated to receive sealant joints have been cleaned per sealant manufacturer's instructions.
4. Ensure that wall conditions at sill, jamb, and head will not short circuit thermal break in frame when installed.

3.2 INSTALLATION

A. Erection of Curtain Wall System:

1. Install curtain wall in exact compliance with approved Shop Drawings and Specifications.
2. Provide anchor clips, lateral load clips, anchorage fasteners, shims, and internal reinforcement as indicated on approved Shop Drawings and structural calculations, to secure and properly support curtain wall assembly to wall surrounds. Account for differential movement between curtain wall frame and wall surrounds caused by calculated thermal expansion and contraction of curtain wall frame sections; building live and dead load movement; supporting structure movement such as story drift, column shortening, or long term creep; and lateral loads while maintaining perimeter expansion tolerances and independent frame movement as shown on the approved Shop Drawings.
3. Set sill frame of curtain wall to not project towards exterior beyond head frame.
4. Torque pressure plate screws to manufacturer's standard compression value.
5. Cap-seal anchor clips, lateral load clips, and associated anchorage fasteners that penetrate interior perimeter sealant joint to prevent air and vapor migration. Insulate aluminum that is not organically coated from direct contact with steel, masonry, concrete, or other dissimilar metals by bituminous paint, zinc chromate primer, non-conductive shims, or other suitable insulating material.
6. End-damn open ends of curtain wall framing to provide air and water-tight seal and support to primary joint sealer.
7. Set units plumb, level, square, and true to line, without warp or rack of imposed loads on frames. Adjust Work to the following tolerances in maximum variation.

a. Plumb: 1/8 inch maximum for entire height. Variation from plumb, with curtain wall sill projecting towards exterior, beyond top of curtain wall is not acceptable or permitted.
b. Level: 1/8 inch per 10 feet of width, non-accumulative.
c. Maximum offset between 2 identical members abutting end to end line: 1/32 inch.

8. Install bond breaker tape and sealant, as recommended by curtain wall manufacturer, along joint between split mullions. Set zone dams in sealant as recommended by curtain wall manufacturer. Install end dams at open ends of curtain wall framing.

9. Prior to installing vapor containment assembly, continuously cap seal curtain wall frame joinery within the spandrel panel area to prevent vapor intrusion and bypass.

10. Vapor containment assembly installation shall provide a vapor tight barrier to prevent the formation of condensation. Vapor barrier shall not be punctured.

11. Install aluminum trim snap-on covers. Do not pound covers into place with sharp edged tools. Dimpling of covers during installation is not acceptable. Replace dimpled aluminum material at no cost to Owner.

12. Fastener installation: Through-fasteners short-circuiting thermal barriers are not acceptable.

a. Install curtain wall system so that wall conditions at sill, jamb, and head do not short circuit thermal broke system when installed.
b. Do not install fasteners, bolts, screws, or other components to impair independent frame movement.
c. Do not install anchor clips and lateral load clips that penetrate primary sealant joint or inhibit independent frame movement.
d. Fasteners within weep system is prohibited.

13. Bed open bottoms of curtain wall frames at floor line in sealant to provide air and watertight seal.

14. Provide manufacturer's on-site supervision of installation.

B. Aluminum Entrances and Frames:

1. Comply with manufacturer’s instructions for installation of frames, doors, and hardware.

2. Set units plumb, level, and true to line, without warp or rack of frame.

3. Anchor frames solidly to surrounding construction.

4. Apply protective coating to separate aluminum from galvanically incompatible materials.

5. Apply joint sealer under thresholds and around frames (interior and exterior).

3.3 FIELD QUALITY CONTROL

A. The Contractor will provide written notice to appropriate firms and laboratories that window installation is complete and ready for field quality control testing. Provide minimum of 10 working days notice for both initial and rescheduled testing.

B. Owner will engage an independent, AAMA certified testing laboratory to field test completed window installation for compliance with specified performance criteria for air infiltration and water resistance.

1. Testing for the completed curtain wall installation will be AAMA and ASTM test standards and per additional requirements, definitions and criteria listed in the field quality control testing below. If curtain wall assembly exceeds constructability limits

for a Method B test chamber, the Owner retains option to utilize AAMA 501 field test standards as tabulated and defined below.

2. Testing shall occur prior to interior finish work, including interior perimeter sealant joint, to allow visual access to areas being tested to check for water penetration.

3. The Contractor shall assist with testing procedures and otherwise cooperate with the testing agency, including provide all scaffolding, lifts, enclosures, temporary heating and other equipment and utilities to facilitate testing.

4. The Owner retains the option to waive portions of testing as specified. The Owner will randomly select curtain wall to be tested.

C. If failures develop under testing, reasons for the failure shall be identified by the Contractor and failures shall be repaired and retested until the installation is completely free of defects. If failures develop under testing, The Contractor shall notify the Owner and the A/E as to when corrective work will be undertaken, and determinations will be made by them as to their required presence for such Work. All retests shall be by the Owner's testing agency.

D. Re-observation, re-testing, and associated costs are responsibility of Contractor and deducted from Contract Sum by Change Order.

3.4 ADJUSTING

A. Adjust movable units to operate smoothly and to be weather-tight when closed. Lubricate hardware to provide properly working condition.

3.5 CLEANING

A. Clean completed systems inside and out, promptly after erection of framing, glass, and sealants. Remove excess sealants, dirt, and other contaminants from aluminum, glass, and adjacent materials. Remove debris from Work site.

3.6 PROTECTION

A. Take protective measures to ensure installation is without damage or deterioration at time of acceptance other than normal weathering. If defects develop prior to Date of Substantial Completion of Work, repair damage or replace with new materials, at no additional cost to Owner.

3.7 TESTING SCHEDULE

Method of Testing	Pass/Fail Definitions	Frequency	Action required (If Failure)
Air Leakage: Conduct air leakage te3st per AAMA 503; including the adjacent wall substrate, exterior perimeter sealant joint and the primary sealant joint.	Maximum allowable rate of air leakage shall not exceed 0.06 cfm/sq.ft. Minimum air leakage test pressure shall be 6.24 lbs./sq.ft.	10% or minimum of 3 curtain wall assemblies, whichever is greater.	For each failed test: 1. Identify reason for failure. 2. Repair failure and retest the installation unit until it is completely free of defects. 3. Test two additional curtain wall assemblies.

Test Chamber shall be AAMA 502, Method B requirements and applied to the exterior of the wall except where the testing agency determines that an interior test chamber is required.			
Water Penetration: Conduct water penetration test per AAMA 503; including the adjacent wall substrate, exterior perimeter sealant joint and the primary sealant joint. Test Chamber shall be AAMA 502, Method B requirements and applied to the exterior of the wall except where the testing agency determines that an interior test chamber is required.	No water shall: penetrate through the perimeter frame or primary sealant join, be visible on interior surfaces, be visible on sub-sill flashing; pass beyond the plane parallel to the glazing (the vertical plane) intersecting the innermost projection of the curtain wall: or be present within or enter the wall cavity during the water penetration test. Minimum water penetration test pressure shall be 12 lbs./sq.ft.	As defined above.	As defined above.

END OF SECTION 084413

SECTION 086223 - TUBULAR DAYLIGHTING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Tubular daylighting devices and accessories.

B. Related Sections include the following:

1. Division 7 Section “Ethylene-Propylene-Diene-Monomer (EPDM) ROOFING” for roof flashings.

1.2 REFERENCES

A. Unit Skylight Standard: Comply with the most recent publication of AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication.

B. American National Standards Institute (ANSI): ANSI C63.4-2014 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

C. ASTM International (ASTM):
1. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
2. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building
3. ASTM A 463/A 463M - Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process
4. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process.
5. ASTM A 792/A 792M – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
6. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
7. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference
8. ASTM D 635 - Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position.
9. ASTM D 1929 - Test Method for Ignition Properties of Plastics.
10. ASTM D 2843 – Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics

D. International Building Code (IBC):
1. IBC Section 2606.7.2 - Installation - Diffuser Fall Out Test (Devised by PE); 2012.
2. IBC Section 1710 - Load Test Procedure for Wind Load Testing on Rooftop Daylight Collecting System - Structural Performance Testing – (Devised by PE); 2012

E. Factory Mutual (FM):
1. FM Standard 4431 - The Approval Standard for Skylights.

F. Federal Emergency Management Agency (FEMA):
1. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes

G. International Code Council (ICC):
1. ICC 500 - Standard for the Design and Construction of Storm Shelters.

H. International Code Council Evaluation Service, Inc. (ICC-ES):

1. ICC-ES AC-16 - Acceptance Criteria for Plastic Skylights; 2008.

I. OSHA 29 CFR - 1910.23 (e)(8) (Guarding Requirements for Skylights); 1926 Subpart M (Fall Protection); 1926.501(b)(4)(i); 1926.501(i)(2); 1926.501(b)(4)(ii).

J. California State OSHA Fall Protection Code of Regulations, Title 8, Section 3212 (e)(1).

K. Code of Federal Regulations (CFR):
1. CFR 47 - Code of Federal Regulations (CFR) Rules and Regulations for FCC, FCC Part 15 - Radio Frequency Devices, Subpart B - Unintentional Radiators, Section 15.107 - Conducted Limits, and 15.109 - Radiated Emission Limits

L. CSA Group (CSA):
1. CSA C22.2 No. 250.0 - Luminaires.

M. Federal Emergency Management Agency (FEMA):
1. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes.

N. General Services Administration (GSA):
1. GSA-TS01-2003: Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Data sheets showing roof dome assembly, flashing base, reflective tubes, diffuser assembly, and accessories.
4. Installation requirements.

B. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including rough opening and framing dimensions, anchorage, roof flashings and accessories.

C. Electrical wiring diagrams and recommendations for power and control wiring.

D. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

E. Sample Warranty: Provide sample of manufacturer’s warranty.

1.4 PERFORMANCE REQUIREMENTS

A. Daylight Reflective Tubes: Spectralight Infinity with INFRAREDuction Technology combines ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields an average total- and specular-reflectance for the Visible Light spectrum (400 nm to 700 nm) providing maximized visible light transmission and less than 25 percent reflectance for Infrared (IR) heat wavelengths (750 nm to 2500 nm) for minimized heat transmission, resulting in a spectrally-selective Total Solar Spectrum (250 nm to 2500 nm) reflectance less than 37 percent, as measured using a Perkin Elmer Lambda 1050 spectrophotometer with a Universal Reflectance Accessory. Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance with ASTM E308.

B. AAMA/WDMA/CSA 101/IS2/A440, Class CW-PG70, size tested 21-inch (533 mm) diameter, Type TDDOC and Type TDDCC.

1. Air Infiltration Test:

a. Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.

2. Water Resistance Test:

a. Passes water resistance; no uncontrolled water leakage with a pressure differential of 10.7 psf (512 Pa) or 15 percent of the design load (whichever is greater) and a water spray rate of 5 gallons/hour/sf for 24 minutes when tested in accordance with ASTM E 547 and ASTM E 331.

3. Uniform Load Test: All units tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.

a. No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa)

C. Fire Testing.

1. Fire Rated Roof Assemblies:

a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the International Building Code for Class A, B, and C roof assemblies.

2. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the International Building Code.
3. Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
4. Smoke Density: Rating no greater than 450 per ASTM Standard E 84 in way intended for use. Classification C.
5. Rate of Burn and/or Extent: Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D 635.
6. Rate of Burn and/or Extent: Maximum Burn Extent: 1 inch (25 mm) Classification CC-1 per ASTM D 635.

D. FM Certification:

1. Spread of Flame: Passes: Class A at 5 in 12. No flame spread when tested in accordance with FM modified version of ASTM E108 Fire Test of Roof Coverings.

2. Simulated Hail Resistance (Pre UV Exposure): Passes: No cracking or breaks when tested with nominal 2.0 in. (51 mm) diameter ice ball having a kinetic energy of 26.8 ft-lbs (36.4J)

3. Simulated Hail Resistance (Post UV Exposure): Passes: No cracking or breaks when tested with nominal 2.0 in. (51 mm) diameter ice ball having a kinetic energy of 26.8 ft-lbs (36.4J) after no less than 1000 hours of ultraviolet (UV) light exposure.

4. Simulated Impact: Passes: No breakage or through openings when a 100 lb (45.5 kg) weight dropped from 4 ft (1.2 m) above highest point of test sample.

5. Simulated Wind Uplift: Passes: 195 psf Wind Rating. No separation, breaking or cracking occurred when tested in accordance with FM 4431.

E. ICC 500 / FEMA P-361 Compliance (Tested to comply with highest wind speed Safe Room design of 250 mph).
1. Missile Impact: Passes: 15 pound, 13 foot 2 by 4 with a velocity of 98 fps when tested in accordance with ASTM E1886.
2. Uniform Load Test: No failure when tested at a Positive Load of 325 psf and a Negative Load of 325 psf when tested in accordance with ASTM E330

3. Design Pressure: No failure when tested at a Positive Pressure of 270 psf and a Negative Pressure of 270 psf when tested in accordance with ASTM E1886 (Air Pressure Cycling)

F. Fall Protection Performance:
1. a. Passes fall protection test: No penetration of dome or curb cap when subject to 400 lb (160 Kg)/42 inch (1066 mm) impact drop test when tested in accordance with OSHA 29 CFR 1926.506(c) Safety Net Systems.
b. Passes fall protection test: California State OSHA Fall Protection Code of Regulations, Title 8, Section 3212 (e)(1) Skylight Screens.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A single manufacturer engaged in manufacture of tubular daylighting devices for a minimum of 20 years.

B. Skylights shall conform with authorities having jurisdiction and be designed to meet design criteria of the project location and the following:

C. Skylights must be Tested and labeled in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.

D. Skylights must have Factory Mutual (FM) Approval Class Number 4431.

E. Installer Qualifications: An installer acceptable to daylighting device manufacturer for installation of units required for this Project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.

B. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by the manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Daylighting Device: Provide manufacturer's standard warranty, agreeing to repair or replace work that exhibits defects in materials or workmanship and guaranteeing weathertight and leak-free performance. “Defects” is defined as uncontrolled leakage of water and abnormal aging or deterioration of metals, metal finishes, and other components.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturers: Solatube International, Inc.; 2210 Oak Ridge Way, Vista, CA 92081. Tel. Toll Free: 888-765-2882. Tel: (760) 477-1120. Fax: (760) 597-4488. Email: commsales@solatube.com. Web: www.solatube.com.

B. Substitutions: Not permitted

2.2 TUBULAR DAYLIGHTING DEVICES

A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16. FM Standard 4431, approved.

B. SolaMaster Series: Solatube Model 750 DS-O, 21-inch (530 mm) Daylighting System:

1. Solatube Model S750DS-O (Open Ceiling) Ceiling. AAMA Type TDDCC.

2. Dome Otions: (Update)

a. Roof Dome Assembly: Transparent, UV and FEMA compliant impact resistant dome with flashing base supporting dome and top of tube.

~~1) Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.~~

~~2) Inner Dome Glazing: Type DAI, 0.115 inch (3 mm) minimum thickness acrylic classified as CC2 material.~~

3) Inner Dome Glazing: Type DPI, 0.115 inch (3 mm) minimum thickness polycarbonate classified as CC1 material.

4) Dome Edge Protection Band (PB)

5) Dome Security Kit (SK). Type SK Dome Security Kit, rivets with nylon spacers to replace dome screws.

6) Security Bar (B). Type B Security Bar 0.375 inch (95 mm) stainless steel bar across flashing diameter opening

b. Tube Ring: 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC. Prevents thermal bridging between base flashing and tubing and channel condensed moisture. Attached to base of dome ring with butyl glazing rope 0.24 inch (6 mm) diameter; to minimize air infiltration.

c. Dome Seal: Adhesive backed weatherstrip, 0.63 inch (16 mm) tall by 0.28 inch (7 mm) wide.

d. LightTracker Reflector, made of aluminum sheet, thickness 0.015 inch (0.4 mm). Positioned in the dome to capture low angle sunlight.

e. Dome Edge Protection Band: Type PB, for fire rated Class A, B or C roof applications. Galvanized steel. Nominal thickness of 0.039 inch (1 mm). For use with Self Mount Flashing Types F4, F8, and F11 Flashings, only

f. Dome Edge Protection Band for Curb Cap: Type PBC, for fire rated Class A, B or C roof applications with 750 DS Domes on Curb Cap Flashing installations. Galvanized steel. Nominal thickness of 0.039 inch (1 mm). For use with Curb Cap Flashing (Type FC), only.

g. Secondary Diffuser: Type SS, Acrylic plastic classified as CC2 material. Thickness shall not be less than 0.100 inches.

h. Secondary Diffuser: Type SS, Acrylic plastic classified as CC2 material. Thickness shall not be less than 0.100 inches.

3. Flashings

a. Roof Flashing Base: One-piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M or ASTM A792/A 792M, 0.028 inch (0.7 mm) plus or minus .006 inch (.015 mm) thick.

1) Base Style: Type CXX, Conforming Custom Metal Insulated Curb. Coordinate size with fixture and roofer. Reference Section 076000 for additional requirements.

2) Curb Cap: Type FC,

b. Flashing Options:

1) Curb Insulator: Curb Insulator, Type CI, Thermal isolation material is for use under flashing Type FC.
2) Curb Cap Insulation: Type CCI, Nominal 1-inch-thick thermal insulation pad to reduce thermal conduction between curb-cap and tubing and thermal convection between room air and curb-cap. Rated R-6 (OFxft2xhr/Btu) Insulation is Polyisocyanurate foam utilizing CFC, HCFC, & HFC free blowing agent. Type-1 Class-1 per ASTM C 1289; Passes UL 1715 (15-minute thermal barrier per IBC 2603.4)

4. Transfer Zone:

a. Extension Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm) conforming to ASTM B 209.

1) Reflective Tubes:

a) Reflective extension tube, Type EXX and Type EL with total length of run as indicated on the Drawings (Confirm if length if not otherwise indicated on drawings).
b) Interior Finish: Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance.

5. Delivery Zone:
a. Diffuser Assemblies for Tubes Not Penetrating Ceilings (Open Ceiling): Solatube Model 750 DS-O. 21 inch (530 mm) diameter, L2P Polycarbonate Prismatic Diffuser diffuser attached directly to bottom of tube.

2.3 ACCESSORIES

A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.

B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.

C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

D. Other accessories, as recommended by manufacturer, for the installation and assembly in an ICC-500 FEMA storm shelter application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions.

C. If substrate and rough opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Coordinate installation with substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing to ensure that each element of the Work performs properly and that finished installation is weather tight.

1. Install flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.
2. Provide thermal isolation when components penetrate or disrupt building insulation. Pack fibrous insulation in rough opening to maintain continuity of thermal barriers.
3. Coordinate attachment and seal of perimeter air and vapor barrier material.

C. Anchorage: Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressure

D. Where metal surfaces of tubular unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, provide permanent separation as recommended by manufacturer

E. Align device free of warp or twist, maintain dimensional tolerances.

F. Inspect installation to verify secure and proper mounting. Test each fixture to verify operation, control functions, and performance. Correct deficiencies.

3.4 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances

3.5 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Monolithic glazing materials installed in transoms, borrowed lights and windows.
2. Safety glazing materials installed as vision lights in doors, borrowed lights, and windows
3. One-Way Reflective Glazing, to be used at observation windows.
4. Fire-rated ceramic glazing to be installed in fire-rated doors, borrowed lights and windows.
5. Insulated glazing as installed in aluminum-framed storefront, curtain walls, and/or exterior windows.
6. Insulated safety glazing as installed in aluminum-framed storefront, entrances, curtain walls, and/or exterior windows
7. Self-adhering translucent glazing films – to be applied on existing glazing.

B. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Section 081113 – Hollow Metal Doors and Frames
2. Section 081416 – Flush Wood Doors
3. Section 084113 – Aluminum-Framed Entrances and Storefronts
4. Section 084413 - Glazed Aluminum Curtain Walls

1.3 DEFINITIONS

A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Insulating Glass: Failure of hermetic seal under normal usage that is attributed to the manufacturing process and not to causes other that glass breakage and practices for maintaining and cleaning insulating glass contrary to the manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.4 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings

B. Consumer Product Safety Commission (CPSC):

1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials

C. ASTM E2010-01: Standard Test Method for Positive Pressure Fire Tests of Window Assemblies

D. National Fire Protection Association (NFPA):

1. NFPA 80: Fire Doors and Windows.

2. NFPA 257 – Fire Tests of Window Assemblies

E. Glass Association of North America (GANA):

1. GANA – Glazing Manual.

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) as required the Minnesota State Building Code, without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Glazing Manual."

C. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

D. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

a. The maximum Lateral Deflection for the following types of glass that are supported on all 4 edges, provided the thickness required that limits center deflection at design wind pressure to 1/50 times short side length or 1 inch, whichever is less.

1) For monolithic glass lites heat treated to resist wind loads.
2) For insulating glass

E. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

F. Fire Protection-Rated Glazing:

1. Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to NFPA 257 or UL 9, including the hose-stream test, and shall comply with NFPA 80.

A. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes shall be exempt from the hose-stream test.

2. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per ASTM E2074-00 and UL 10B, labeled and listed by UL

G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

H. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with basic-protection testing requirements in ASTM E 1996 for Wind Zone 2 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.

1. Large-Missile Test: For glazing located within 30 feet (9.1 m) of grade.

2. Small-Missile Test: For glazing located more than 30 feet (9.1 m) above grade.

1.6 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: For the following products, in the form of 12-inch- square Samples for glass and of 12-inch- long Samples for sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

C. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.

D. Product Test Reports: From a qualified testing agency indicating the following products comply with requirements, based on comprehensive testing of current products.

E. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.

F. SWRI Validation Certificate: For each elastomeric glazing sealant specified to be validated by SWRI's Sealant Validation Program.

G. Qualification Data: For installers.

H. Manufacturer’s Written Instructions for the maintenance and cleaning of insulated glass.

I. Warranties: Special warranties specified in this Section.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, coated float glass, laminated glass, glass-clad polycarbonate and insulating glass

C. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.

1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

2. Glass Testing Agency Qualifications: An independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program

D. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.

1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.

2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

3. Test elastomeric glazing sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness

E. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction

F. Fire Protective Rated Glass: Each lite shall bear permanent, nonremovable label of UL certifying it for use in tested and rated fire protective assemblies.

G. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per ASTM E2074-00 and UL 10B, labeled and listed by UL

H. Glazing Publications: Comply with the following published recommendations:

1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.

I. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency: Insulating Glass Certification Council.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F (4.4 deg C).

1.10 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer’s Warranty for Vertical Glazing: Provide written manufacturer’s warranties for replacement of deteriorated glass, associated glazing product accessories and units, including coated, heat-strengthened and insulating glass units, due to normal conditions of use and not to handling, installation, protection and maintenance practices contrary to the glass manufacturer’s published instructions. Defects shall include edge seal separation, delamination, cracks, blemishes, or material obstructing vision through the glass. Should any defect develop during the warranty period, such defects shall, upon request, be repaired or replaced at no additional cost to the Owner. Costs of such Work shall be borne by the defective product manufacturer. Provide written warranties for a ten (10) year warranty period from the date of Substantial Completion.

C. Manufacturer’s Warranty for Laminated Glass and Tempered Safety Glass: Provide written manufacturer’s warranties for replacement of deteriorated laminated and tempered safety glass, associated with glazing product accessories and units, due to normal conditions of use and not to handling, installation, protection and maintenance practices contrary to the glass manufacturer’s published instruction. Defects shall include edge seal separation, delamination, cracks, blemishes, or material obstruction vision through the glass. Defects covered by the warranty for heat-soaked tempered glass shall include spontaneous breakage of the tempered glass due to inclusion, particularly nickel sulfide. Should any defect develop ducting the warranty period, the Contractor shall replace the glass, pay for the cost of replacement labor, including all incidental costs as a result of breakage. Costs of such Work shall be borne by the defective product manufacturer. Provide written warranties for a ten (10) year warranty period from the date of final Substantial Completion

D. Manufacturer's Special Warranty on Insulating Glass: Manufacturer’s standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Manufacture.

E. If there are separate manufacturers for each to the different glass types, then a separate warranty shall be provided by each manufacturer

PART 2 - PRODUCTS

2.1 MANUFACTURERS OR FABRICATORS

A. Manufacturer, Basis of Design: Viracon.

B. Subject to compliance with requirements, provide products from one of the following manufacturers or fabricators for each type of glass specified, specific products listed are basis of design products, products by other manufacturers shall be submitted for approval by the Architect:

1. Advanced Glass Systems.
2. AFG Industries, Inc.
3. Cardinal Glass Industries.
4. Guardian Industries.
5. Monsanto Company, Inc.
6. Oldcastle Glass.

7. Pilkington Building Products.
8. PPG Architectural Glass.

2.2 GLASS PRODUCTS

A. See paragraphs 3.4 and 3.5 in this Section for the glazing products that are scheduled be used in this project.

B. Annealed Float Glass: ASTM C 1036, Type I, Quality-Q3.

C. Fully Tempered Glass – Glass that has been heat-treated using the horizontal (roller hearth) method and complies with ASTM C1048, Type I, Class 1 (clear), Class 2 (tinted), Quality Q3 (glazing select), Kind FT.

1. Tempered architectural safety glass shall conform with ANSI Z97.1 and CPSC 16 CFR 1201.

D. PVB Laminated Architectural Flat Glass:

1. ASTM C1172 Standard Specification for Laminated Architectural Flat Glass.
2. All laminated architectural safety glass shall conform with ANSI Z97.1 and CPSC 16 CFR 1201.
3. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written recommendations.
4. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
5. Interlayer Color: Clear unless otherwise indicated
6. Laminated Glass products to be fabricated free of foreign substances and air or glass pockets in autoclave with heat plus pressure.

E. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in the Insulating-Glass Schedule at the end of Part 3.

1. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the Insulating-Glass Schedule at the end of Part 3 are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
    a. Unit Overall Thickness Tolerance: Minus 1/16 inch (1.6 mm) to 1/32 inch (0.8 mm) for a 1 inch (25 mm) two ply insulating unit. Unit constructed with patterned or laminated glass shall be plus or minus 1/16 inch (1.6 mm).
2. Provide coated insulating glass nominal values based on manufacturer’s published performance values for units with ¼ inch panes of glass and ½ inch thick air space, or performance characteristics designated.
3. Sealed Insulating Glass Units to be double sealed with a primary seal of polyisobutylene or VTS and a secondary seal of silicone.
    a. The minimum thickness of the secondary seal shall be 1/16 inch (1.6 mm) for metal spacers and 5/32 inch (4 mm) for VTS.
    b. The target width of the primary polyisobutylene seal shall be 5/32 inch (4 mm) and the target width of VTS shall be 1/4 inch (6 mm).
    c. There shall be no voids or skips in the primary seal.
    d. Up to a maximum of 3/32 inch (2.4 mm) of the spacer may be visible above the primary polyisobutylene sealant.

e. Gaps or skips between primary and secondary sealant are permitted to a maximum width of 1/16 inch (1.6 mm) by maximum length of 2 inches (51 mm) with gaps separated by at least 18 inches (457 mm) and a maximum width of 1/16 inch (1.6 mm) by maximum length of 6 inches (152 mm) along the VTS splice. Continuous contact between the primary seal and the secondary seal is desired

2.3 FIRE PROTECTIVE RATED GLASS

A. Manufacturers:

1. Fire Protective Rated Glass Basis-of-Design Products:

a. Fire Protected, Non-Impact Safety Rated: FireLite® as manufactured by Nippon Electric Glass Company, Ltd and distributed by Technical Glass Products.
b. Fire Protected, Impact Safety Rated: FireLite Plus® as manufactured by Nippon Electric Glass Company, Ltd, and distributed by Technical Glass Products.

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

a. Safti First Fire Rated Glazing Solutions
b. Technical Glass Products
c. AGC Glass Company North America, Inc.
d. Vetrotech Saint-Gobain.

B. Single Source Responsibility: Provide fire protective rated glass produced by a single manufacturer of the units identical to those specified.

C. Monolithic Ceramic Glazing Material: Proprietary product in the form of clear flat sheets of 3/16-inch nominal thickness weighing 2.5 lb/sq. ft., and as follows:

1. Fire-Protection Rating: As indicated for the fire window in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.

2.4 ELASTOMERIC GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range for this characteristic.

B. Elastomeric Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Subject to compliance with requirements, provide products from one of the following manufacturers:

a. Bostik, Inc.
b. Dow Corning Corporation
c. GE Construction Sealants
d. Sika Corporation

e. Tremco Incorporated

C. Elastomeric Glazing Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied, chemically curing sealant in the Glazing Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

D. Low-Emitting Materials: Sealants shall have a VOC content of not more than 250 g/L.

E. Low-Emitting Materials: Sealants shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. Glazing Sealant for Fire-Resistive Glazing Products: Identical to product used in test assembly to obtain fire-protection rating.

2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tape: Closed-cell, PVC foam tape; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.
2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.6 GLAZING GASKETS

A. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.

B. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. Neoprene, ASTM C 864.
2. EPDM, ASTM C 864.
3. Silicone, ASTM C 1115.
4. Thermoplastic polyolefin rubber, ASTM C 1115.
5. Any material indicated above.

C. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. Neoprene.

2. EPDM.

3. Silicone.

4. Thermoplastic polyolefin rubber.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire resistance rating

2.8 SELF-ADHERING TRANSLUCENT GLAZING FILM

A. Basis of Design Product: 3M™ CRYSTAL Glass Finishes 7725SE-314 Dusted CRYSTAL by 3M Architectural Products

1. Subject to compliance with requirements, provide named product from the named manufacturer or approved equal product by other manufacturer meeting all requirements listed below and approved by Architect.

B. Performance Requirements: Provide self-adhering translucent glazing film complying with the following requirements:

1. Film Type: Vinyl.

2. Adhesive Type: Pressure-sensitive acrylic.

3. Release liner: Silicone-coated polyester

4. Thickness:

a. Film: 3.2 mils (81 microns)

5. Color: 314 Dusted White

6. Fire Rating: ASTM E84, Class A as defined in NFPA 101, Life Safety Code®.

7. Tensile Strength Minimum: 5 lb./in. at 73°F (23N / 25mm at 23°C)

8. Applied Product Shrinkage: 0.01 in. (0.3mm) maximum

9. Applied Product Exposure Temperature: -40°F - +149°F (-40°C - +65°C)

2.9 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

C. Grind smooth and polish exposed glass edges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine glass framing, with glazier present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
2. Minimum required face or edge clearances.
3. Observable edge damage or face imperfections.
4. Effective sealing between joints of glass-framing members.

B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.2 INSTALLATION

A. Comply with referenced FGMA standards and instructions of manufacturers of glass, glazing sealants, and glazing compounds.

B. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are contained in GANA's "Glazing Manual."

C. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

D. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass, and impair performance and appearance.

E. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

F. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

G. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

H. Provide spacers for glass lights where the length plus width is larger than 50 inches as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and

glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape

I. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

J. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

K. Tape Glazing

1. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

2. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

3. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

4. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

5. Do not remove release paper from tape until just before each glazing unit is installed.

6. Apply heel bead of elastomeric sealant.

7. Center glass lights in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings

L. Gasket Glazing (Dry)

1. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

2. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

3. Center glass lights in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

4. Install gaskets so they protrude past face of glazing stops

M. Sealant Glazing (Wet):

1. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lights and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

2. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

3. Tool exposed surfaces of sealants to provide a substantial wash away from glass

N. Remove nonpermanent labels, and clean surfaces immediately after installation.

3.3 PROTECTION AND CLEANING

A. Protect glass from contact with contaminating substances resulting from construction operations. Remove any such substances by method approved by glass manufacturer.

B. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer

C. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period

D. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion. Wash glass by method recommended by glass manufacturer.

3.4 GLAZING SCHEDULE

A. Monolithic Glass Types:

1. GL-XX Glass Type: Clear Annealed Float Glass.
    a. Overall thickness of 1/4 inch.
    b. Provide at interior at hollow metal frames, where safety glazing is not required by Code
2. GL-XX Glass Type: Fully Tempered Float Glass.
    a. Overall thickness of 1/4 inch.
    b. Provide at glazed doors, and at hollow metal frames where safety glazing is required by Code
3. GL-XX Glass Type: Mirrored Tinted Bullet Resistant: Global Security Glazing: 1-5/64-inch PPG Mirror Pane Secur-tem plus Poly-UL Level III, Code-SP311 or approved equal.

B. Fire-Rated Glass Types:

1. GL-XX: Fire Protective Rated Glass, Non-Impact Safety Rated
    a. Thickness: 3/16 inch [5 mm].
    b. Weight: 2.4 lbs./sq. ft.
    c. Approximate Visible Transmission: 88 percent.
    d. Approximate Visible Reflection: 9 percent.
    e. Hardness (Vicker's Scale): 700.
    f. Fire-rating: 20 minutes to 90 minutes.
    g. Impact Safety Resistance: None.
    h. Positive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes.
    i. Surface Finish:
        1) Premium Grade-Ground and polished on both sides.
2. GL-XX: Fire Protective Rated Glass, Impact Safety Rated
    a. Thickness: 5/16 inch [8 mm] overall.
    b. Weight: 4 lbs./sq. ft.
    c. Approximate Visible Transmission: 85 percent.
    d. Approximate Visible Reflection: 9 percent.
    e. Fire-rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications.
    f. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).

g. STC Rating: Approximately 38 db.
h. Surface Finish:

1) Premium Grade-Ground and polished on both sides

i. Positive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes.

C. Laminated and Fully Tempered Glass Types:

1. GL-XX Glass Type: Laminated-tempered glazing for use at all interior glazing unless noted otherwise: Two layers of 1/8" fully tempered glass laminated with polyvinyl butyl interlayer.

a. Fully Tempered Float Glass: ASTM C 1048, Kind FT; Type I, Quality-Q3, Clear.
b. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified A. GL-XX Glass Type: Laminated-tempered glazing for use at all interior glazing unless noted otherwise: Two layers of 1/8" fully tempered glass laminated with polyvinyl butyl interlayer.

a) Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written recommendations,
b) Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
c) Interlayer Color: Clear unless otherwise indicated.

2. GL-XX Glass Type: Laminated-tempered, one-way Reflective Glazing, to be used at observation windows at classrooms and other locations as identified on Plans:

a. Provide laminated-fully tempered glazing as specified in GL-1.
b. Provide at hollow metal framed observation windows as shown in Hollow Metal Frame Types on drawings or in the following locations noted:
c. Provide the reflective surfaces on the Classroom and Work/Learn space sides.
d. Pyrolytic Coating, ASTM C 1376.
e. Visible Reflectance - Coated Side 68%.

D. Fire-Rated Heat-Resistant Glass Types:

1. GL-XX – 90-minute rated heat resistant fire glass type: Specified in Section 084123 Fire-rated Frame and Storefronts.

2. GL-XX – 120-minute rated heat resistant fire glass type: Specified in Section 084123 Fire-rated Frame and Storefronts.

E. Insulating Glass Types:

1. GL-XX - Low-E Insulating glass for general use at exterior windows, storefront or curtain wall.

a. Insulating Glass: Basis of design product is Viracon 1" (25mm) VE1-2M Insulating Coated Glass.

1) Components.

a) Exterior Glass Ply: 1/4" (6mm) Clear, Heat Treatment – Annealed
b) Coating: VE-2M on #2 Surface
c) Airspace: 1/2" (13.2mm) argon space, finish – mill finish
d) Silicone: gray
e) Interior Glass Ply: 1/4" (6mm) Clear, Heat Treatment -Annealed

2) Performance Classification per ASTM E774, Class CBA.
3) Visible Light Transmittance: 70 percent.
4) Shading Coefficient: 0.43.
5) Winter U-Value: 0.25 BTU.

6) Summer U-Value: 0.21 BTU.
7) Solar Heat Gain Coefficient: 0.37

b. Thickness: 1/4 inch each pane, 1/2-inch air space, overall unit thickness 1 inch.

2. GL-XX Glass type: Low-E Insulating glass for use at exterior windows, storefront or curtain wall where safety glazing is required by local Building Code.

a. Insulating Glass: Basis of design product is Viracon 1" (25mm) VE1-2M Insulating Coated Glass, exterior and interior plies are fully tempered.

1) Components:

a) Exterior Glass Ply: 1/4" (6mm) Clear, Heat Treatment – Fully tempered
b) Coating: VE-2M on #2 Surface
c) Airspace: 1/2" (13.2mm) argon space, finish – mill finish
d) Silicone: gray
e) Interior Glass Ply: 1/4" (6mm) Clear, Heat Treatment – Fully tempered

2) Performance Classification per ASTM E774, Class CBA.
3) Visible Light Transmittance: 70 percent.
4) Shading Coefficient: 0.43.
5) Winter U-Value: 0.25 BTU.
6) Summer U-Value: 0.21 BTU.
7) Solar Heat Gain Coefficient: 0.37

b. Thickness: 1/4 inch each pane, 1/2-inch air space, overall unit thickness 1 inch

3. GL-XX: Low-E Insulating glass with translucent screen pattern for general use at exterior windows, storefront or curtain wall.

a. Insulating Glass: Basis of design product is Viracon 1" (25mm) VE1-2M Insulating Coated Glass.

1) Components.

a) Exterior Glass Ply: 1/4" (6mm) Clear, Heat Treatment – Annealed
b) Coating: VE-2M on #2 Surface
c) Airspace: 1/2" (13.2mm) argon space, finish – mill finish
d) Silicone: gray
e) Silk screen pattern on surface #3. Pattern to be selected by Architect from manufacturer's standard patterns.
f) Interior Glass Ply: 1/4" (6mm) Clear, Heat Treatment -Annealed

2) Performance Classification per ASTM E774, Class CBA.
3) Visible Light Transmittance: 70 percent.
4) Shading Coefficient: 0.43.
5) Winter U-Value: 0.25 BTU.
6) Summer U-Value: 0.21 BTU.
7) Solar Heat Gain Coefficient: 0.37

b. Thickness: 1/4 inch each pane, 1/2-inch air space, overall unit thickness 1 inch

4. GL-XX: Low-E Insulating glass with translucent screen pattern for use at exterior windows, storefront or curtain wall where safety glazing is required by local Building Code.

a. Insulating Glass: Basis of design product is Viracon 1" (25mm) VE1-2M Insulating Coated Glass, exterior and interior plies are fully tempered.

1) Components.

a) Exterior Glass Ply: 1/4" (6mm) Clear, Heat Treatment – Fully Tempered
b) Coating: VE-2M on #2 Surface
c) Airspace: 1/2" (13.2mm) argon space, finish – mill finish
d) Silicone: gray
e) Silk screen pattern on #3 surface. Pattern to be select by Architect from Manufacturer's standard patterns.
f) Interior Glass Ply: 1/4" (6mm) Clear, Heat Treatment – Fully Tempered

2) Performance Classification per ASTM E774, Class CBA.
3) Visible Light Transmittance: 70 percent.
4) Shading Coefficient: 0.43.
5) Winter U-Value: 0.25 BTU.
6) Summer U-Value: 0.21 BTU.
7) Solar Heat Gain Coefficient: 0.37

b. Thickness: 1/4 inch each pane, 1/2-inch air space, overall unit thickness 1 inch.

5. GL-XX: Insulating Spandrel Glass: Where glass of this designation is indicated, provide low-emissivity insulating-glass units complying with the following:

a. Performance Classification per ASTM E774, Class CBA; exterior pane clear float glass with low-E coating on No. 2 surface; interior pane clear float glass/ Spandrel coating, No. 4 surface; annealed.
b. Use: At spandrel locations identified on Drawings.
c. Winter U-Value: 0.29 BTU.
d. Summer U-Value: 0.26 BTU.
e. Thickness: 1/4 inch each pane, 1/2-inch air space, overall unit thickness 1 inch.
f. Coating: Viracon VE1-2M #2 Low-E Insulating Glass or approved substitute.
g. Viraspan Opaque Ceramic Frit: V903 or approved substitute.

END OF SECTION

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SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes the following types of silvered flat glass mirrors:

1. Glass mirrors qualifying as safety glazing.

B. Related Sections:

1. Section 108100 "Toilet Accessories" for metal-framed mirrors.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

C. Samples: For each type of the following products:

1. Mirrors: 12 inches (300 mm) square, including edge treatment on two adjoining edges.
2. Mirror Clips: Full size.
3. Mirror Trim: 12 inches (300 mm) long.

D. Qualification Data: For qualified Installer.

E. Product Certificates: For each type of mirror and mirror mastic, from manufacturer.

F. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing paint and substrates on which mirrors are installed.

G. Maintenance Data: For mirrors to include in maintenance manuals.

H. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE.

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.

C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

D. Glazing Publications: Comply with the following published recommendations:

1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

E. Safety Glazing Products: Provide products complying with testing requirements in 16 CFR 1201 for Category II materials.

F. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing and substrates on which mirrors are installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: Five years from date of final Substantial Completion.

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRROR

A. Glass Mirrors, General: ASTM C 1503.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
    a. Binswanger Mirror; a division of Vitro America, Inc.
    b. D & W Incorporated
    c. Donisi Mirror Company.
    d. Guardian Industries.
    e. Approved Equal.

B. Clear Glass: Mirror Select Quality.

1. Nominal Thickness: 6.0 mm.

2.2 MISCELLANEOUS MATERIALS

A. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

B. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

C. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.3 MIRROR HARDWARE

A. Top Channel/Cleat and Bottom Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.

1. Bottom Trim: J-channels formed with front leg and back leg not less than 5/16 and 3/4 inch (7.9 and 19 mm) in height, respectively.

a. Product: Subject to compliance with requirements, provide D638 FHA Type "J" Channel by Laurence, C. R. Co., Inc.

2. Top Trim: Formed with front leg with a height of 5/16 inch (7.9 mm) and back leg designed to fit into the pocket created by wall-mounted aluminum cleat.

a. Product: Subject to compliance with requirements, provide D 1638 Top Channel and D 1637M Mirror Mount System Cleat by Laurence, C. R. Co., Inc.

3. Finish: Clear bright anodized.

B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.4 FABRICATION

A. Mirror Sizes: To suit Project conditions, cut mirrors to final sizes and shapes.

1. Dimensions: As indicated on drawings

B. Mirror Edge Treatment: Pencil edge.

1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.

2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

C. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

B. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Provide a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. Wall-Mounted Mirrors: Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

1. Top Channel/Cleat and Bottom Aluminum J-Channels: Fasten J-channel directly to wall and attach top trim to continuous cleat fastened directly to wall.

2. Install mastic as follows:

   a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
   b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
   c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

D. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

END OF SECTION

SECTION 092100 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Interior gypsum wallboard and finishing accessories
2. Non-load-bearing steel framing.
    a. Interior framing systems (e.g., supports for partition walls, furring, etc.)
    b. Interior and exterior suspension systems (e.g., supports for ceilings, suspended soffits, etc.)
3. Load-bearing steel framing.
    a. Interior framing systems.
4. Fire-rated Shaft-wall construction.

B. Related Sections include the following:

1. Division 5 Section "Cold-Formed Metal Framing" for load-bearing steel framing.
2. Division 061000 “Rough Carpentry” for plywood backing behind gypsum board and other blocking materials.
3. Division 072100 “Thermal Insulation” for Sound batt insulation.
4. Division 079200 "Joint Sealants" for field-applied acoustical and fire rated sealants.

1.3 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 SYSTEM REQUIREMENTS (FOR LOAD BEARING MEMBERS)

A. Design Requirements:

1. Use member size and thickness nomenclature from Steel Framing Alliance.
2. Design system components to comply with AISI Specification.
3. Follow the provisions of AISI General standards.
4. Size components to withstand design loads as follows:
    a. Vertical Assembly: Design for 5 psf internal lateral load pressure.
    b. Horizontal Assembly: Dead Load: 40 psf; Live Load: 100 psf.
5. Vertical Assembly Requirements:
    a. Vertical assemblies include headers, sills, jamb studs, and their connections as necessary.
    b. Horizontal deflection: Design to permit maximum deflection of 1/360 of span.
    c. Provide bridging to meet design requirements. Do not use gypsum sheathing or gypsum wallboard as lateral bracing.

6. Horizontal Assembly Requirements:

    a. Include web stiffeners, bracing, blocking, and bridging as needed to meet specification requirements.
    b. Design connections and details as needed to provide a complete installation.
    c. Vertical Deflection: Design to permit maximum deflection of 1/360 of span. Determine deflections based on joist/beam properties only.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For Load Bearing Assemblies

1. Indicate loading, typical and special component details, framed openings, welds, type and location of fasteners, connections, anchorage, and accessories of items required for related work.

    a. Indicate stud layout.
    b. Describe method for securing studs to tracks and for all framing connections.
    c. Provide calculations certified by an engineer licensed in the State in which the Project is located for all load bearing framing and their connections.

2. Submit design calculations prepared and certified by an engineer in the State in which the Project is located.

    a. Review of calculations will be for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor/Fabricator remains responsible for correctness and completeness of submitted calculations.
    b. Submit a letter certifying that the engineer designing connections has reviewed the shop drawings and that the drawings reflect design calculation information

C. Samples: For the following products:

1. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.6 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1. STC-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

C. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this Woek and licensed in the State in which the Project is located.

D. Calculate structural properties of framing members in accordance with requirements of AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

C. Stack gypsum panels flat to prevent sagging.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Steel Framing and Furring:

a. Dale Industries, Inc. - Dale/Incor.
b. Dietrich Industries, Inc.
c. National Gypsum Company.
d. Scafco Corporation.
e. Unimast, Inc.

2. Gypsum Board and Related Products:

a. American Gypsum Co.
b. CertainTeed
c. G-P Gypsum Corp.
d. National Gypsum Company.
e. United States Gypsum Co.

2.2 STEEL FRAMING

A. Components, General: As follows:

1. Comply with ASTM C 754 for conditions indicated.

2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with manufacturer's standard corrosion-resistant zinc coating.

B. Steel Studs and Runners: ASTM C 645.

1. Depth: As indicated on Drawings.

2. Minimum Base Metal Thickness: 0.0179 inch before galvanizing; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf

C. Components For Load-Bearing Assemblies, as follows:

1. Steel Studs and Track: ASTM C955; studs formed to channel, “C”, or “Sigma” shape with punched web; U-shaped track in matching nominal width and compatible height. Headers and horizontal framing within wall to be unpunched.

   a. Gage and Depth: As required to meet specified performance levels.
   b. Galvanized in accordance with ASTM A653/A653M, G60/Z180 coating.

2. Joists and Purlins: Fabricated from ASTM A653/A653M sheet steel, with G60/Z180 hot dipped galvanized coating.

   a. Gage and Depth: As required to meet specified performance levels.
   b. Base Metal: Structural Steel (SS), Grade 50/340, Class 1 for materials 53 mils and thicker.
   c. Base Metal: Structural Steel (SS), Grade 33/230 for material 43 mils and thinner.
   d. Horizontal framing members to be unpunched.

D. C-H studs for Shaft Wall construction:

1. Studs: 2-1/2 in. 4 in. and 6 in. I, CH or CT shaped studs, weighing 490 lbs. and 615 lbs. per 1000 linear ft. with min. base steel of 0.020 in., galvanized, and complying with ASTM C 645.

2. Track: 2-1/2 in. 4 in. and 6 in. J shaped track with 2-1/4 in. leg, weighing 390 lbs. and 490 lbs. per 1000 linear ft., 25 ga, galvanized and complying with ASTM C 645.

E. Deep-Leg Deflection Track: ASTM C 645 top runner with 2-inch- deep flanges.

F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base Metal Thickness: 0.0179 inch

G. Resilient Furring Channels: 1/2-inch- (12.7-mm-) deep, steel sheet members designed to reduce sound transmission and as indicated in Drawings.

1. Configuration: Asymmetrical or hat shaped

H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base Metal Thickness: 0.0179 inch

2. Depth: As indicated.

I. Cold-Rolled Furring Channels: 0.0538-inch bare steel thickness, with minimum 1/2-inch- wide flange.

1. Depth: As indicated.

2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare steel thickness of 0.0312 inch.

3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire

J. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

K. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

2.3 METAL SUPPORTS FOR SUSPENDED AND FURRED GYPSUM BOARD CEILINGS

A. Components, General: Comply with ASTM C 754 for conditions indicated.

B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.

D. Hangers, as follows:

1. Rod Hangers: ASTM A 510, mild carbon steel.
    a. Diameter: As indicated
    b. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
2. Flat Hangers: Commercial-steel sheet, ASTM A 653/A 653M, G40, hot-dip galvanized.
    a. Size: As indicated 1 by 3/16 inch by length indicated.
3. Angle Hangers: ASTM A 653/A 653M, G60 hot-dip galvanized commercial-steel sheet.
    a. Minimum Base Metal Thickness: As indicated.
    b. Size: As indicated.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch, a minimum 1/2-inch- wide flange, with ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating.

1. Depth: As indicated.

F. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating.

1. Cold Rolled Channels: 0.0538-inch bare steel thickness, with minimum 1/2-inch- wide flange, 3/4 inch deep.
2. Steel Studs: ASTM C 645.
    a. Depth: As indicated.
3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
    a. Minimum Base Metal Thickness: As indicated.

G. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    a. Armstrong World Industries, Inc.; Drywall grid system. www.armstrong.com.
    b. Chicago Metallic Corp, 640 System: www.rockfon.com/products/chicago-metallic-drywall-grid.
    c. USG Interiors, Inc.; Drywall Suspension System, www.usg.com.

2.4 INTERIOR GYPSUM WALLBOARD

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Gypsum Wallboard - General use: ASTM C 1396.

1. Thickness: Thicknesses as indicated on Drawings.

2. Edges: Square cut, tapered.

C. Fire-Rated Gypsum Board: ASTM C1396 Type X; gypsum core wall panel with additives to enhance fire resistance of the core and surfaced with paper on front, back and long edges; UL rated.

1. Type X Gypsum Board: Provide type 'X' fire-rated at fire rated construction.

a. Thickness 5/8"
b. Edges: Square cut, tapered.

2. Type C Gypsum Board: Provide type 'C' fire-rated at fire rated construction.

a. Thickness 1/2"
b. Edges: Square cut, tapered.

D. Moisture Resistant Gypsum Board: ASTM C630; gypsum core wall panel with additives to enhance the water resistance of the core. Surface with water repellent paper on the front, back, and long edges.

1. Thickness: Thicknesses as indicated on Drawings.

2. Edges: Square cut, tapered.

E. Abuse Resistant Gypsum Board: ASTM C1658: noncombustible, moisture-resistant gypsum core encased in a fiberglass face and back to offer greater resistance to surface abrasion, indentation and impact damage.

1. Basis of Design product: Sheetrock Brand Glass-Mam Panels Mold Tough AR Firecode X

2. Thickness: 5/8 inch thickness.

3. Edges: Square cut, tapered.

4. Abuse Resistance Performance ASTM C1629

a. Abrasion: Level 2
b. Indentation Level 2
c. Soft Body Impact Level 3
d. Hard Body Impact Level 1

F. Impact-resistant Gypsum Board: ASTM C1278: noncombustible, moisture-resistant gypsum core encased in moisture-and mold-resistant papers with a fiberglass reinforcing mesh imbedded in the core adjacent to the back paper to increase resistance to impact damage.

1. Basis of Design product: USG Sheetrock Brand Mold Tough VHI Firecode X panels.

2. Thickness: 5/8 inch thickness.

3. Edges: Square cut, tapered.

4. Abuse Resistance Performance ASTM C1629.

a. Abrasion: Level 2
b. Indentation Level 1
c. Soft Body Impact Level 3
d. Hard Body Impact Level 3

G. Fire-Rated Shaftliner Board: A gypsum core shaftwall panel with additives to enhance fire resistance of the core and surfaced with moisture resistant paper on front, back, and long edges and complying with ASTM C 1396, Type X.

1. Thickness: 1 in.
2. Width: 2 ft.
3. Length: 7 ft. through 14 ft.
4. Edges: Beveled

2.5 TILE BACKING PANELS

A. Cement Board: Cement board formed in a continuous process of aggregated Portland cement slurry with polymer coated glass fiber mesh completely encompassing edges, back, and front surfaces.

1. Maximum framing spacing is 16 inches on center.

B. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

C. Cementitious Backer Units: ANSI A118.9. (For use on walls at showers.)

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Custom Building Products; Wonderboard.
b. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
c. United States Gypsum Co.; DUROCK Cement Board.

3. Thickness: As indicated.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.

2. Shapes:

a. Cornerbead: Use at outside corners.
b. Bullnose Bead: Use at outside corners.
c. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.
d. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges.
e. L-Bead: L-shaped; exposed long leg receives joint compound; use where indicated.
f. U-Bead: J-shaped; exposed short flange does not receive joint compound; use where indicated.
g. Tear Away L Bead: Used to finish the rough edge of the drywall. Features a tear off strip that acts as a guide for the taping knife as well as a protective mask for mudding.
h. Control Joint: Bent zinc sheet formed with V shaped slot, covered with plastic tape, with perforated flanges and Complying with ASTM C 1047

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. Fry Reglet Corp.
    b. Gordon, Inc.
    c. MM Systems Corporation.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, alloy 6063-T5.
3. Finish: Clear anodized aluminum.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.

B. Joint Tape:
1. Interior Gypsum Wallboard: Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
    a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, suitable for paint finishes, use setting-type, sandable topping compound

2.8 ACOUSTICAL SEALANT

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

B. Products: Subject to compliance with requirements, provide one of the following:
1. Acoustical Sealant for Exposed and Concealed Joints:
    a. Pecora Corp.; AC-20 FTR Acoustical and Insulation Sealant.
    b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
2. Acoustical Sealant for Concealed Joints:
    a. Ohio Sealants, Inc.; Pro-Series SC-170 Rubber Base Sound Sealant.
    b. Pecora Corp.; BA-98.
    c. Tremco, Inc.; Tremco Acoustical Sealant.

C. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

D. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.9 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Gypsum board textured finish, ASTM E84:

1. USG Sheetrock Brand Ceiling spray texture
2. Fine orange peel texture
3. Flame spread: 5
4. Smoke developed: 0

C. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

D. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

E. Isolation Strip at Exterior Walls:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.

2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

F. Bonding adhesive to secure gypsum board panels directly to masonry or tiled substrates:

1. Sheetrock Brand Durabond Setting Type Joint Compound, or equal as recommended by gypsum board panel manufacturer.

G. Sound Attenuation Blankets: specified in Section 072100 “Thermal Insulation”.

H. Polyethylene Vapor Retarder: As specified in Division 7 Section "Building Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.

1. Furnish concrete inserts and other devises indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.

2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of gypsum board assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. Installation Standards: ASTM C 754, and ASTM C 840 requirements that apply to framing installation.

B. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

C. Stud splicing is not allowed.

D. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."

E. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement.

1. Isolate ceiling assemblies where they abut or are penetrated by building structure.

2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.

a. Use deep-leg deflection track where indicated.
b. Use proprietary deflection track where indicated.
c. Use proprietary firestop track where indicated.

3.4 INSTALLING STEEL FRAMING

A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.

1. Where studs are installed directly against exterior walls, install asphalt-felt or foam-gasket isolation strip between studs and wall.

B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. Cut studs 1/2 inch short of full height to provide perimeter relief.

2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below

floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.

D. Install steel studs and furring at the following spacings:

1. Single-Layer Construction: 16 inches o.c., unless otherwise indicated.

E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.

F. Curved Partitions:

1. Cut top and bottom track (runners) through leg and web at 2-inch intervals for arc length. In cutting lengths of track, allow for uncut straight lengths of not less than 12 inches at ends of arcs.

2. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.

3. Support outside (cut) leg of track by clinching steel sheet strip, 1-inch- high-by-thickness of track metal, to inside of cut legs using metal lock fasteners.

4. Begin and end each arc with a stud, and space intermediate studs equally along arcs at stud spacing recommended in writing by gypsum board manufacturer for radii indicated. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.=

G. At fire-rated partitions provide and install framing members in quantities and spacings as directed by the U.L. listing and provide fasteners in quantities and spacings as directed by the listing.

H. One bead of acoustical sealant shall be placed between runner and substrate to achieve acoustical seal.

I. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

J. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Install two studs at each jamb, unless otherwise indicated.

2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint.

3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

K. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads

L. Stud framing shall be braced for rigid framing:

1. 0' to 10' height: 1 row at center span.
2. Higher than 10' to 15' height: 2 rows at 1/3 span.
3. Higher than 15' to 20' height: 3 rows at 1/4 span.
4. Higher than 20' to 25' height: 4 rows at 1/5 span

M. Z-Furring Members:

1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches o.c.

2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

4. Until gypsum board is installed, hold insulation in place with 10-inch staples fabricated from 0.0625-inch- diameter, tie wire and inserted through slot in web of member.

3.5 INSTALLING STEEL SUSPENDED CEILING AND SOFFIT FRAMING

A. Suspend ceiling hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.

4. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

6. Do not attach hangers to steel deck tabs.

7. Do not attach hangers to steel roof deck. Attach hangers to structural members.

8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet measured lengthwise on each member and transversely between parallel members.

C. Sway-brace suspended steel framing with hangers used for support

D. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

E. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.

F. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track

3.6 APPLYING AND FINISHING PANELS, GENERAL

A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.

B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

G. Attach gypsum panels to framing provided at openings and cutouts.

H. Form control and expansion joints with space between edges of adjoining gypsum panels.

I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.

   2. Fit gypsum panels around ducts, pipes, and conduits.

   3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

J. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

K. Floating Construction: Where feasible, including where recommended in writing by manufacturer, install gypsum panels over wood framing, with floating internal corner construction

L. Provide control joints at the following locations:

   1. Partitions or ceilings of dissimilar construction meet and remain in same plane.

   2. Expansion or control joints occur in base wall construction and/or building structure.

   3. In continuous surrfaces spaced no greater than 30’-0” in either direction.

M. At fire-rated partitions apply panels using methods as directed by the U.L. LIsting and provide fasteners in quantities and spacings as directed by the listing.

N. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

O. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

1. Space screws a maximum of 12 inches o.c. for vertical applications.

P. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

3.7 PANEL APPLICATION METHODS

A. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.

2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

a. Stagger abutting end joints not less than one framing member in alternate courses of board.
b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

B. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Curved Partitions:

1. Install panels horizontally and unbroken, to the extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.

2. Wet gypsum panels on surfaces that will become compressed where curve radius prevents using dry panels. Comply with gypsum board manufacturer's written recommendations for curve radii, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.

3. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around curve. On concave side, start fastening panels to stud at center of curve and work outward to panel ends. Fasten panels to framing with screws spaced 12 inches o.c.

4. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

5. Allow wetted gypsum panels to dry before applying joint treatment.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set

3.8 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations as identified in the Drawings by Architect for visual effect.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:

1. Level 1: Concealed areas only; such as attics, plenums above ceiling spaces, etc.
2. Level 3: Areas to receive wall coverings, textured surfaces, etc.
3. Level 5: Areas to receive paint finish

3.10 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION

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SECTION 093000 - CERAMIC TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Porcelain floor tile and coved base
2. Porcelain mosaic tile.
3. Glazed ceramic wall tile.
4. Ceramic mosaic tile.
5. Quarry tile.
6. Crack-suppression and waterproof membranes for thin-set tile installations.
7. Setting and grouting materials
8. Edge-protection and transition profiles installed as part of tile installations.

B. Related Sections include the following:

1. Section 033000 "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
2. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
3. Section 092900 – “Gypsum Board Assemblies” for Cementitious Backer Units

1.3 DEFINITIONS

A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

B. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.4 REFERENCES

A. American National Standards Institute:

1. ANSI A108.1 - Installation of Ceramic Tile, A collection.
2. ANSI A108.1A - Specifications for Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar.
3. ANSI A108.10 - Specifications for Installation of Grout in Tilework.
4. ANSI A118.4 - Latex-Portland Cement Mortar.
5. ANSI A118.6 - Ceramic Tile Grouts.
6. ANSI A137.1 - Ceramic Tile.

B. ASTM International:

1. ASTM C847 - Standard Specification for Metal Lath.

C. Tile Council of North America:

1. TCNA - Handbook for Ceramic Tile Installation

1.5 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.

2. Full-size units of each type of trim and accessory.

3. Mosaic tile blends: Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches (300 mm) square and mounted on rigid panel. Use grout of type and in color or colors approved for completed work.

4. Metal edge strips in 6-inch (150-mm) lengths.

D. Qualification Data: For Installer.

E. Operation and Maintenance Data: for ceramic tile, to include in maintenance manuals specified in Division 1. Include the following:

1. Methods for maintaining ceramic tile and grout, including cleaning and stain removal products and procedures.

2. Precautions for cleaning material and methods that could be detrimental to ceramic tile and grout.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with TCA Handbook and ANSI A108 Series/A118 Series.

B. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.

1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

D. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:

1. Waterproof membrane.
2. Crack isolation membrane.

3. Joint sealants.
4. Metal edge strips.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.

D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements, unless otherwise indicated.

2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.

C. Colors and Textures: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. As indicated by manufacturer's designations.

D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

G. Patterns: See Drawings for tile coursing, patterns and quantities of each tile type and size at each location.

H. Provide cove bases where wall tile transitions into floor tile, unless noted otherwise.

2.2 TILE PRODUCTS

A. Available Manufacturers: The design for each tile type is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product approved by the Architect, by one of the other manufacturers specified.

1. American Olean
2. Crossville, Inc.
3. Daltile; Division of Dal-Tile International Inc.
4. Metropolitan Ceramics
5. Summitville Tiles
6. United States Ceramic Tile Company.
7. Approved equal

B. Tile Type CT-XX: Unglazed porcelain floor tile.

1. Colorbody Porcelain, Porcealto by Daltile, Group 1
2. Face Size: 8 by 8 inches (102 by 102 mm).
3. Face: Plain with square edges.
4. Tile Color, Glaze, and Pattern: As selected from Group 1 range of colors, unpolished.
5. Grout Color: As selected.
6. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable. and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
    a. Base for thin set mortar installations: 4 by 8 inches tile size, coved, bull nose at exposed edges. Provide cove inside corner and cove outside corners.

C. Tile Type CT-XX: Porcelain mosaic tile: ANSI A137.1conforming to the following:

1. Moisture Absorption: [0 to 0.5] percent.
2. Size: 2 x 2 x ¼ inch.
3. Shape: Square.
4. Edge: Square.
5. Surface Finish: Slip resistant, COF ASTM #C1028 Greater than .60
6. Mounted Sheet Size: 12 x 24 inches.
7. Tile Color – XX% Group 3, XX% Group 2 and XX% Group 1, Colors to be selected.
8. Grout Color: As selected.

D. Tile Type CT-XX: Glazed wall tile.

1. Bright and Matte by American Olean, Group 1
2. Module Sizes: 6 by 6 inches.
3. Face: Plain with modified square edges or cushion edges.
4. Finish: Bright
5. Color: As selected from Group 1 range of colors.
6. Grout Color: As selected.
7. Mounting pattern: set in running bond pattern, offset each successive course of tile by one-half tile dimension.
8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable. and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
    a. Base for thin set mortar installations: 6 by 6 inches tile size, Coved.
    b. Wainscot Cap for thin set mortar installations: Surface bullnose.
    c. External Corners for thin set mortar installations: Surface bullnose.
    d. Internal Corners: Field-butted square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.

E. Tile Type QT-XX: Unglazed, square-edged quarry tile.

1. Quarry Tile by Summitville Tiles, Inc.
2. Face Size: 6 x 6 inches (152 by 152 mm),1/2 inch thick (7mm).
3. Wearing Surface: Smooth.
4. Finish: Seal all quarry tile and grout.
5. Color: As selected from manufacturer’s full range of standard colors.
6. Grout Color: As selected.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
    a. Round-top Coved Base: 5 by 6 inches (152 by 152 mm). 1/2-inch-thick (7 mm). Provide pre-molded inside and outside coved (round-top) corners.

F. Thresholds:

1. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes. All Thresholds and Transition Strips must be ADA compliant.
    a. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.
2. Marble Thresholds: ASTM C 503 with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.
    a. Description: Uniform, fine- to medium-grained white stone with gray veining

2.3 PATCHING AND LEVELING COMPOUND

A. Portland cement base, polymer-modified, self-leveling compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.

B. Provide a patching and leveling compound with the following minimum physical properties:

1. Compressive strength - 25 MPa (3500 psig) per ASTM C109/C109M.
2. Flexural strength - 7 MPa (1000 psig) per ASTM C348 (28-day value).
3. Tensile strength – 4.1 MPa (600 psi) per ANSI 118.7.
4. Density – 1.9.

C. Capable of being applied in layers up to 38 mm (1-1/2 inches) thick without fillers and up to 101 mm (4 inches) thick with fillers, being brought to a feather edge, and being troweled to a smooth finish.

D. Primers, fillers, and reinforcement as required by manufacturer for application and substrate condition.

E. Ready for use in 48 hours after application.

2.4 CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS

A. General: Manufacturer's standard product that complies with ANSI A118.12.

B. Chlorinated-Polyethylene-Sheet Product: Nonplasticized, chlorinated polyethylene faced on both sides with high-strength, nonwoven polyester fabric, for adhering to latex-portland cement mortar; 60 inches wide by 0.030-inch nominal thickness.

1. Available Product: Noble Company (The); Nobleseal TS

2.5 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Provide waterproofing membrane to extent indicated on drawings.

C. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Bonsal American; an Oldcastle company; B 6000 Waterproof Membrane with Glass Fabric.
b. Bostik, Inc.; Hydroment Blacktop 90210.
c. Laticrete International, Inc.; Laticrete 9235 Waterproof Membrane.
d. MAPEI Corporation; Mapelastic HPG with MAPEI Fiberglass Mesh.
e. Mer-Kote Products, Inc.; Hydro-Guard 2000

2.6 SETTING AND GROUTING MATERIALS

A. Conform to TCNA Handbook for Ceramic Tile Installation.

B. Manufacturers:

1. American Olean
2. Bonsal: W.R. Bonsal Company
3. Bostik.
4. LATICRETE International Inc.
5. MAPEI Corporation.
6. TEC Incorporated.

C. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:

1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils thick.
2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C 847.
    a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
    b. Base Metal and Finish for Exterior Applications: Zinc-coated (galvanized) steel sheet.
    c. Configuration over Solid Surfaces: Self-furring.
    d. Weight: 3.4 lb./sq. yd.
4. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field mixed portland cement and aggregate mortar bed.

D. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
1. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.
    a. For wall applications, provide non-sagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

E. Standard Sanded Cement Grout: ANSI A118.6, color as selected by Architect from manufacturer’s full range.

F. Standard Unsanded Cement Grout: ANSI A118.6, color as selected by Architect from manufacturer’s full range.

G. Water-Cleanable Epoxy Grout: ANSI A118.3, color as selected by Architect from manufacturer’s full color range, to match adjacent grout color.
1. Provide epoxy grout at floor tile at urinals and toilets 24” minimum beyond fixture edge.

H. Water: Clean, potable, and free from salts and other injurious elements to mortar and grout materials.

2.7 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Section 079200 "Joint Sealants".

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

2.8 MISCELLANEOUS MATERIALS

A. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.

B. Metal Trim Edge Pieces and Profiles
1. Manufacturers:

a. Basis of Design Manufacturer: Schluter Systems, L.P., 194 Pleasant Ridge Road, Plattsburgh, NY 12901-5841. ASD. Tel: (800) 472-4588. Fax (800) 477-9783. Web: www.schluter.com

b. Contractor may submit equal products by other manufacturers complying with all requirements listed in this Section and complying the procedures as described in Section 016200 - Product Options.

2. Aluminum, ADA compliant tile to floor transition.

a. Reno-Ramp by Schluter Systems, L.P.

1) Description: anodized aluminum profile with textured, sloped exposed surface, tapered leading edge, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
2) Material and Finish: AE - Satin Anodized Aluminum
3) Height: Height as required – not to exceed 1/2”.

3. Aluminum edge trim.

a. Schluter-JOLLY

1) Description: L-shaped profile with 1/8 inch (3.2 mm) wide top section vertical wall section that together form the visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
2) Anchoring Leg: Provide with straight anchoring leg.
3) Material and Finish: Brushed Chrome Anodized Aluminum.
4) Height as required to coordinate with tile selection and setting system selected

4. Aluminum coved profile trim:

a. Schluter-DILEX-AHKA

1) Description: Anodized aluminum profile with single integrated trapezoid-perforated anchoring leg and dovetailed channel, connected at a 90-degree angle by a cove-shaped 3/8-inch (10 mm) radius section that forms the visible surface.
2) Corners:

a) Provide with matching inside corners.
b) Provide with matching outside corners.
c) Provide with matching end caps.
d) Provide with matching connectors

3) Material and Finish: Satin Clear Anodized Aluminum.

C. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.

2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

1. Available Products:

a. Bonsal, W. R., Company; Grout Sealer.
b. Bostik; CeramaSeal Grout Sealer.
c. C-Cure; Penetrating Sealer 978.
d. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
e. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
f. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.

2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.

2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.

4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Tolerances:

1. Variation in plane of sub-floor, including concrete fills leveling compounds and mortar beds.

a. Not more than 1/4 inch in 10 feet (6 mm in 3048 mm) from required elevation where portland cement mortar setting bed is used.

b. Not more than 1/8 inch in 10 feet (3 mm in 3048 mm) where dry-set portland cement, and latex-portland cement mortar setting beds and chemical-resistant bond coats are used.

2. Variation in Plane of Wall Surfaces:

a. Not more than 1/4 inch in 8 feet (6 mm in 2438 mm) from required plane where portland cement mortar setting bed is used.
b. Not more than 1/8 inch in 8 feet (3 mm in 2438 mm) where dry-set or latex-portland cement mortar or organic adhesive setting materials is used.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

B. Provide concrete substrates for tile floors installed with thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.

1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.

2. Remove protrusions, bumps, and ridges by sanding or grinding.

3. At locations where existing tile finishes have been removed from existing concrete slab floors, remove all excess mortar, or grout and provide concrete floor topping or trowelable leveling compound as required for a continuous and level substrate.

C. Mortar Bed for Slopes to Drains:

1. Slope compound to drain where drains are shown on construction documents.

2. Install mortar bed in depressed slab sloped to drains not less than 1/8 inch per foot (3.2 mm in 305 mm).

3. Prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drain

4. Allow not less than 2-inch (50 mm) depression at edge of depressed slab.

5. Screed for slope to drain and float finish.

6. Cure mortar bed for not less than seven (7) days. Do not use curing compounds or coatings

D. Cleavage Membrane:

1. Install polythene sheet as cleavage membrane in depressed slab when waterproof membrane is not scheduled or indicated.

2. Turn up at edge of depressed floor slab to top of floor

E. Existing Floors and Walls:

1. Remove existing composition floor finishes and adhesive. Prepare surface by grinding, chipping, self-contained power blast cleaning or other suitable mechanical methods to completely expose uncontaminated concrete or masonry surfaces. Follow safety requirements of ANSI A10.20.

2. Remove existing concrete fill or topping to structural slab. Clean and level the substrate for new setting bed and waterproof membrane or cleavage membrane.

3. Where new tile bases are required to finish flush with plaster above or where they are extensions of similar bases in conjunction with existing floor tiles, cut channel in floor slab and expose rough wall construction sufficiently to accommodate new tile base and setting material

F. Vacuum clean surfaces and damp clean.

G. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.

H. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

I. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

J. Protect surrounding work from damage.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.

C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. Do not interrupt tile pattern through openings.

2. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Paver Tile: 1/4 inch.

2. Glazed Wall Tile: 1/16 inch

G. Lay out tile wainscots to next full tile beyond dimensions indicated.

H. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.

2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

I. Grout tile to comply with requirements of the following tile installation standards:

1. Allow tile to set for a minimum of 48 hours prior to grouting.

2. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.

J. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight, aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

K. Sound tile after setting. Replace hollow sounding units.

L. Keep expansion and control joints free of adhesive or grout. Apply sealant to joints.

M. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

N. At showers, tubs, and where indicated, install cementitious backer units, and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated. See Section 092900 “Gypsum Board Assemblies” for cementitious backer units.

3.4 CRACK-SUPPRESSION MEMBRANE INSTALLATION

A. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.

B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.5 WATERPROOFING INSTALLATION

A. Install waterproofing to extent indicated on drawings.

B. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

C. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight

3.6 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCNA installation methods and ANSI A108 Series of tile installation standards.

1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.

a. Tile floors in wet areas.
b. Tile floors composed of tiles 8 by 8 inches or larger.
c. Tile floors composed of rib-backed tiles.

B. Place metal edge strips Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

C. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.7 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

3.8 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove latex-portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

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095113 - ACCOUSTIC PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes:

1. Ceiling Acoustical Panels.
2. Suspension systems for ceilings and metal trim to be supplied by suspension system manufacturer.
3. Suspended micro perforated wood plank ceiling system.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be anchored into structure at ceilings.

1.3 DEFINITIONS

A. AC: Articulation Class.

B. CAC: Ceiling Attenuation Class.

C. LR: Light Reflectance coefficient.

D. NRC: Noise Reduction Coefficient.

1.4 REFERENCES

A. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

B. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

C. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels

D. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.

E. ASTM E 1264 Classification for Acoustical Ceiling Products

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Layout and details of acoustical ceilings, show locations of items that are to be coordinated with, or supported by the ceilings.

C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Panel: Set of 6-inch- square samples of each type, color, pattern, and texture.

2. For panels to match existing ceiling tile, provide sample of proposed tile and sample of existing tile to be matched for comparison.

1.6 QUALITY ASSURANCE

A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the specified test methods.

B. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.

2. Suspension System: Obtain each type through one source from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

a. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.

b. Identify materials with appropriate markings of applicable testing and inspecting agency.

2. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:

a. Smoke-Developed Index: 450 or less.

D. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.9 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS (Confirm USG tile (basis of design) types used at extg. school building and whether the same are generally desired.)

A. Manufacturers:

1. Available Manufacturers: New ceiling tiles are to match existing tiles in panel size, thickness, color, texture, edge profile and patterns. Field verify manufacturer and product line of acoustic tile used in existing ceilings to provide match. Subject to compliance with requirements, provide matching product or a comparable product approved by the architect, by one of the manufacturers specified.

a. USG Interiors, Inc.
b. Armstrong World Industries, Inc
c. Certainteed, Inc.

B. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.

C. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

D. Coating-Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment consisting of manufacturer's standard formulation with fungicide added to inhibit growth of mold and mildew and showing no mold or mildew growth when tested according to ASTM D 3273.

E. Acoustical Panels for suspended grid ceiling systems: (UPDATE)

1. ACT-XX. Use at all ACT ceiling unless noted otherwise. [Update with USG - General Use Budget Panel per Nova Standard]

a. Product: General Use, 24” x 24” x 5/8”, square edge, white, non-directional lay-in panels.

1) Armstrong 1810 “Fine-fissured School Zone”.
2) Color White.

3) 0.70 NRC/40 CAC
4) Approved equal tile by other manufacturer to match.

2. ACT-XX. Use at all ACT ceiling unless noted otherwise. [General Use, Enhanced Performance Panel]

a. Product: General Use, 24" x 24" x 5/8", tegular edge, white, non-directional lay-in panels.

1) Armstrong 584 "Cirrus"
2) Color White.
3) 0.70 NRC/40 CAC
4) Approved equal tile by other manufacturer to match

3. ACT-XX. Use at ACT locations as identified on reflective ceiling plans. [Accent Ceiling]

a. Product: 24" x 24" x 5/8", tegular edge, white, lay-in panels.

1) Armstrong 514 "Cirrus Second look III"
2) Panel scored creating 4 nominal 6" planks.
3) Color White.
4) 0.65 NRC/35 CAC
5) Approved equal tile by other manufacturer to match, and to match general use tile.

4. ACT-XX. Use at ACT locations as identified on reflective ceiling plans. [Accent Ceiling]

a. Product: 48" x 48" x 1", square edge, white, non-directional lay-in panels

1) Armstrong #3160 "Optima".
2) Color White.
3) 0.95 NRC
4) Approved equal tile by other manufacturer to match

5. ACT-XX. Use at food preparation and wet areas as identified on reflective ceiling plans.

a. Product: 24" x 24" x 5/8", square edge, complying with ASTM E1264, Type IX, Form 2, Pattern G, Fire Class A, Water-repellent, Washable, Scratch-resistant, Soil-resistant, Smooth surface, shall meet USDA/FSIS guidelines for use in food processing areas.

1) Armstrong #673, "Kitchen Zone".
2) Color White.
3) Approved equal tile by other manufacturer to match.

F. Acoustical Panels to Match Existing Tiles.

1. New ceiling tiles are to match existing tiles in panel size, thickness, color, texture, edge profile and patterns. Field verify manufacturer and product line of acoustic tile used in existing ceilings to provide match. Subject to compliance with requirements, provide matching product or a comparable product approved by the architect, by one of the manufacturers specified.

G. Aluminum Eggrate Louvers:

1. Subject to compliance with requirements, available products that may be incorporated into the Work include the following, or other approved equal product:

a. American Louver
b. Edee Aiken Company.

c. Commercial Air Products, Inc.
d. Approved Equal.

2. 1/2" x 1/2" x 1/2” open cell aluminum eggcrate louver:

a. Manufacturer's standard moldings for edges and penetrations that fit ceiling suspension systems indicated.
b. White, Powder coat finish.
c. Sizes as indicated on Drawings.

2.2 CEMENTITIOUS WOOD FIBER PLANK ACOUSTICAL PANEL CEILING

A. Basis of Design Product: Tectum by Armstrong World Industries, Inc.

1. Contractor may submit equal products by other manufacturers complying with all requirements listed in this Section and complying the procedures as described in Section 016200 - Product Options.

B. Ceiling Panel: Lay-in, Item Number 8184T10, 24”x24” x Standard 1” thickness, square edge, white.

1. Surface Texture: Coarse

2. Composition: Aspen wood fibers bonded with inorganic hydraulic cement.

3. Noise Reduction Coefficient (NRC): ASTM C 423 (E400) Standard NRC 0.45

4. Ceiling Attenuation Class (CAC): ASTM C 1414; (CAC 0.35)

5. Flame Spread: ASTM E 1264; (Fire Class A)

2.3 METAL SUSPENSION SYSTEMS, GENERAL

A. Manufacturers:

1. Available Manufacturers: New suspension systems are to match existing syuspension system in size, profile, and color. Field verify manufacturer and product line of acoustic tile used in existing ceilings to provide match. Subject to compliance with requirements, provide matching product or a comparable product approved by the architect, by one of the manufacturers specified.

a. Armstrong World Industries, Inc
b. Certainteed Inc.
c. Rockfon, Inc.
d. USG Interiors, Inc.

B. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by

testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Type: Postinstalled expansion anchors.

b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency

E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

2. Support for Recessed and Semi-recessed Grid-Type Fixtures: Units shall be supported from suspended ceiling support system. Ceiling Contractor shall install ceiling support system rods or wires at a minimum of 4 rods or wires for each fixture, located not more than 6 inches from fixture corners.

3. Install support clips for recessed fixtures, securely fastened to ceiling grid members, at or near each lighting fixture corner.

4. Fixtures of Sizes Less than Ceiling Grid: Center in acoustical panel. Support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.

F. Provide 15/16” wide grid system, white.

2.4 SUSPENSION GRID TRIM AND ACCESSORIES

A. Manufacturers:

1. Available Manufacturers: Subject to compliance with requirements, provide matching product or a comparable product approved by the Architect, by one of the manufacturers specified. Ceiling transition trims and ceiling suspension systems shall be provided by the same manufacturer.

a. Armstrong World Industries, Inc
b. Certainteed Inc.
c. Rockfon, Inc.
d. USG Interiors, Inc.

B. Acoustical-to-Acoustical Ceiling Height Transition Trims:

1. Basis of Design Product: Armstrong, Axion Transitions - Elevation change, acoustical-to-acoustical

a. Extruded aluminum, alloy 6063, with factory applied baked polyester paint finish.
b. Provide in ceiling height transistions as indicated on reflected ceiling plans.
c. Provide ceiling height transition trim in a curved radius at locations indicated on reflected ceiling plans, curved to radii as indicated.
d. Provide 90 degree transistion corners at locations where square corners are indicated on reflected ceiling plans.

e. Provide all required clips, attachments, fasteners and other accessories as directed by the manufacturer for complete installation.
f. Color: Match suspension grid.

C. Acoustical Ceiling Extruded Perimter Trim

1. Basis of Design Product: Armstrong, Axiom Classic Trim.

a. Extruded aluminum, alloy 6063, with factory applied baked polyester paint finish
b. Provide in ceiling locations as indicated on reflected ceiling plans
c. Provide in heights as indicated on Drawings.
d. For curved sections: Provide standard radiused sections as indicated on reflected ceiling plans.
e. Provide 90 degree transistion corners at locations where square corners are indicated on reflected ceiling plans.
f. Provide all required clips, attachments, fasteners and other accessories as directed by the manufacturer for complete installation
g. Color to match suspension system.

D. Hold-down clip for Cementitious Wood Fiber Plank Panel Ceiling:

1. Tectum® Hold-Down Clip 8178T10 – for 1" Panel Thickness.

2. Provide one hold down clip at the center of each panel on each cross tee for a 2’ x 2’ ceiling.

E. Miscellaneous shop or field fabricated metal trim:

1. Vertical ceiling transition:

a. Depths of 12” or greater: Min. 16 Ga pre-finished sheetmetal to match color of suspension grid, in dimensions shown on drawings, exposed edges to be hemmed.

b. Depths less than 12”: Min. 20 Ga pre-finished sheetmetal to match color of suspension grid, in dimensions shown on drawings, exposed edges to be hemmed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer’s printed recommendations.

D. The Contractor shall be responsible for coordinating with the Owner the use adjacent of occupied spaces during the ceiling work. The Contractor shall be responsible for construction and maintaining the barriers in such areas to restrict access by unauthorized personel.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans

3.3 REMOVAL OF EXISTING CEILINGS FOR OVERHEAD REMODELING, STRUCTURAL, MECHANICAL AND/OR ELECTRICAL WORK

A. Before removal of existing panels or grid, Contractor shall carefully review with the Owner the condition of the existing ceiling where work is to take place. Areas shall be inspected and photographed and any existing damage, soiled panels or grid shall be noted in a report. Replacement of existing damaged or soiled panels will be at the Owner's request and a change order processed for such work. Wall conditions shall also be noted in the report. Copies of report and photographs shall be distributed to the Owner, Contractor and Architect.

1. Existing ceiling panels where work is to take place consist of various types of panels. If new panels are required to replace existing, new panels shall match existing.

2. Existing grid system where work is to take place consists of various types of grids. If new grid is required to replace existing, new grid shall match existing.

3. Provide any additional 1-1/2" runner channels necessary to maintain hanger spacing.

B. Extreme care shall be utilized in removal of existing panels and grid system. Panels and grid shall be kept free of soil and damage resulting from their removal, or from any other work under this contract. Soiled materials shall be replaced at no additional cost to the Owner.

C. Existing floor surfaces to remain shall be protected to avoid damage.

D. Remove existing light fixtures necessary for installation of new work. Utilize a licensed electrician for such work.

E. The Contractor shall be responsible for the storage and protection of the tiles throughout the entire period of Construction.

3.4 INSTALLATION, GENERAL

A. General: Install acoustical panel ceilings to comply with UBC Standard 25-2 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and

that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.

6. Do not attach hangers to steel deck tabs.

7. Do not attach hangers to steel roof deck. Attach hangers to structural members.

8. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

G. Reinstallation of Existing Ceilings:

1. Do not reinstall damaged or soiled tiles. The Contractor shall be responsible for providing matching replacement tiles for those damaged as a result of demounting the existing ceiling work, storage of the panels and other construction damage.

2. Install existing panels, or new panels, with pattern (if any) in same direction as existing ceiling.

3. Install ceiling system to match existing, true to lines and levels and free from warped, soiled or damaged grid or lay-in panels.

4. Provide steel channels as necessary to maintain hanger spacing.

5. Reinstall existing light fixtures after work is complete in these areas, See Electrical.

3.5 CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

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SECTION 096466 - WOOD ATHLETIC FLOORING (ADD ALTERNATE)

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes wood athletic floor assemblies consisting of the following:
   1. Supply and installation of MFMA Maple Wood Flooring System.
   2. Fasteners.
   3. Finish Materials.
   4. Perimeter Base.
   5. Miscellaneous accessories
   6. Application of the game lines
   7. References for the correct construction and preparation of concrete slabs to receive flooring.

B. Related Sections include the following:
   1. Division 03 Section for concrete and concrete finishing.

1.2 SUBMITTALS

A. Manufacturer's Product Data
   1. Submit manufacturer’s floor system product specification sheets.
   2. Suppliers shall submit certificates attesting that materials furnished will meet specifications for grade, quality, dryness and treatment, if required.

B. Concrete Guidelines
   1. Submit MFMA Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive wood flooring.

C. Samples
   1. Submit sample 16”x16” of assembled floor system. Samples shall be made by the manufacturer and so indicated.

D. Maintenance Literature
   1. Submit copies of Maintenance Instructions.

E. Striping Plan
   1. Submit drawing of Proposed Striping Plan.
   2. Submit color samples of all the manufacturer’s standard game line paint colors for selection and approval.

1.3 QUALITY ASSURANCE

A. Floor System Manufacturer Qualifications
   1. Manufacturer shall be an established firm experienced in field and have been in business or a minimum of ten (10) years.
   2. Manufacturer shall be a member in good standing of the Maple Flooring Manufacturers Association (MFMA).

B. Floor Contractor/Installer Qualifications and Certifications
   1. Installer to submit manufacturer’s or distributor’s certification attesting that they are an approved installer. The flooring contractor shall be an MFMA Mill Accredited Installation

Company* with MFMA Accredited Installer(s)* on-site for the duration of the wood floor installation

2. Flooring contractor shall be a firm experienced in flooring field and approved by manufacturer.
3. Submit a list of at least three completed projects of similar magnitude and complexity.

C. Surface Appearance
1. Expansion spacing will be installed to allow for normal expected increases in Equilibrium Wood Moisture Content (EMC).

D. System Performance Requirements:
1. Independent testing report shall be provided as part of the bid qualification process and submittal process if requested.
2. System shall have continuous subfloor construction and homogenous compounded resilient pads.
3. Expansion spacing shall be installed between every row of flooring throughout entire floor for purpose of appearance and stability.
4. Subfloor seams directly under maple shall be diagonal to strip flooring.
5. Floor must meet or exceed all of the following performance criteria:
   a. MFMA PUR
   b. DIN 18032 Part2 2001
   c. DIN 18032 Part2 1991
   d. ASTM F2772 Sport Floor Standards
   e. FIBA International Standards
   f. EN 14904

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials
1. Materials shall not be delivered, stored or installed until all masonry, painting, plastering and tilework is complete, and all overhead mechanical work, lighting, backstops, scoreboards are installed. Room temperature of 55-80 degrees Fahrenheit (13 to 27 degrees Celsius) and relative humidity of 35-50 % are to be maintained. Ideal installation/storage conditions are the same as those that will prevail when building is occupied.
2. Materials shall not be stored at the installation location if the moisture content of the concrete slab exceeds 4% or vapor transmission exceeds 4.5 pounds per 1,000 square feet (2.20 kg per 100 square meters).

1.5 PROJECT CONDITIONS

A. Do not install floor system until concrete has been cured 60 days and the requirements in paragraph 1.4 A are obtained.

B. Concrete substrate to be constructed and finished in accordance with MFMA recommendations. Slab’s finish shall be no more than 1/8” deflection within a 10ft radius

C. General Contractor is responsible to ensure slab is clean and free of all dirt and debris prior to floor installation beginning.

D. Permanent heat, light and ventilation shall be installed and operating during and after installation. Maintain a temperature range of 55 to 80 degrees Fahrenheit (13 to 27 degrees Celsius) and a relative humidity range of 35 to 50%. Consult MFMA guidelines for further information.

E. After floors are finished, area shall be kept locked by General Contractor to allow curing time for the finish. If after required curing time General Contractor or Owner requires use of gym, General Contractor shall protect the floor by covering with non-fibered kraft paper or red rosin paper with taped joints, until acceptance by Owner of complete gymnasium floor.

1.6 WARRANTY

A. Materials: The maple flooring shall be covered by the manufacturer against product defects for three (3) years.

B. Installation: The installation shall be covered against poor workmanship and faulty installation by a two (2) year written, limited warranty provided by the contractor performing/overseeing the installation

1.7 ADDITIONAL MATERIALS

A. Furnish to the owner additional materials containing a total of at least 1%

PART 2 - PRODUCTS

2.1 MANUFACTURERS (Confirm; plus confirm base bid vs alternate)

A. Athletic wood flooring system: Provide MFMA Maple Wood Flooring System. All other installation accessories and related components must be either made or approved by the supplier.
   1. Manufacturer, Basis of Design: Bio-Channel EQ1, by Robbins Flooring.
   2. Subject to compliance with requirements, provide named product or comparable product by one of the following:
      a. Aacer Sports Flooring
      b. Action Floor Systems
      c. Tarkett Sports Surfaces
      d. Connor Sports

2.2 WOOD FLOORING SYSTEM

A. System total thickness: 2 3/8 inches

B. Vapor Barrier
   1. 10-mil Polyethylene

C. Subfloor:
   1. 9/16” continuous open cell foam blanket (base bid)
      a. Rubber/resilient pads or strips of foam are not acceptable for base bid, see 096466 ALT
   2. Subfloor Panels that have been factory prepared to accept anchor channel
   3. Metal Anchor Channels

D. Maple Flooring: Flooring shall be MFMA maple.
   1. Maple Width: 2 1/4 inches
   2. Maple Sepcie: Northern Hard Maple

3. Seasoning: Kiln Dried (KD)
4. Pattern: Straight-lay
5. Maple Length: Random or Finger-Jointed
6. Maple Thickness: 25/32 inches
7. MFMA Maple Grade: 2nd or better.

E. Fasteners
1. Flooring – 1 3/4" barbed cleats or staples
2. Subfloor - 1 5/8" to 1 3/4" length, subflooring nails or staples.
3. Channel Anchors – 1 ½" long steel Powers SPIKE anchors or Tapcon screws

F. Perimeter base:
1. Manufactured from a homogeneous composition of synthetic
2. ASTM F-1861, Type TS, Group 1 (solid)
3. Size: 4" (10.16 cm) high by 5/16" (7.94 mm) thick coved profile with a 3" (7.62 cm) long by 3/8" (9.53 mm) thick toe. Back surface grooved with vertical semi-circular (5/32" radius) vents (15 vents per 4 ft. length).
4. Black

G. Floor finish: Oil-modified polyurethane sealer and finish as approved by the flooring manufacturer.

H. Game Line Paint: As approved by the finish manufacturer. Colors are to be selected from the manufacturer's standard range

I. Threshold Strips: Provide fully recessed threshold strips with expansion capability as required by floor system manufacturer.
1. Basis of design Product: Balco 1120/1140 series or similar
2. Finish: Mill finish aluminum with black seal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect concrete slab for proper tolerance and dryness and report any discrepancies to the General Contractor and Architect in writing. Slab shall be level to within 1/8" (3mm) in a 10' (3m) diameter. Moisture content of the concrete slab shall not exceed 4% or vapor transmission exceeds 4.5 pounds per 1,000 square feet (2.20 kg per 100 square meters).

B. All work required to put the concrete subfloors in acceptable condition shall be the responsibility of the General Contractor.

C. Verify that the area is dry and weather tight. Verify that permanent heat, light, and ventilation are installed and operable

D. Verify that all other work that could cause damage, dirt and dust, or interrupt the normal pace of the indoor resilient athletic flooring installation is completed.

E. Subfloor shall be broom cleaned by General Contractor.

F. Installer shall document all working conditions provided in General Specifications prior to commencement of installation.

3.2 INSTALLATION, GENERAL

A. Install in strict accordance with the manufacturer's written instructions.

B. The installation area shall be closed to all traffic and activity for a period to be set by the installer. The installation shall not begin until the installer is familiar with the existing conditions.

C. Vapor Barrier
   1. Install polyethylene with joints lapped a minimum of 6" and turned up 4" at the walls

D. Subfloor
   1. Install shock absorbing pad per manufacturer's recommendations over 6 mil poly
   2. Place SubFloor assembly in end-to-end manner, staggering end joints in adjacent rows. Allow for ¼" gap between panels, panels shall be placed on a 45 degree angle to the direction of the maple flooring. Provide 1 1/2" to 2" expansion void at perimeter and all vertical obstructions
   3. Install solid blocking at doorways, under bleachers in the stacked positions and below portable goals.
   4. Install bleacher blocking in accordance with manufacturer's recommendations
   5. Place metal anchor channel in each factory-prepared location in the panel.
   6. Anchor each metal anchor channel in the center pre-routed hole only, unless trimming at wall or vertical obstruction required relocations in adjacent location to anchor.

E. Maple Flooring
   1. Machine nail maple finish flooring 10" to 12" (250mm to 300mm) O.C. with end joints properly driven up and proper spacing provided for humidity conditions in specific regions. Provide 2" (50mm) expansion voids at the perimeter and at all vertical obstructions. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

F. Install appropriate threshold plates or transition strips where necessary

3.3 FINISHING

A. Sanding
   1. Sand per manufacturer's recommendations.
   2. After sanding, buff entire floor using 100 grit screen or equal grit sandpaper, with a heavy-duty buffing machine.
   3. Inspect entire area of floor to insure the floor presents a smooth surface without drum stop marks, gouges, streaks or shiners.
   4. Vacuum and/or tack floor before first coat of seal.
   5. Floor shall be clean and completely free of dirt and sanding dust.

B. Finishing
   1. Gymnasium
      a. Apply seal and finish coats according to manufacturer's instructions. Use only MFMA approved sealers and finishes
      b. Buff and vacuum and/or tack between each coat after it dries.
      c. Paint game lines using approved game line paint in strict accordance with the game line paint manufacturer's instructions
      d. Apply game lines accurately after buffing and vacuuming the coated surfaces. Layout in accordance with drawings. For game lines, use current rules of association having jurisdiction. Lines shall be straight with sharp edges in colors selected by Architect.

3.4 WALL BASE INSTALLATION

A. Install vent cove base anchored to walls with base cement or screws and anchors.

B. Use pre-molded outside corners and neatly mitered inside corner.

C. Corners and seams are to be installed flush with no gaps

D. Treat door casings or other vertical abutments not to receive vented cove according to manufacturer's recommendations

3.5 CLEANING AND PROTECTION

A. Clean up all unused materials and debris and remove from the premises.

B. Protect the indoor resilient athletic surfacing from damage using coverings approved by the manufacturer until acceptance of work by the Owner or their authorized representative.

END OF SECTION

SECTION 096466 - WOOD ATHLETIC FLOORING ALTERNATE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes wood athletic floor assemblies consisting of the following:

1. Supply and installation of MFMA Maple Wood Flooring System.
2. Fasteners.
3. Finish Materials.
4. Perimeter Base.
5. Miscellaneous accessories
6. Application of the game lines
7. References for the correct construction and preparation of concrete slabs to receive flooring.

B. Related Sections include the following:

1. Division 03 Section “Cast in Place Concrete” for concrete and concrete finishing.
2. Division 03 Section “Cast in Place Concrete” for below slab vapor retarder.

1.3 REFERENCES

A. ASTM F1869 “Standard Test Method for Measuring Moisture Evaporation Rate of Concrete Subfloor Using Anhydrous Calcium Chloride”

B. ACI 302.2R-06 “Guideline for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials”

C. MFMA – Maple Flooring Manufacturer’s Association

1.4 SUBMITTALS

A. Manufacturer's Product Data

1. Submit manufacturer’s floor system product specification sheets.
2. Suppliers shall submit certificates attesting that materials furnished will meet specifications for grade, quality, dryness, and treatment, if required.

B. Concrete Guidelines

1. Submit MFMA Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive wood flooring.

C. Samples

1. Submit sample 16”x16” of assembled floor system. Samples shall be made by the manufacturer and so indicated.

D. Maintenance Literature

1. Submit copies of Maintenance Instructions.

E. Striping Plan

1. Submit drawing of Proposed Striping Plan.
2. Submit color samples of all the manufacturer's standard game line paint colors for selection and approval.

1.5 QUALITY ASSURANCE

A. Floor System Manufacturer Qualifications

1. Manufacturer shall be an established firm experienced in field and have been in business or a minimum of ten (10) years.
2. Manufacturer shall be a member in good standing of the Maple Flooring Manufacturers Association (MFMA).

B. Floor Contractor/Installer Qualifications and Certifications

1. Installer to submit manufacturer's or distributor's certification attesting that they are an approved installer. The flooring contractor shall be an MFMA Mill Accredited Installation Company* with MFMA Accredited Installer(s)* on-site for the duration of the wood floor installation
2. Flooring contractor shall be a firm experienced in flooring field and approved by manufacturer.
3. Submit a list of at least three completed projects of similar magnitude and complexity.

C. Surface Appearance

1. Expansion spaces will not exceed 1/64" (0.4mm) at time of installation and will be spread evenly across the floor with each row of flooring.
2. Expansion spacing will be installed to allow for normal expected increases in Equilibrium Wood Moisture Content (EMC).

D. System Performance Requirements:

1. Independent testing report shall be provided as part of the bid qualification process and submittal process if requested.
2. System shall have continuous subfloor construction and homogenous compounded resilient pads.
3. Expansion spacing shall be installed between every row of flooring throughout entire floor for purpose of appearance and stability.
4. Subfloor seams directly under maple shall be diagonal to strip flooring.
5. Floor must meet or exceed all of the following performance criteria:
   a. MFMA PUR
   b. DIN 18032 Part2 2001
   c. DIN 18032 Part2 1991
   d. ASTM F2772 Sport Floor Standards
   e. FIBA International Standards
   f. EN 14904

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials

1. Materials shall not be delivered, stored, or installed until all masonry, painting, plastering, and tilework is complete, and all overhead mechanical work, lighting, backstops, scoreboards are installed. Room temperature of 55-80 degrees Fahrenheit (13 to 27 degrees Celsius) and relative humidity of 35-50 % are to be maintained. Ideal installation/storage conditions are the same as those that will prevail when building is occupied.

2. Materials shall not be stored at the installation location if the moisture content of the concrete slab exceeds 4% or vapor transmission exceeds 4.5 pounds per 1,000 square feet (2.20 kg per 100 square meters).

1.7 PROJECT CONDITIONS

A. Do not install floor system until concrete has been cured 60 days and the requirements in paragraph 1.4 A are obtained.

B. Concrete substrate to be constructed and finished in accordance with MFMA recommendations. Slab's finish shall be no more than 1/8" deflection within a 10ft radius.

C. General Contractor is responsible to ensure slab is clean and free of all dirt and debris prior to floor installation beginning.

D. Permanent heat, light and ventilation shall be installed and operating during and after installation. Maintain a temperature range of 55 to 80 degrees Fahrenheit (13 to 27 degrees Celsius) and a relative humidity range of 35 to 50%. Consult MFMA guidelines for further information.

E. After floors are finished, area shall be kept locked by General Contractor to allow curing time for the finish. If after required curing time General Contractor or Owner requires use of gym, General Contractor shall protect the floor by covering with non-fibered kraft paper or red rosin paper with taped joints, until acceptance by Owner of complete gymnasium floor.

1.8 WARRANTY

A. Materials: The maple flooring shall be covered by the manufacturer against product defects for three (3) years.

B. Installation: The installation shall be covered against poor workmanship and faulty installation by a two (2) year written, limited warranty provided by the contractor performing/overseeing the installation

1.9 ADDITIONAL MATERIALS

A. Furnish to the owner additional materials containing a total of at least 1% total volume installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Athletic wood flooring system: Provide MFMA Maple Wood Flooring System. All other installation accessories and related components must be either made or approved by the supplier.

1. Manufacturer, Basis of Design: Clutch Court-Trainer 3, by Tarkett Sports. (Other Considerations: Omnisport's Active/HPL, or Pureplay?)

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

a. Aacer Sports Flooring
b. Action Floor Systems
c. Robbins Sports Surfaces
d. Signature Sports Flooring
e. Connor Sports

2.2 WOOD FLOORING SYSTEM

A. System total thickness: 2 1/2 inches

B. Maple Flooring: Flooring as graded in accordance with MFMA-rules

1. Maple Width: 2 1/4 inches
2. Maple Length: Random or Finger Joined
3. Maple Thickness: 25/32 inches
4. MFMA Maple Grade: 2nd or better.

C. Subfloor:

1. Two layers of 15/32” (12mm) Structural APA- rated sheathing, exposure 1, minimum of 4 ply per panel.

D. Force Reduction Shock Pad

1. 3/8” Resilient Shock Pads

E. Fasteners:

1. Flooring – 2” (51mm) 15-gauge cleats or staples
2. Subfloor:
   a. 1” length, 7/16” (11mm) crown, coated staples or equivalent.
   b. Construction adhesive, PL400 or equivalent.

F. Perimeter base:

1. Manufactured from a homogeneous composition of synthetic
2. ASTM F-1861, Type TS, Group 1 (solid)
3. Size: 4" (10.16 cm) high by 5/16" (7.94 mm) thick coved profile with a 3" (7.62 cm) long by 3/8" (9.53 mm) thick toe. Back surface grooved with vertical semi-circular (5/32" radius) vents (15 vents per 4 ft. length).
4. Black

G. Floor finish: Oil-modified polyurethane sealer and finish as approved by the flooring manufacturer.

H. Game Line Paint: As approved by the finish manufacturer. Colors are to be selected from the manufacturer’s standard range

I. Threshold Strips: Provide fully recessed threshold strips with expansion capability as required by floor system manufacturer.
1. Basis of design Product: Balco 1120/1140 series or similar
2. Finish: Mill finish aluminum with black seal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect concrete slab for proper tolerance and dryness and report any discrepancies to the General Contractor and Architect in writing. Slab shall be level to within 1/8” (3mm) in a 10’ (3m) diameter. Moisture content of the concrete slab shall not exceed 4% or vapor transmission exceeds 4.5 pounds per 1,000 square feet (2.20 kg per 100 square meters).

B. All work required to put the concrete subfloors in acceptable condition shall be the responsibility of the General Contractor.

C. Verify that the area is dry and weather tight. Verify that permanent heat, light, and ventilation are installed and operable

D. Verify that all other work that could cause damage, dirt, and dust, or interrupt the normal pace of the indoor resilient athletic flooring installation is completed.

E. Subfloor shall be broom cleaned by General Contractor.

F. Installer shall document all working conditions provided in General Specifications prior to commencement of installation.

3.2 INSTALLATION, GENERAL

A. Install in strict accordance with the manufacturer's written instructions.

B. The installation area shall be closed to all traffic and activity for a period to be set by the installer. The installation shall not begin until the installer is familiar with the existing conditions.

C. Subfloor

1. Install the lower subfloor perpendicular to the intended finish flooring direction. All joints shall be staggered 4' and spaced ¼" (6mm) apart. The kerfed layer shall be facing up.

2. Install solid blocking at doorways, under bleachers in the stacked position.

3. Install Bleacher Blocking per manufacturer's recommendations.

4. Install the upper subfloor diagonal to the lower subfloor panels staggering joints 4' and spacing ¼" (6mm) apart. Secure these panels using adhesive (Box X pattern) and 1" (25mm) staples placed 6" (150mm) On Center (O.C.) at panel perimeter and 12" (300mm) O.C. throughout interior. The kerfed side shall be facing down.

D. Maple Flooring

1. Machine nail maple finish flooring 10" to 12" (250mm to 300mm) O.C. with end joints properly driven up and proper spacing provided for humidity conditions in specific regions. Provide 2" (50mm) expansion voids at the perimeter and at all vertical obstructions. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Install appropriate threshold plates or transition strips where necessary

3.3 FINISHING

A. Sanding

1. Sand per manufacturer's recommendations.

2. After sanding, buff entire floor using 100 grit screen or equal grit sandpaper, with a heavy-duty buffing machine.

3. Inspect entire area of floor to ensure the floor presents a smooth surface without drum stop marks, gouges, streaks, or shiners.

4. Vacuum and/or tack floor before first coat of seal.

5. Floor shall be clean and completely free of dirt and sanding dust.

B. Finishing

1. Gymnasium

a. Apply seal and finish coats according to manufacturer's instructions. Use only MFMA approved sealers and finishes
b. Buff and vacuum and/or tack between each coat after it dries.
c. Paint game lines using approved game line paint in strict accordance with the game line paint manufacturer's instructions
d. Apply game lines accurately after the buffing and vacuuming the coated surfaces. Layout in accordance with drawings. For game lines, use current rules of association

having jurisdiction. Lines shall be straight with sharp edges in colors selected by Architect.

3.4 WALL BASE INSTALLATION

A. Install vent cove base anchored to walls with base cement or screws and anchors.

B. Use pre-molded outside corners and neatly mitered inside corner.

C. Corners and seams are to be installed flush with no gaps

D. Treat door casings or other vertical abutments not to receive vented cove according to manufacturer's recommendations

3.5 CLEANING AND PROTECTION

A. Clean up all unused materials and debris and remove from the premises.

B. Protect the indoor resilient athletic surfacing from damage using coverings approved by the manufacturer until acceptance of work by the Owner or their authorized representative.

END OF SECTION

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SECTION 096500 - RESILIENT TILE FLOORING (Confirm whether used and where.)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Vinyl Composition Tile. (VCT)
2. Static Dissipative Resilient Flooring.
3. Luxury Vinyl Tile. (LVT)
4. Rubber Flooring.
5. Installation Accessories

B. Related Sections

1. Section 033000 – “Cast-in-Place Concrete” for poured concrete floor substrate.
2. Section 096513 – “Resilient Base and Accessories” for wall base, floor transition (reducer) strips and stair finishing accessories.

1.3 REFERENCES

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

B. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

C. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

D. ASTM F 1066 Standard Specification for Vinyl Composition Tile

E. ASTM F 1700 Standard Specification for Solid Vinyl Tile

F. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

G. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

H. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

I. NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid Materials

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.

B. Installer Qualifications: Minimum two years' experience and completed at least three projects of similar magnitude, material, and complexity. Upon request, provide project references including contact names and telephone numbers for three projects.

C. Fire Performance Characteristics: Provide resilient vinyl composition tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:

1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I
2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less

D. Pre-Installation Testing: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.

1. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
2. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
3. Bond Testing: Conduct testing and document results in accordance with the manufacturer's recommendations.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification:

1. Full-size units of each color and pattern of floor tile required.

C. Submit shop drawings show floor patterns, extent of each tile type, seaming plan, coving details.

D. Qualification Data: For qualified Installer.

E. Maintenance Data: For resilient products to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original, unopened containers labeled with manufacturer's name, brand, pattern, color and run number.

B. Inspection: Inspect all deliveries to ensure undamaged goods, and for accurate product type for thickness, edge type, color, and speckle. Contact manufacturer immediately if product is damaged or inconsistent with order specifications.

C. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 55 deg F or more than 90 deg F. Store tiles on flat surfaces.

D. Flooring material and adhesive (if required) shall be acclimated to the installation area for a minimum of 24 hours prior to installation. See manufacturer's installation guidelines for details on proper acclimation procedures. Longer acclimation may be required if product has been stored for extended time periods.

1.7 PROJECT CONDITIONS

A. Environmental Requirements/Conditions:

1. Areas to receive material should be clean, fully enclosed and weather tight. The permanent HVAC should be fully operational and controlled and set at a minimum

temperature 65° F (18.3° C). If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75° F ± 10°F (23.9° C ± 5.5° C) with a 50% ± 10% ambient relative humidity. These conditions MUST be established at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.

2. The flooring material should be conditioned in the same manner for at least 48 hours prior to the installation.

3. Substrate evaluation and preparation should not begin until a stable, conditioned environment has been established as described in this section.

4. Areas to receive flooring must have adequate lighting to allow for proper inspection and preparation of the substrate, installation of the flooring and final inspection.

B. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.

1. Temperature Conditions: 65° F (18.3° C) for at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.

C. Substrate Conditions:

1. Concrete Curing: Do not install flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by the concrete and flooring manufacturer's recommendations.

2. Testing Results: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.

a. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.

b. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

c. In-situ Relative Humidity Testing: ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

d. Calcium Chloride Testing: ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

e. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter.

f. Bond Testing: Conduct testing and document results in accordance with the manufacturer’s recommendations.

D. Close spaces to traffic during installation.

E. Close spaces to traffic for 48 hours after installation.

F. Install resilient products after other finishing operations, including painting, have been completed.

G. Where demountable partitions and other items are indicated for installation on top of resilient flooring material, install flooring material before these items are to be installed.

1.8 WARRANTY

A. Warranty Period: Manufacturer's standard 10 Year Warranty against manufacturing defects.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, size, and pattern of floor tile installed.

PART 2 - PRODUCTS

2.1 VINYL COMPOSITION FLOOR TILE

A. Basis-of-Design Product: The design for each tile type is to match adjacent resilient flooring: Armstrong Commercial Flooring, Standard Echelon.

1. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

a. Burke Mercer Flooring Products, Division of Burke Industries Inc
b. Johnsonite
c. Manning Commercial
d. Roppe Corporation, USA
e. TOLI International

2. All proposed tile substitutions shall provide all colors matching those indicated in the drawings. The Architect shall be the final arbiter for all proposed color matches and intended aesthetic effect. Substitutions not providing colors that are judged by the Architect as not providing satisfactory matches to those specified shall be rejected.

B. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.

C. Fire-Test-Response Characteristics: NFPA 101 Life Safety Code

D. Wearing Surface: Smooth.

E. Thickness: 0.125 inch (3.2 mm).

F. Size: 12 by 12 inches (304.8 by 304.8 mm).

G. Colors are to be selected from Manufacturer’s full range of colors and patterns.

H. Provide transition/reducing strips tapered to meet abutting materials.

2.2 STATIC DISSIPATIVE RESILIENT FLOORING

A. Basis-of-Design Manufacturer: Armstrong Commercial Flooring

1. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

a. Burke Mercer Flooring Products, Division of Burke Industries Inc
b. Johnsonite
c. Manning Commercial
d. Roppe Corporation, USA
e. TOLI International

B. Basis-of-Design Product: Armstrong Commercial Flooring, Excelon SDT™ Static Dissipative Tile Flooring

1. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified

C. Description: Static dissipative vinyl tile composed of polyvinyl chloride resin, plasticizers, fillers, pigments, and antistatic additive with colors and texture dispersed uniformly throughout its thickness.

D. Tile shall meet size, thickness, indentation, impact, deflection, dimensional stability, resistance to chemicals, squareness, and resistance to heat requirements of ASTM F 1066 Standard Specification for Vinyl Composition Tile, Class 2, through pattern.

E. Performance: Meet the following electrical properties when installed according to manufacturer's instructions with the required adhesive, copper strips and SDT floor finish.

1. ANSI/ESD STM 7.1 Floor Materials—Resistive Characterization of Materials results between 10^6 and 10^9 ohms, point-to-point, and point-to-ground.

2. ASTM F 150 Electrical Resistance of Flooring between 10^6 and 10^9 ohms, point-to-point, and point-to-ground.

3. ANSI/ESD STM 97.1: Floor Materials and Footwear—Resistance in Combination with a Person results between 10^6 and 10^9 ohms (average) with dissipative footwear and when using heel straps.

4. ANSI/ESD STM 97.2: Floor Materials and Footwear Voltage Measurement in Combination with a Person – 30 volts (average) with dissipative footwear at 12% relative humidity.

5. Static Dissipation @ 12% RH: Flooring in combination with a person wearing dissipative footwear – 1000 to 100 volts: 0.2 seconds maximum

F. Thickness: 0.125 inch (3.2 mm).

G. Size: 12 by 12 inches (304.8 by 304.8 mm)

H. Pattern and Color: to be selected from Manufacturer's full range of colors and patterns.

I. Adhesive: Provide Armstrong S-202 Static Dissipative Tile Adhesive with 2 in. (5.08 cm) wide x 24 in. (60.96 cm) long copper ground-connection strips for under the tile or adhesives and copper ground-connection as recommended by tile manufacturer.

J. Accessories

1. Provide Armstrong S-392 Static Dissipative Tile Polish for application as initial and on-going static dissipative maintenance finish, polish as recommended by other tile manufacturer.

2. For patching, smoothing, and leveling monolithic subfloors (concrete, terrazzo, quarry tile, ceramic tile, and certain metals), provide Armstrong S-184 Fast-Setting Cement-Based Patch and or compound as recommended by other tile manufacturer.

3. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.

4. Provide transition/reducing strips tapered to meet abutting materials.

2.3 LUXURY VINYL TILE (LVT)

A. General:

1. Description: A layered construction consisting of a clear, vinyl wear layer protecting a high-fidelity print layer on a solid vinyl backing. Protected by a UV-cured polyurethane finish, the wear surface is embossed with different textures to enhance each of the

printed visuals. Colors are insoluble in water and resistant to cleaning agents and light.

2. Luxury Solid Vinyl Tile shall conform to the requirements of ASTM F 1700, “Standard Specification for Solid Vinyl Tile", Class III, Backing Class – Commercial Grade, Type B – Embossed Surface.

3. Performance:

   a. Slip Resistance/ASTM D2047: ADA compliant
   b. Residual Indentation/ASTM F970: 750 psi
   c. Flexibility/ASTM F137: Passes
   d. Resistance to Heat/ASTM F1514: Passes
   e. Resistance to Light/ASTM F1515: Passes
   f. Resistance to Chemicals/ASTM F925: Passes
   g. Antibacterial Activity/AATCC 147: Passes
   h. Radiant Flux/ASTM E64: 8>0.45 watts/cm2, NFPA Class I
   i. Smoke Density/ASTM E662: Passes, <450

B. LVT-1: Luxury Vinyl Tile.

1. Product Manufacturer: Shaw Contract LVT.
2. Style: Jeogori 0215V
3. Color(s):
4. Size ASTM F536, Nominal Dimensions: 6" wide x 48" long.
5. Wear layer thickness: 20 mil/20.20”/.05mm
6. Overall thickness: .0118/3mm
7. Installation: Glue-down
8. Installation Pattern:
9. No Substitutions.

C. LVT-2: Luxury Vinyl Tile

1. Product Manufacturer: Shaw Contract LVT,
2. Style: Crete 0203V
3. Color(s):
4. Size ASTM F536, Nominal Dimensions: 18” x 18”
5. Wear layer thickness: 20 mil/20.20”/.05mm
6. Overall thickness: .0118/3mm.
7. Installation: Glue-down
8. Installation Pattern:
9. No Substitutions.

2.4 RUBBER FLOORING:

A. General Exercise Flooring:

1. Basis of Design Product: Capri Fitness & Rec rolled goods, square-edge tile and interlocking tile as manufactured by Capri Cork, Manufacturer: Capri Collections.

2. Product Physical Characteristics:

   a. Comply with ASTM F 1344 standard specification for Rubber Floor Tile, Class 1-A and 1-B.
   b. ASTM F3041 – Bonded Crumb Rubber:

      1) ASTM D3389 – Abrasion Resistance: Passes, <1g loss
      2) ASTM F137 – Flexibility: Passes
      3) ASTM F970 – Static Load Limit: Passes, 250 lbs.
      4) ASTM F2199 – Dimensional Stability: Passes, <0.05 in. change
      5) ASTM F1514 – Color Heat Stability: Passes, ΔE<8

6) ASTM F925 – Chemical Resistance: Passes

c. ASTM D2240 – Hardness: 60, Shore A
d. ASTM E648 (NFPA 253) – Critical Radiant Flux: Class I, > 0.45 W/cm^2
e. ASTM E662 (NFPA 258) – Smoke Density: Passes, <450
f. ASTM D2047 – Slip Resistance: >0.8 (wet), >0.8 (dry)

3. Square-Edge Tile Size: 24 inches by 24 inches by 1/8 inches (610 mm by 610 mm by 3.2 mm)
4. Strength Collection: Color to be selected from manufacturer's standard colors
5. Installation: Glue-down: Use manufacturer's approved adhesive for installation.
6. Adhesive: Type and make as approved by tile manufacturer for installing specified product.
7. Finish: Type and make as approved by tile manufacturer for finishing specified product.
   a. Finish Application: Install finish in accordance with manufacturer's written initial finish application instructions.

B. Oil Resistant Resilient Rubber Tile Flooring: Comply with ASTM F 1344 standard specification for Rubber Floor Tile, Class 1-A and 1-B

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Armstrong World Industries, Inc
   b. Flexco
   c. Johnsonite; A Tarkett Company
   d. Roppe Corporation, USA
   e. VPI Corporation
2. Minimum Thickness: 0.125 inch (3.2 mm).
3. Size and Pattern: Solid color, hammered texture, 24" x 24"
4. Oil Resistance: Comply with ASTM D 471, Effect of Liquids on Rubber Properties
5. ASTM Standard Test Method for Rubber Property-Durometer Hardness: 65 Shore A
6. ASTM D 3389 Standard Test Method for Coated Fabrics Abrasion Resistance: <1.00gram weight loss
7. ASTM D 2047, Standard Test Method for Static Coefficient of Friction of Polish Coated Flooring: 0.8 or greater
8. ASTM F 970, Standard Test Method for Static Load Limit: Passes at 250 psi or greater
9. Colors: To be selected by Architect from manufacturer's standard colors

2.5 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement- or blended-hydraulic-cement-based formulation provided or approved by flooring manufacturer for applications indicated.

B. Liquid Applied Vapor Retarder Membrane at existing concrete slabs on grade:

1. Basis-of-Design Product: Subject to compliance with requirements, provide UZIN, a brand of Uzin Utz North America, Inc.; PE 460 or comparable product by one of the following:
   a. ARDEX Americas
   b. KOSTER American Corporation

c. MAPEI Corporation.
d. Schonox HPS North America

2. MVE-Control System: ASTM F3010-qualified, fluid-applied, two-component, 100 percent solids epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of floor coverings indicated and acceptable to manufacturers of floor covering products indicated, including adhesives

   a. Water-Vapor Transmission: 0.1 perm (5.72 ng/s x sq. m x Pa) in accordance with ASTM E96/E96M

3. Acrylic Primer: UZIN PE 280, bonding agent directly applied to epoxy-based primer/moisture vapor retarders

C. Adhesives: Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.

1. Low-Emitting Materials: Adhesives shall have a VOC content of 50 g/L or less.

2. Low-Emitting Materials: Adhesives shall comply with Green Seal's GS-36 and with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Provide transition/reducing strips tapered to meet abutting materials.

E. Floor Polish: For VCT flooring, provide protective liquid floor polish products as recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products. Where substrates do not comply with tolerances and other requirements, correct, and prepare substrate as necessary.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

B. Visually inspect flooring materials, adhesives, and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

B. Concrete Substrates:

1. New or existing concrete subfloors shall meet the guidelines of the latest edition of ACI 302 and ASTM F 710, “Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
2. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
3. Wet curing 7 days is the preferred method for curing new concrete.
4. Do not use curing compounds in concrete substrate. If present they can interfere with the bond of the adhesive to the concrete.
5. Concrete floors shall be flat: 3/16" in 10 ft.
6. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer on concrete floors regardless of their age or grade level. pH of concrete sub-floor shall not be greater than 10. Proceed with installation only after substrates pass testing.
7. Moisture Testing: Perform tests recommended by manufacturer on concrete floors regardless of their age or grade level. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft. in 24 hours
8. Perform all other tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

D. Installation of Liquid Applied Vapor Retarder Membrane on Existing Concrete Slabs on Grade:

1. Concrete Substrates: Prepare and clean substrates in accordance with MVE-control system manufacturer's written instructions to ensure adhesion of system to concrete.
    a. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE-control system manufacturer. Do not use solvents.
    b. Provide concrete surface profile complying with ICRI 310.2R CSP 3 by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    c. After shot blasting, repair damaged and deteriorated concrete in accordance with MVE-control system manufacturer's written instructions.
    d. Before installing MVE-control systems, broom sweep and vacuum prepared concrete.
2. Install MVE-control system in accordance with ASTM F3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fisheyes, and voids
3. Install cementitious underlayment over cured membrane if required to maintain manufacturer's warranty in thickness required to maintain the warranty.

E. Subfloor Cleaning:

1. The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below.
2. Remove residual adhesives as recommended by the flooring manufacturer.

3. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring.

4. Avoid organic solvents.

5. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate, they must be mechanically removed prior to the installation of the flooring material.

6. Refer to the Manufacturer's written installation instructions, and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation

F. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are same temperature as space where they are to be installed.

G. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 TILE INSTALLATION

A. Install flooring in strict accordance with the latest edition of the manufacturer's written installation instructions for each product used.

B. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

C. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

D. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tile in basket-weave pattern with grain direction alternating in adjacent tiles.

E. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles in pattern of colors and sizes indicated.

F. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including pipes, outlets, edgings, door frames, thresholds, and nosings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

H. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

I. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.
    a. Do not wash surfaces until after time period recommended by manufacturer.

B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

1. Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes if recommended in writing by manufacturer.
    a. Use commercially available floor polish products as recommended by the tile manufacturer.
    b. Apply minimum number of coat(s) as required to establish a complete, continuous base finish with a consistent sheen throughout, no fewer than 2 coats.
    c. Coordinate selection of floor polish with Owner's maintenance service.
2. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
3. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

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SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Resilient vinyl wall base.
2. Resilient vinyl flooring transitions.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification:

1. Resilient Wall Base and Accessories: Manufacturer's standard-size Samples, of each resilient product color and pattern required.

C. Maintenance Data: For resilient products to include in maintenance manuals.

D. Extra Materials: Deliver to Owner at least 10 linear feet (3 linear m) of each type and color of resilient wall base installed.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.5 PROJECT CONDITIONS

A. Maintain temperatures within the range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After post installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during installation.

D. Close spaces to traffic for 48 hours after installation.

E. Install resilient products after other finishing operations, including painting, have been completed.

1.6 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide the basis of design product or an equal product meeting all requirements of this section by one of the following:

1. Armstrong World Industries, Inc
2. Flexco
3. Johnsonite; A Tarkett Company
4. Roppe Corporation, USA
5. VPI Corporation

2.2 VINYL BASE

A. ASTM F 1861, Type TP (vinyl, thermoplastic), Group I (solid, homogeneous)

B. Styles:

1. For use at stained concrete and resilient tile floors: Cove (base with toe)

C. Minimum Thickness: 0.125 inch (3.2 mm).

D. Height: 4 inches (153 mm).

E. Lengths: coils in manufacturer's standard lengths.

F. Outside Corners: preformed.

G. Inside Corners: preformed.

H. Color: To be selected by Architect from manufacturer’s full range of standard colors.

2.3 VINYL FLOORING TRANSITIONS

A. ASTM F 1861, Type TV (vinyl, thermoplastic), Group I (solid, homogeneous)

B. Slip Resistance: ASTM D 2047 - Exceed Federal Standards and ADA recommendations of 0.5 for flat surfaces.

C. Fire Resistance: ASTM E 648/NFPA 253 (Critical Radiant Flux) - Class 1.

D. Comply with ADA requirements for changes in level.

E. Color(s): To be selected by Architect from manufacturer’s full range of standard colors.

F. Basis of design products: Tarkett Resilient Reducer Moldings:

1. 1/8” Resilient flooring to subfloor reducer strip: SSR-XX-B: Binder bar edging for 1/16″ to 1/8″ thick materials to floor.

G. Basis of design products: Tarkett Slim Line Transitional Moldings:

1. Carpet to 1/8” Resilient flooring transition strip: SLT-C-XX-A: 1/4″ (6.35mm) carpet to 1/8″ (3.18mm) resilient materials, 5/8″ (1.59cm) cap with 11/64″ (3.18mm) wide support with contoured transition

2.4 INSTALLATION ACCESSORIES

A. Adhesives: Water-resistant type recommended by the manufacturer to suit floor covering and substrate conditions indicated.

1. Low-Emitting Materials: Adhesives shall have a VOC content of 50 g/L or less.
2. Low-Emitting Materials: Adhesives shall comply with Green Seal's GS-36 and with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

B. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by the manufacturer. Do not use solvents.

C. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are the same temperature as space where they are to be installed.

3.3 RESILIENT WALL BASE INSTALLATION

A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

B. Install wall base in lengths if practicable without gaps at seams and with tops of adjacent pieces aligned.

C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

D. Do not stretch the wall base during installation.

E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.

F. Premolded Corners: Install premolded corners before installing straight pieces.

G. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.

2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate

3.4 RESILIENT ACCESSORY INSTALLATION

A. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.

1. Only clean vinyl surfaces using products recommended by the manufacturer for each product, and as instructed by the manufacturer's written instructions.

B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by the manufacturer.

END OF SECTION

SECTION 096700 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 RELATED SECTIONS

A. Section 03 30 00 – Cast-In-Place Concrete

B. Section 07 92 00 - Joint Sealants: Rod and sealant at construction, control and expansion joints in masonry.

1.3 REQUIREMENTS INCLUDED

A. This Section includes the following:

1. Two-component, 100% solids epoxy consisting of an epoxy resin and colored vinyl flake chips, seal coated with a two-component, high solids urethane with non-yellowing stability and slip resistance.

1.4 REFERENCE STANDARDS

A. NACE No. 6/SSPC-SP 13 - Surface Preparation of Concrete

B. ACI 308 – Standard Practice for Curing Concrete

C. ACI 302.1R-80 - Guide for Concrete Floor and Slab Construction

D. ASTM International (ASTM)

1. ASTM C 413 - Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.
2. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.
3. ASTM D1475 - Standard Test Method For Density of Liquid Coatings, Inks, and Related Products.
4. ASTM D 2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
5. ASTM D 2240 - Standard Test Method for Rubber Property—Durometer Hardness.
6. ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
7. ASTM D 2370 - Standard Test Method for Tensile Properties of Organic Coatings.
8. ASTM D 3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
9. ASTM D 4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
10. ASTM D5441 - Standard Test Method for Analysis of Methyl Tert-Butyl Ether (MTBE) by Gas Chromatography.
11. ASTM D 7234 - Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
12. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

13. ASTM F 2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
14. ASTM G 154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials.

E. International Concrete Repair Institute (ICRI): ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

F. Steel Structures Painting Council Surface Preparation (SSPC-SP):

1. SSPC-SP – 2: Hand Tool Cleaning

1.5 ADMINISTRATIVE REQUIREMENTS

A. See Division 1 for submittal procedures.

B. Product Data: For each type of product indicated.

1. Product Data: Submit manufacturer's technical information and installation details to describe materials to be used, including properties, VOC content, wet static coefficient of friction, compressive strength, tensile strength, elongation and similar properties. Include application, preparation, and installation instructions. The same manufacturer shall supply all polymer underlayments and floor finishes.
   a. Where products are supplied by two or more manufacturers, letters of product compatibility shall be provided from each product manufacturer. Letters shall certify that the products in contact with one another are fully compatible, and that the warranty and application instructions for each product/manufacturer is not affected using another manufacturer's product within the system proposed.
2. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
3. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

C. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction. Include overall plan drawings indicating area scheduled to receive each system specified.

D. Applicator Certificate: Submit official certificate indicating applicator's successful completion of manufacturer's training program, as applicable.

E. Samples for selection: Provide manufacturer's printed, not electronic or copies color charts showing full selection manufacturer's standard colors for color selection.

F. Samples for Verification: Before beginning work, submit physical Mock-up: 2'-0" x 2'-0" Mock-up on concrete slab of same material of the flooring system for the Architect's approval. Physical samples shall be an accurate representation of specified color, texture and finish.

1. Before beginning the final application of the flooring system, construct a mockup to serve as basis for evaluation of texture and workmanship
   a. Number of Mock-Ups to be prepared: 1 for selected resinous floor finish (RF-1)
   b. Use the same materials and methods for work as specified in this Section.
   c. Use approved design samples as basis for mock-ups, including selected texture, color, and finish.
   d. Location: As determined by Owner/Architect.
   e. Minimum size: 48 inches by 48 inches.
   f. Approvals: Obtain Architect's written approval of field sample before start of material application, including approval of aesthetics, color, texture, and appearance.

G. Maintenance Data: Submit manufacturer's care and maintenance instructions, including cleaning instructions to include in maintenance manuals.

H. Storage, application, and handling instructions and recommendations.

I. Submit Manufacturer’s standard warranty.

J. Preapplication Conference:

1. Contractor to arrange and conduct a preapplication conference, held at the Project site at a minimum of 2 weeks prior to commencement of work of this section. Provide at least 72 hours advance notice to participants prior to convening preapplication conference.
2. Contractor to prepare meeting agenda and record discussions of conference including decisions and agreements reached, and disagreements, and furnish copy of record to each party attending. If substantial disagreements exist at the conclusion of the conference, determine how disagreements will be resolved and the set date for reconvening the conference.
3. Required attendance, unless otherwise noted, includes Contractor, Contractor’s Superintendent, resinous flooring applicator and manufacturer’s representative, Architect, Owner’s Representative/Project Manager and Owner’s QA/QC representative at Owner’s discretion.
4. Perform a thorough review of construction, condition, materials, details, and methods of application
5. Review of completed mock-up sample(s).
6. Perform a thorough review of substrate, penetrations, and other preparatory work performed by other trades. Review repair procedures of concrete floor, as recommended by coating manufacturer.
7. Review observation, protection, and repair procedures during/after Installation
8. Review required submittals, both completed and yet to be completed
9. Review and finalize construction schedule as related to this work, and verify availability of materials, installer’s personnel, equipment, and facilities needed to make progress and avoid delays.
10. Review conditions and procedures for coping with unfavorable construction conditions, including temporary requirements.
11. Review notification procedures for non-working days.

1.6 QUALITY ASSURANCE

A. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

B. Applicator Qualifications:

1. Applicator regularly engaged, for a minimum of 5 years, in the application of resinous flooring systems of similar type to that specified.
2. Employ persons trained for application of resinous flooring systems, approved, trained, or certified, by the manufacturer, if applicable.

1.7 WARRANTY

A. Written manufacturer's warranty covering materials only. Applicator to provide application warranty.

1.8 PROJECT CONDITIONS

A. Apply products conforming to product manufacturer’s temperature and moisture products, only after concrete surface is fully cured. Provide temperature and moisture control measures and equipment, if needed, to conform to manufacturer requirements.

B. Evaluate the substrate condition, including moisture content and extent of substrate leveling and repairs required, if any.

C. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous polyaspartic floor coating system application.

D. Coordinate flooring work with other trades and building operations to ensure adequate illumination, ventilation, and dust free environment during application and curing of flooring.

E. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting flooring installation.

F. Do not proceed with installation if environmental conditions do not comply with Manufacturer’s requirements, notify Architect immediately.

G. Close spaces to traffic during resinous polyaspartic floor coating system application, and for not less than 72 hours after application, unless manufacturer recommends a longer period.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and batch number.

B. Store materials in accordance with manufacturer's instructions.

C. Store materials in A dry enclosed area with adequate protection from moisture.

D. Keep materials in manufacturer's original, unopened containers and packaging until application.

E. Store materials in a clean, dry area indoors

F. Maintain environmental conditions in storage areas strictly in accordance with manufacturers’ written recommendations.

G. Protect materials from freezing.

H. Protect materials during storage, handling, and application to prevent contamination or damage.

I. Discard all materials suspected of contamination/damage and provide new.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. RF-1 Resinous Polyaspartic Flooring System:

1. Basis-of-Design System Manufacturer: Sherwin Williams Accelera 4850 (formerly Elladur 4850) Deco-Flake DB, resinous flooring system.
2. Subject to compliance with requirements, provide the specified product or a comparable product by one of the following:
   a. Laticrete International, Inc.
   b. Sika Corporation.
   c. Other manufacturers offer products meeting all requirements and approved by Architect.

2.2 MATERIALS

A. Basis-of-Design Product & System: Accelera 4850 (formerly Elladur 4850) Deco-Flake DB, resinous flooring system.

1. Overall System Thickness: 1/16 in Nominal.
2. Decorative Polyaspartic Resinous Flooring with Flake System:
3. Primer: Accelera 4850, 200-300 sq. ft. per gallon.
4. First Basecoat w/Broadcast: Accelera 4850 pigmented, 150-200 sq. ft. per gallon with 6750/6755 decorative vinyl flake.
5. Second Basecoat w/Broadcast: Accelera 4850 pigmented, 150-200 sq. ft. per gallon with 6750/6755 decorative vinyl flake.

2.3 PROPERTIES

A. Accelera 4850: A two-component, high solids, thick coat polyaspartic.

1. Abrasion Resistance, mg loss, Taber Abraser (CS-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions), ASTM D4060: 80 m/g loss.
2. Adhesion, ASTM D 4541: 425 psi.
3. Direct Impact Resistance, ASTM D 2794: 100.
4. Elongation, ASTM D 638: 6%.
5. Tensile Strength, ASTM D 638: 6,400 psi.
6. Flexibility 1/8” Mandrel, ASTM D1737: Pass.
7. Hardness, Shore D, ASTM D 2240: 69.
8. Tear Strength, ASTM D 624: 300 ibf/in.
9. CDPH/EHLB/Standard Method V1.2, TVOC 0.5 mg/m2 (unreduced).
10. Color: As selected by Architect from manufacturer's full range.

B. Decorative Flake: Water-based resin material, inorganic minerals, additives, and integrally pigmented.

1. Shape: Random.
2. Size: 1/8 inch.
3. Surface Texture: Smooth.
4. Color: Selected by Architect from the manufacturer’s full range of 1/8” flake represented in the color card for the Deco Flake product.

C. Macropoxy® 646 Fast Cure - Polymide Epoxy Mastic: For priming of steel floor plates/frames, and as otherwise recommended and required by Architect.

1. Conforms to AWWA D102 OCS #5
2. Conforms to MPI # 108
3. Chemistry: VOC <250 g/L (2,08 Lb/Gal)
4. Meets Class A requirements for slip coefficient, 0.36
5. 6 mils / 150 microns dft

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine concrete surface to receive floor coating system. Notify the Architect if surface is not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

B. Moisture Testing of Concrete: Perform at least one of the following two tests to determine moisture in concrete. Type of test and frequency as recommended by manufacturer and installer. Submit results of test to Owner and Architect for review and incorporation into

project records. Installation of flooring materials cannot proceed prior to distribution of testing results.

1. Measure moisture vapor emission in accordance with ASTM F1869.
2. Measure internal relative humidity in accordance with ASTM F2170
3. Measure Alkalinity (pH) in accordance with ASTM F710.

C. Floor temperature and materials should be between 65°F (18°C) and 90°F (32°C). Humidity must be less than 80%. DO NOT coat unless floor temperature is more than five degrees over the dew point.

D. Do not begin preparation or installation until satisfactory moisture test results are achieved. Provide flooring manufacturer's recommended moisture vapor control coating if required.

3.2 COORDINATION

A. Coordinate floor finishing schedule with Owner and Architect to provide notification to building occupants, a minimum of one week in advance of commencing application of flooring materials.

B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.

3.3 PREPARATION

A. General: Proper surface preparation includes the following:

1. Inspection of the concrete substrate
2. Removal and replacement of nondurable concrete
3. Inspection of the steel plate covers and frames
4. Decontamination of the steel plate covers and frames using a SSPC SP2/3 hand tool preparation
5. Decontamination of the concrete surface
6. Creation of surface profile
7. Repair of surface irregularities

B. Prepare surfaces in accordance with manufacturer's instructions.

1. Clean surfaces thoroughly prior to installation.
2. Protection of In-Place Conditions: Protect adjacent surfaces, equipment, and adjoining walls from contact with flooring system materials.
3. Surface Preparation:
4. Prepare concrete surface in accordance with manufacturer’s instructions.
5. Remove dirt, dust, debris, oil, grease, curing agents, bond breakers, paint, coatings, sealers, silicones, and other surface contaminants which could adversely affect application of flooring system.
6. Steel shot blast concrete to a minimum surface profile of ICRI 310.2R, CSP 5.
7. Key-cut termination points with 1/4-inch (6-mm) by 1/4-inch (6-mm) cut.
8. Patch depressions, divots, and cracks in concrete in accordance with manufacturer’s instructions. Provide a flush, level surface.
9. Mechanically remove loose, delaminated, and damaged concrete and repair in accordance with manufacturer’s instructions. Provide a flush, level surface.
10. Joints: Fill joints in accordance with manufacturer’s instructions. Provide a flush, level surface.
11. Steel Plates: After decontamination procedure is complete, install a prime/base coat of Macropoxy 646 FC Polyamide Epoxy to bond to and scuff surface providing a microprofile for bonding of the Resinous Flooring System, according to manufacturer instructions. Steel plate removal must be maintained.

3.4 APPLICATION

A. Install flooring system in accordance with manufacturer's instructions and approved submittals at locations indicated on the Drawings.

B. Ensure concrete is dry, clean, and prepared in accordance with manufacturer's instructions.

C. Allow concrete to cure a minimum of 7 days before applying flooring system.

D. Mixing:

1. Mix material components together in accordance with manufacturer's instructions.
2. Mix only enough material that can be applied within working time. 096700-6 3. Add and mix colorants with materials in accordance with manufacturer's instructions to achieve uniform color.

E. Apply flooring system materials to obtain consistent mil thickness and smooth, uniform appearance and texture.

F. Overlay: Apply overlay in accordance with manufacturer's instructions. Apply overlay to prepared concrete surface.

G. Traction Aggregate: Broadcast traction aggregate in accordance with manufacturer's instructions. Broadcast traction aggregate into wet overlay.

H. Seal Coat:

1. Apply seal coat in accordance with manufacturer's instructions.
2. Apply seal coat over traction aggregate.

3.5 CLEANING AND PROTECTION

A. Applicator shall remove any material spatters and other material that is not where it should be. Remove masking and covers taking care not to contaminate surrounding area.

B. Applicator shall repair any damage that should arise from either the application or clean-up effort

C. Close job site to traffic for 72 hours after coating application, increasing cure time depending upon temperature and humidity, thus allowing product to fully cure prior to opening.

D. Allow flooring system to dry a minimum of 1 week before cleaning by mechanical means.

E. Protect completed flooring system from damage during construction.

END OF SECTION

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes

1. Walk off mat tiles, accessories and installation

B. Related Sections include the following:

1. Division 9 Section "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation methods.

B. Samples for verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge Stripping and Accessory: 12-inch long Samples.

C. Maintenance Data: For carpet tile to include in maintenance manuals specified in Division 1. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

D. Extra Materials: Deliver to Owner carpet tiles equal to 5 percent of each type and color installed, packaged with protective covering for storage.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with CRI 104, Section 5, "Storage and Handling."

1.5 PROJECT CONDITIONS

A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."

B. Environmental Limitations: Do not install carpet tile until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tile, install carpet tile before installing these items.

1.6 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Carpet Tile Warranty: Written warranty, signed by carpet tile manufacturer agreeing to replace carpet tile that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

1. Warranty Period: 10 years from date of final Substantial Completion.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type, color and pattern indicated, but not less than 10 sq. yd.

PART 2 - PRODUCTS (Confirm/Add)

2.1 CARPET TILE CPT-1: MODULAR WALK-OFF MAT

a) Basis of design Product: Subject to meeting performance criteria defined in the Contract Documents, equivalent products may be substituted with Approval by Architect:

1. Shaw Contract Group, Steppin Out Collection, Entrée 5T033 Charcoal 31549
2. Fiber Content: PET Polyester
3. Face Construction: Needlebond diagonal
4. Average Density: 6.091 oz/yd3.
5. Pile Thickness: 0.157 inches (4.00mm) for finished carpet tile per ASTM D 6859.
6. Primary Backing: Manufacturer's standard material
7. Secondary Backing: Manufacturer's standard material.
8. Size: 24 by 24 inches (610 by 610 mm).
9. Radiant Panel: ASTM E 648 Class 1
10. NBS Smoke ASTM E 662 Less than 450

B. All carpet materials for each respective blend shall be procured from a single manufacturer.

C. Carpet materials shall meet or exceed all performance criteria specified for Basis of Design Product

D. Carpet materials shall be equivalent in aesthetic quality, with comparable textures, patterns, and color available.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided by or recommended by carpet tile manufacturer.

B. Slab surface primer: Latex primer, Shaw 9050, or as recommended by carpet tile manufacturer.

C. Carpet Tile Adhesives: Pressure-sensitive type that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for conditions indicated for releasable installation.

1. Low-Emitting Materials: Adhesives shall have a VOC content of 50 g/L or less.
2. Low-Emitting Materials: Adhesives shall comply with Green Seal's GS-36 and with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Verify that substrates and conditions are satisfactory for carpet tile installation and comply with requirements specified.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
2. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, old adhesives and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Prime the floor substrate with a paint roll application of liquid latex, Shaw 9050, or other as recommended by carpet tile manufacturer.

E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 13, "Carpet Modules (Tiles)."

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

D. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

F. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 15, "Protection of Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

SECTION 097700 - FIBER-REINFORCED PLASTIC PANEL WALL FINISH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fiber-reinforced wall panels (FRP) with smooth or textured finishes. Mounting hardware, adhesives, accessories, and trims.

B. Related Sections

1. Section 092900 - Gypsum Board Assemblies, for surface preparation of substrates to receive fiber-reinforced plastic panel wall finish.

1.3 REFERENCES

A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.

B. ASTM International:

1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM D638 Standard Test Method for Tensile Properties of Plastics.
3. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.4 SUBMITTALS

A. Product Data: Manufacturer's product data, storage, handling and preparation requirements and installation instructions.

B. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, finish colors, patterns, and textures. Indicate location and dimension of joints and fastener attachment.

C. Selection Samples: Manufacturer's standard sample chain, in complete range of solid colors and textures, for selection by the Architect.

D. Verification Samples: Submit verification samples for each finish, color, and texture. Submit 2 samples of each type of panel, trim and fastener.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have a minimum of 5 years’ experience with composite wall panel work similar in scope and size to this project.

B. Surface-Burning Characteristics: ASTM E 84, flame-spread index of 25 or less and smoke developed index of 450 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1. Store panels indoors.
2. Lay panels flat. Do not stand panels on edge.
3. Protect panels from moisture.
4. Do not store panels in contact with the floor or against an outside wall.
5. Do not remove protective film from panel surface until after installation (if applicable).

C. Maintain optimum storage conditions of 60-75 degrees F (16-24 degrees C) at 35 - 55% relative humidity. Avoid extremes in temperature and humidity.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:
1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation and residual moisture from plaster, concrete or terrazzo work has dissipated
2. Install panels between 60 degrees F - 75 degrees F (15 - 24 degrees C) and relative humidity below 55%, ideally at the same conditions as the room's normal operating temperatures after building is occupied.
3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.
4. Do not install wall system until normal lighting conditions exist. Normal lighting conditions are described as those in place when the project is finished.

B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1. Wall, ceilings, floors, and openings must be level, plumb, straight, in-line and square

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Basis-of-Design Product:

1. Nudo, 1500 Taylor Avenue, Springfield, IL 62703; Telephone: (800) 826-4132, (217) 528-5636; Fax: (217) 528-8722; E-mail: info@nudo.com ; website: www.nudo.com

B. Comparable products of the following manufacturers are acceptable, subject to conformance with these specifications:

1. Crane Composites.
2. Kal-Lite Inc.

3. Kemlite Company, Inc.
4. Marlite
5. Panolam Surface Systems
6. Equal product approved by Architect.

2.2 MATERIALS

A. Panels shall consist of high-pressure laminate (made of melamine-impregnated decorative surface papers combined with phenolic-treated kraft paper consolidated in a press at high pressures) laminated to fiberglass reinforced panels.

B. Proprietary Products/Systems: Composite wall panels, provide the following:

1. FiberLite® FRP Wall Panels

a. Texture: Pebbled
b. Thickness: 0.090"
c. Fire-Rating Class: C
d. Color: As selected by Architect from Manufacturer's full range of standard colors
e. Size: 4' x 8' x .09" thick or as indicated on drawings.

2. Physical Properties:

a. Flexural Strength (ASTM D790): 14,000 psi.
b. Flexural Modulus (ASTM D790): 400,000 psi.
c. Tensile Strength (ASTM D638): 7,000 psi.
d. Tensile Modulus (ASTM D638): 800,000 psi.
e. Barcol Hardness (ASTM D2583): 45
f. Izod Impact (ASTM D256): 4.0 ft-lbs./in.
g. Gardner Impact (ASTM D5420): 25 in-lbs.
h. Water Absorption (ASTM D570): 0.16% (24 hrs@77ºF).
i. Surface Burning Characteristics (ASTM E84): Class A.
j. Coefficient of Linear Thermal Exp (ASTM D696): $2.0x10^{-5}$ in/in' ºF.

C. Food preparation Areas: CFIA approved and compliant with FDA and USDA guidelines.

D. Moldings: Coordinating PVC (polyvinyl chloride) moldings to match panel color. Installation to include all cap, inside corner, outside corner, battens, etc., as required by the Work to provide a complete, finished appearance.

E. Adhesive: Provide panel adhesive as recommended by panel manufacturer, specifically formulated for adhering panels to substrates indicated.

F. Division Bars, Corner Trim: Panel Manufacturer's standard-length extruded vinyl pieces; longest length possible to eliminate end joints.

G. Fasteners: Noncorrosive drive rivets.

H. Source Quality: Obtain fiberglass reinforced plastic (FRP) panels from a single manufacturer. Provide panels and molding only from manufacturer specified to ensure warranty and color harmonization of accessories.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

1. Examine back-up surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails are countersunk, and joints and cracks are filled flush and smooth with the adjoining surface.
2. Do not proceed with installation of wall panels until unacceptable conditions are corrected

3.2 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   1. Clean surfaces thoroughly prior to installation.
   2. Wall substrate must be dry and free from dirt, dust, grease, and other contaminants.
   3. Walls must be flat and even. Remove high spots and fill low spots with material acceptable to panel manufacturer
   4. Remove wallpaper, soluble or loose paint and other foreign matter that might interfere with proper adhesive bond.
   5. Painted walls must be prepared to adhesive manufacturer specifications for proper adhesion.

3.3 INSTALLATION

A. Install materials in strict accordance with manufacturer's installation instructions.

B. General: Prior to installing panels, remove packaging and allow panels to acclimate to room temperature and humidity for at least 48 hours.

C. Inspect panels for any defects immediately. Do not install panels of unacceptable quality.

D. Field cutting of all wall systems should be accomplished using a circular saw with fine tooth carbide blade. Position panel so that the saw blade enters the finished HPL side first to avoid chipping or damage. Protect decorative laminate face of panel by covering work area, do not remove protective will until after installation.
   1. All electrical switches, power points etc., should be in a first fix / installation state. All electrical equipment shall be moved or altered only by a qualified electrician.
   2. All plumbing should have pipework removed to a first fix or installation state and “tails” left protruding from the substrate. Panels can then be drilled and slid over the pipe tails. All holes should be drilled 1/8” (3mm) oversize, then sealed with caulking. Plumbing shall be done only by a qualified plumber.
   3. Hot pipes and steam pipes should be insulated and a 1/8” to 1/4” (3-6mm) expansion gap should be created when installing panels around these pipes, then sealed with caulking.
   4. All pipes, fixing bolts, etc. extending through the panels should have a minimum 1/8” (3mm) expansion gap and be sealed with caulking.

E. Follow adhesive manufacturer’s recommendations for appropriate height of adhesive bead left by trowel and do not allow adhesive to skin over.

F. Installation using PVC Trims:
   1. Start in the corner. Mark plumb line 48 1/8 inches from corner.
   2. Apply adhesive directly to entire back of composite wall panel using correct trowel with 100% adhesive coverage using crosshatch pattern. Apply adhesive to within 1/2 inch of all edges of panel.

3. Install moldings with continuous bead of silicone sealant applied within channels prior to placing over panels
4. Slide panel into molding and withdraw 1/8 inch for PVC moldings to provide appropriate gap. Align with plumb line.
5. Begin in top corner nearest molding with laminate roller, rolling down and out toward the edge without molding.
6. Continue rolling down and out working across panel away from previously installed panel or initial molding. Remove all trapped air.
7. Install one-piece division bar and caps or next molding by sliding onto panel.
8. Repeat process, working in one direction around room.
9. Immediately remove all adhesive residue. To remove, clean with nonabrasive cotton cloth and warm water. If necessary, use a mild nonabrasive detergent. For cleanup with solvent based adhesives, use mineral spirits or acetone to remove residue.

G. Install units to the following tolerances:

1. Plane Alignment (Panel to Panel): 1/16 inch.
2. Variation from Plumb: Plus or minus 1/8 inch per 10 feet.
3. Variation from Straightness: Plus or minus 1/4 inch per 25 feet

3.4 CLEANING

A. Clean panel surfaces in compliance with manufacturer's recommendations.

1. Use a clean, damp, nonabrasive cotton cloth and a mild liquid detergent or household cleaner.
2. Rinse with clean water using a clean, nonabrasive cotton cloth.
3. Dry panels with a soft, clean nonabrasive cotton cloth.
4. Do not use cleaners containing acid, alkali, or sodium hypochlorite

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 098400 - ACOUSTICAL TREATMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

A. This Section includes the following:

1. Acoustical wall products and installation components.
2. Acoustic hanging baffles and suspension systems.
3. Acoustic hanging clouds and suspension systems.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
2. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
3. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of panel indicated.

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations
3. Installation methods

B. Shop Drawings: Layout and details of direct-attached wall panels show locations of items that are to be coordinated with the installation. Field verify locations of all other wall mounted items impacting installation.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns. Note: Submit either manufacturers printed color charts or physical samples accurately demonstrating the product colors. Electronic files, reproductions from electronic files or other types of copies or prints are not acceptable.

D. Samples for Verification:

1. Minimum 6-inch x 6-inch samples of specified direct-attached acoustical wall panels.

E. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, products must be tested to the A, D-20, C-20, or C-40 method.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

B. Manufacturer Qualifications: Minimum 5 years of experience manufacturing similar products.

C. Installer Qualifications: Minimum 2 years of experience installing similar products.

D. Coordination of Work: Coordinate acoustical work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

E. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Panels shall be stored in a dry interior location and shall remain in cartons prior to installation to avoid damage. The cartons should be stored in a flat, horizontal position.

1. Do not store in unconditioned spaces with humidity greater than 85% or lower than 25% RH and temperatures lower than 32°F or greater than 120°F.

2. Panels must not be exposed to extreme temperatures, for example, close to a heating source or near a window where there is direct sunlight

C. Provide labels indicating brand name, style, size, and thickness.

D. Before installing panels, permit them to reach room temperature and a stabilized moisture content.

E. Handle acoustical panels carefully to avoid chipping edges or damaged units in any way.

1.7 PROJECT CONDITIONS

A. Do not install ceiling panels until building is closed in and HVAC system is operational.

B. All wet work must be complete and dry prior to installation.

C. Store panels on site to reach room temperature and have stabilized moisture content for a minimum of 72 hours before installation.

D. Maintain the following conditions in areas where acoustical materials are to be installed 24 hours before, during and after installation:

1. Relative Humidity: 65 - 75%.

2. Uniform Temperature: 55 - 70 degrees F (13 - 21 degrees C).

1.8 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical panel products: Furnish quantity of full-size units equal to 5.0 percent of amount installed of each type and color.

1.9 WARRANTY

A. Acoustical wall/ceiling products: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical wall/ceiling products that fail within the warranty period. Failures include, but are not limited to:

1. Acoustical ceiling/wall products: Manufacturer's defects
2. Warranty Period: Acoustical ceiling/wall products: One (1) year from date of substantial completion

B. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS (Confirm.)

2.1 MANUFACTURER

A. Manufacturer, Basis of Design: Autex LLC, 19350 Van Ness Avenue, Torrance CA 90501, Ph. 310-490-1591, contact@autexacoustics.com.

1. Local Representative: Stacy Finck, Autex Acoustics, Phone (612) 386-2650, stacy@autexacoustics.com.

B. Contractor may submit equal products by other manufacturers complying with all requirements listed in this Section, which provide similar design and color options as listed in this Section and as shown on the Construction Documents, and complying the procedures as described in Section 016200 - Product Options. The Architect shall be the sole judge of the proposed substitute product's design conformance with the specified product.

2.2 PRODUCTS

A. Wall Mounted Panels:

1. AWP-1: Basis of Design Product: Cube, by Autex
   a. Locations as identified on the Drawings.
   b. Composition: 100% Polyester (min 45% (+/-) recycled material)
   c. Color: As selected by architect from manufacturer's standard color selections
   d. Thickness: 1/2" (13mm)
   e. Size: 48 in x 48 in, See drawings for quantities and locations of panels.
   f. Mounting Type: Adhesive. Panels to be directly mounted to wall surface.
   g. Noise Reduction Coefficient (NRC): ASTM C 423.
      1) 13mm, Direct Mounting: 0.45
   h. Flame Spread: ASTM E 84; Class A, Flame Spread: 0 – Smoke Developed: 45
2. AWP-2: Basis of Design Product: Quietspace® Panel by Autex
   a. Locations as identified on the Drawings.
   b. Composition: Panel from thermally bonded polyester (min 45% (+/-) recycled material).
   c. Colors: Quietspace®: gray
   d. Thickness 1 inch.
   e. Panel size: cut from 48 in x 96 in panels, See Drawings for finish panel sizes.
   f. Mounting Type: Adhesive. Panels to be directly mounted to wall surface.
   g. Noise Reduction Coefficient (NRC): ASTM C 423.
      1) 1", Direct Mounting, NRC 0.85.
   h. Flame Spread: ASTM E 84; Class A minimum.

B. Acoustical Hanging Baffles:

1. Basis of Design Product: Quietspace® Frontier, by Autex

a. Material: 100 percent recycled thermally bonded high-density polyester (100 percent PET) containing not less than 65 percent post-consumer recycled material.

1) Composition: Monolithic panel.
2) Thickness: 0.94 inch (24 mm).
3) Weight: 7.87 oz/sf (2401 gms/sm)
4) Fastness to Light: Suitable for indoor use only.
5) Fire Rating: ASTM E-84 Class A, FS: 0 - SD: 45.
6) VOC Concentration: 0.01 mg/m3

2. ACP-1 : Design - Talus.

a. Locations as identified on the Drawings.
b. Assembled Size: 12 inches (305 mm) nominal depth, 7.87 feet (2400 mm) at longest point.
c. Spacing of panels: 12 inches on center.
d. Colors: Selected randomly from the following color percentages.

1) Color: Petronas 20%.
2) Color: Zenith 20%.
3) Color: Flatiron 60%.

3. ACP-2: Design – Tundra.

a. Locations as identified on the Drawings.
b. Sizes:

1) Custom Size A: 24 inches (610 mm) nominal depth x 24 inches (610 mm) long.
2) Custom Size B: 24 inches (610 mm) nominal depth x 48 inches (1220 mm).

c. Color: To be selected by Architect from Manufacturer’s standard range.

4. Suspension system: Install using manufacturer’s standard patented aluminum channels, connector clips, hanger wire and hanger components as provided by the manufacturer for this system.

C. Acoustical Hanging Clouds:

1. Basis of Design Product: Horizon, by Autex

a. Material: 100 percent recycled thermally bonded high-density polyester (100 percent PET) containing not less than 65 percent post-consumer recycled material.

1) Composition: Monolithic panel.
2) Thickness: 0.94 inch (24 mm).
3) Weight: 15.74 oz/sf.
4) Fastness to Light: Suitable for indoor use only.
5) Fire Rating: ASTM E-84 Class A, FS: 0 - SD: 45.

2. ACP-3: Design - Horizon Square

a. Size: Standard 3.93 ft (1200 mm) x 3.93 ft (1200 mm)
b. Color: To be selected by Architect from Manufacturer’s standard range

3. Install using manufacturer’s standard patented aluminum channels, connector clips, hanger wire and hanger components as provided by the manufacturer for this system.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with installation.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Do not proceed with installation until all wet work such as concrete, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Measure each wall/ceiling area and establish layout of acoustical units. Coordinate panel layout with mechanical, electrical, and lighting fixtures.

D. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

3.3 ACOUSTIC WALL PANEL INSTALLATION

A. Install wall/ceiling products by attaching/installing the products per the manufacturer’s written instructions and in accordance with the authorities having jurisdiction.

B. Attachment of wall/ceiling products to be installed using manufacturer’s recommended adhesives.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken wall panels.

B. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any panels that cannot be successfully cleaned and or repaired. Replace with new product to eliminate evidence of damage.

3.5 PROTECTION

A. Protect finished work from damage due to subsequent construction activity on the site.

B. Touch-up, repair or replace damaged products before Substantial Completion

END OF SECTION 098400

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SECTION 099000 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes surface preparation, priming, and field painting of the following:

1. Interior gypsum board partition, soffits, and other surfaces
2. Concrete masonry unit partitions.
3. Hollow metal frames and other exposed metal fabrications.
4. Other exposed interior items and surfaces.
5. Exterior metal surfaces.
6. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item, or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

D. Related Sections include the following:

1. Section 081113 - Hollow Metal Doors and Frames, for factory priming steel doors and frames.

2. Section 092900 - Gypsum Board Assemblies, for surface preparation of substrates to receive paint finish.

3. Section 099600 – High Performance Coatings, for other protective coatings not specified in this Section.

1.3 DEFINITIONS

A. General: Standard coating terms defined in MPI apply to this Section.

MPI GLOSS STANDARDS			
GLOSS LEVEL	DESCRIPTION	GLOSS AT 60 DEG	SHEEN AT 85 DEG
G1	A traditional matte finish - flat	Max. of 5 units	Max. of 10 units
G2	A high side sheen flat - "a velvetlike" finish	Max. of 10 units	10 - 35 units
G3	A traditional "eggshell-like" finish	10 - 25 units	10 - 35 units
G4	A "satinlike" finish	20 - 35 units	Min. of 35 units
G5	A traditional semigloss	35 - 70 units	-
G6	A traditional gloss	70 - 85 units	-
G7	A high gloss	More than 85 units	-

1.4 SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instruction.

1. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

E. Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used. Include for Operation and Maintenance Manuals submitted at project closeout.

1.5 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

B. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

C. Source Limitations: Obtain primers for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F.

1. Maintain storage containers in a clean condition, free of foreign materials and residue.
2. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.7 PROJECT CONDITIONS

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.8 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied and, in the quantities, described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

1. Quantity: Furnish Owner with extra paint materials in quantities indicated below:

a. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

PART 2 - PRODUCTS (Confirm colors, finishes, application types, finish sched.)

2.1 MANUFACTURERS

A. Basis of Design Manufacturer: The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115, Tel: (800) 321-8194, www.sherwin-williams.com.

B. Contractor may submit equal products by other manufacturers complying with all requirements listed in this Section and approved by the Architect.

1. Diamond Vogel Paints.
2. Glidden Paints
3. PPG Industries, Inc.
4. Benjamin Moore & Co.
5. Pratt and Lambert

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be

used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24)].

1. Flat Paints and Coatings: 50 g/L.
2. Non-flat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoats: 200 g/L.
4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.

D. Colors: Match Architects sample selections.

1. [10] [20] [30] <Insert number> percent of surface area will be painted with deep tones.

2.4 PRIMERS

A. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.

1. Basis of design product: Sherwin-Williams ProMar 200 Zero VOC Latex Primer.

B. Block Filler: Block filler, latex, interior/exterior, Use on new masonry or concrete surfaces or previously unfinished masonry or concrete surfaces

1. Basis of design product: Sherwin-Williams PrepRite® Block Filler.

C. Steel, Galvanized, or Aluminum Primer: Factory-formulated quick-drying, rust-inhibitive, interior/exterior, universal cross-linking, acrylic primer. Low sheen.

1. Basis of design product: Sherwin-Williams Pro Industrial™ Pro-Cryl® Universal Primer.
2. Corrosion Weathering - ASTM D5894, 10 cycles, 3360 hours: Passes.

D. Wood Primer: Factory-formulated latex based, primer interior application.

1. Basis of design product: Sherwin-Williams Premium Wall & Wood Latex Primer

2.5 INTERIOR FINISH COATS.

A. Interior Water-based Acrylic-Latex, Flat finish: Factory-formulated eggshell acrylic-latex interior enamel. At 4.0 mils wet, 1.5 mils dry, per coat.

1. Basis of design product: Sherwin-Williams ProMar 200 Zero VOC Latex Flat.

B. Interior Water-based Acrylic- Latex, Eggshell finish: Factory-formulated eggshell acrylic-latex interior enamel. At 4.0 mils wet, 1.5 mils dry, per coat

1. Basis of design product: Sherwin-Williams ProMar 200 Zero VOC Latex Eg-Shel.

C. Interior Water-based Acrylic- Latex, Semi-gloss finish: Factory-formulated semi-gloss acrylic-latex interior enamel. At 4.0 mils wet, 1.5 mils dry, per coat.

1. Basis of design product: Sherwin-Williams ProMar 200 Zero VOC Latex Semi-gloss.

D. Interior Water-based Acrylic-Urethane, Semi-gloss finish: Factory-formulated semi-gloss acrylic-urethane. At 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry, per coat

1. Basis of design product: Sherwin-Williams Pro Industrial Water based Alkyd Urethane Semi-Gloss.

E. Interior Water-based Epoxy: Factory-formulated, single-component, water-based, pre-catalyzed epoxy, semi-gloss finish: At 5.0-12.0 mils wet, 2.0-5.0 mils dry.

1. Basis of design product: Sherwin-Williams Pro Industrial Pre-Catalyzed Water Based Epoxy.

F. For use at interior ferrous metal roof structure exposed to finished spaces below: Sherwin-Williams, Pro-Industrial waterborne acrylic Dryfall B42-80 Series, flat finish, 6 mils wet, 1.7 dry per coat.

2.6 EXTERIOR FINISH COATS

A. Exterior Acrylic Coating: Water-based, light industrial, exterior acrylic coating for use on primed steel surfaces.

1. Basis of design product: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss Coating.

2.7 **"GREEN SCREEN"** VIDEO PAINT

1. Acceptable Manufacturer: Rosco Laboratories Inc.; (800) 767-2669, (203) 708-8900; email: info@rosco.com.

2. Basis of design product: Rosco Chroma Key Green video paint, 05711.

a. Vinyl Acrylic
b. Water based
c. Matte finish
d. Phase Angle: 242°, Luminance 57.

3. For application on primed gypsum board surfaces, use interior latex based gypsum board primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Substrate Conditions:

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

a. Concrete: 12 percent.
b. Fiber-Cement Board: 12 percent.
c. Masonry (Clay and CMU): 12 percent.
d. Wood: 15 percent.
e. Gypsum Board: 12 percent.
f. Plaster: 12 percent.

2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

3. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

C. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

2. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each substrate condition and as specified.

1. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

2. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.

4. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

5. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

6. Aluminum Substrates: Remove loose surface oxidation.

7. Wood Substrates.

a. Scrape and clean knots and apply coat of knot sealer before applying primer.
b. Sand surfaces that will be exposed to view and dust off.
c. Prime edges, ends, faces, undersides, and backsides of wood.
d. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried

D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions and to recommendations in "MPI Manual. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
9. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
10. Sand lightly between each succeeding coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer over metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.

2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in occupied spaces.

F. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

G. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

H. Paint the following work where exposed in occupied spaces.

1. Equipment, including panelboards.
2. Uninsulated metal piping.
3. Uninsulated plastic piping.
4. Pipe hangers and supports.
5. Metal conduit.
6. Plastic conduit. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or another paintable jacket material
7. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
8. Other items as directed by Architect

3.4 FIELD QUALITY CONTROL

A. Architect may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing, or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

C. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 PAINT SCHEDULE

A. Gypsum board walls: Provide the following finish systems over interior gypsum board surfaces:

1. Semi-gloss Acrylic-Latex Finish: Two finish coats over a primer.

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior semigloss acrylic-latex.

B. Gypsum board ceilings and soffits: Provide the following finish systems over interior gypsum board surfaces:

1. Flat Acrylic- Latex Finish: Two finish coats over a primer

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior flat acrylic-latex.

C. Gypsum board walls at Toilets and other surfaces as indicated on Drawings:

1. Epoxy System: Two finish coats over a primer coat.

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior Water Based Catalyzed Epoxy

D. Concrete Masonry Unit Substrates:

1. Latex System: Two finish coats over a primer coat.

a. Primer: Interior/exterior latex block filler.
b. Finish Coats: Interior semigloss acrylic-latex.

E. Hollow Metal Doors and Frames New:

1. Semi-gloss Water-based/Alkyd Urethane Finish: Two finish coats over a factory applied primer.

a. Touch up factory prime finish as required with steel, galvanized, or aluminum acrylic primer.
b. Intermediate Coat: Interior acrylic-alkyd matching topcoat.
c. Topcoat: Interior semigloss alkyd-urethane.

F. Exposed ferrous roof structure exposed to finished spaces below:

1. Waterborne Acrylic Dryfall system: Two finish coats over a factory applied primer

a. Touch up factory prime finish as required with steel, galvanized, or aluminum acrylic primer.

b. Finish Coats: Pro-Industrial WB Acrylic Dryfall

G. Other Interior ferrous metal:

1. Semi-gloss Alkyd-Enamel Finish: Two finish coats over a primer. Delete primer on previously painted surfaces and on shop primed surfaces.

a. Primer: Steel, galvanized, or aluminum acrylic primer.
b. Finish Coats: Interior semigloss alkyd-urethane.

H. Interior wood Substrates: Including exposed wood items not indicated to receive shop-applied finish:

1. Semi-gloss Alkyd-Enamel Finish: Two finish coats over a primer.

a. Primer: Latex Based Primer-Sealer.
b. Finish Coats: Interior semigloss acrylic-latex.

I. Exterior Ferrous Metal – Metal lintels at window openings and other locations as needed.

1. Exterior acrylic coating: Two coats over a primer, Delete primer on previously painted surfaces.

a. Primer: Steel, galvanized, or aluminum acrylic primer.
b. Finish Coats: Exterior Acrylic Coating

3.8 PAINT COLOR SCHEDULE

A. xxxxx.

END OF SECTION 099000 PAINTING

SECTION 099300 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes surface preparation and the application of wood finishes on the following substrates:

1. Interior Substrates:

a. Dressed lumber (finish carpentry).
b. Exposed wood panel products.

B. Related Sections include the following:

1. Section 099000 – Painting for surface preparation and application of standard paint systems on interior substrates.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Product characteristics
2. Surface preparation instructions and recommendations
3. Primer requirements and finish specification
4. Storage and handling requirements and recommendations
5. Application methods
6. Cleanup information

B. Samples for Initial Selection: For each type of product indicated submit a complete set of color chips that represent the full range of manufacturer's color samples available.

C. Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.

1. Submit Samples on representative samples of actual wood substrates specified, 8 inches square.

2. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.

2. Printout of MPI's current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.

E. Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used. Include for Operation and Maintenance Manuals submitted at project closeout.

1.4 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in its "MPI Approved Products List."

2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and finish systems indicated.

B. Mockups: Apply benchmark samples of each finish system indicated and each color selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F.

1. Maintain storage containers in a clean condition, free of foreign materials and residue.

2. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.6 PROJECT CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply exterior finishes in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. Furnish extra stain and transparent finish materials from the same production run as the materials applied and, in the quantities, described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

1. Quantity: Furnish Owner with extra stain and transparent finish materials in quantities indicated below:

a. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturer: The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115, Tel: (800) 321-8194, www.sherwin-williams.com.

B. Contractor may submit equal products by other manufacturers complying with all requirements listed in this Section and approved by the Architect. Shortened versions of the following manufacturers' names are used in other Part 2 articles:

1. Cloverdale Paint.
2. Diamond Vogel Architectural Coatings
3. Hallman Lindsay Quality Paints.

4. PPG Architectural Finishes, Inc.
5. Other manufacturer meeting al specified requirements and approved by Architect.

2.2 MATERIALS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.

3. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions,

B. VOC Content of Field-Applied Interior Primers, Stains, and Transparent Finishes: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to primers, stains, and transparent finishes that are applied in a fabrication or finishing shop:

1. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
2. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
3. Floor Coatings: VOC not more than 100 g/L.
4. Shellacs, Clear: VOC not more than 730 g/L.
5. Stains: VOC not more than 250 g/L.

C. Stain Colors: As selected by Architect from manufacturer's full range.

2.3 STAINS AND TRANSPARENT FINISHES

A. Wood Interior Systems (vertical).

1. Clear Finish - Polyurethane System, 2 coats:

a. First coat: Sherwin Williams Minwax® Waterbased Oil-Modified Polyurethane
b. Second coat: Sherwin Williams Minwax® Waterbased Oil-Modified Polyurethane,
c. Clear satin finish.

2. Semi-Transparent Stain, Water Reducible, Polyurethane (topcoat).

a. First coat: Sherwin Williams Minwax Performance Series Tintable Wood Stain 250 VOC.
b. Second coat: Sherwin Williams Minwax® Waterbased Oil-Modified Polyurethane.
c. Third coat: Sherwin Williams Minwax® Waterbased Oil-Modified Polyurethane.
d. Stain color to be selected by Architect from manufacturer’s full line of colors.
e. Polyurethane finish to be clear, satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

1. Maximum Moisture Content of Wood Substrates: 15 percent when measured with an electronic moisture meter.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.

3. Begin finish application only after unsatisfactory conditions have been corrected and surfaces are dry.

4. Beginning application of finish system constitutes Contractor's acceptance of substrate and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be finished. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.

1. After completing finishing operations, reinstall items that were removed; use workers skilled in the trades involved. Remove surface-applied protection if any.

C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.

2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

3. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.

D. Surface Preparation: Clean and prepare surfaces to be stained according to manufacturer's written instructions for each substrate condition and as specified

1. Wood—Interior: All finishing lumber and flooring must be stored in dry, warm rooms to prevent absorption of moisture, shrinkage, and roughening of the wood. All surfaces must be sanded smooth, with the grain, never across it. Surface blemishes must be corrected, and the area cleaned of dust before coating. Patching compounds will generally be visible through clear coatings.

2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.

3.3 APPLICATION

A. Apply all coatings and materials with manufacturer’s specifications in mind. Mix and thin coatings according to manufacturer’s recommendation.

1. Use applicators and techniques suited for finish and substrate indicated.

2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

C. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.

D. Regardless of number of coats specified, apply as many coats as necessary for complete coverage and uniform appearance.

3.4 FIELD QUALITY CONTROL

A. Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when finishes are being applied:

1. Owner will engage the services of a qualified testing agency to sample finish materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces if, on refinishing with complying materials, the two finishes are incompatible.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

END OF SECTION

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SECTION 099350 - CONCRETE FLOOR STAIN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes surface preparation and field painting of the following:

1. Stained concrete for floors.
2. Single application sealer-hardener for concrete floors.
3. Sealer.

B. Related Sections include the following:

1. Division 3 Section “Cast-in-Place Concrete” for interior cast-in-place concrete floor slab.

1.3 DEFINITIONS

A. General: Standard coating terms defined in MPI apply to this Section.

1.4 SUBMITTALS

A. Product Data: Submit product data, including manufacturer’s Spec-Data sheet, installation instructions and technical bulletins for specified products.

B. Samples for Initial Selection: Manufacturer's color charts.

C. Qualification Data: For Installer and manufacturer specified in Quality Assurance Article, including names and addresses of completed projects, architects, and owners.

D. Maintenance Data: Maintenance instructions, including precautions for avoiding staining after application

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Two year's experience with projects of similar scope and quality:

B. Source Limitations: Obtain products from same source throughout Project.

C. Mock-ups: Locate at site and obtain approval before start of final work. Mock-up shall be minimum 4 by 4 feet (1.2 by 1.2 m).

1. If stain does not visibly fizz, additional cleaning is required, or pH of concrete is too low to react with stain.
2. Demonstrate range of colors, finishes, and workmanship, including sealing procedures.
3. Approved mock-up set quality standards for comparison with remaining work.
4. Verify location of field sample with Architect. Approved mock-ups may become part of the completed Work if undisturbed at completion of Project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packaging with labels intact

B. Store in a clean, dry, and protected location, according to manufacturer's requirements.

C. Handling: Protect materials from dirt, corrosion, oil, grease and other contaminants.

1.7 PROJECT CONDITIONS

A. Environmental Requirements: Comply with stain manufacturer's instructions.

1. Do not apply stain if concrete substrate temperature is not between 50 to 85 deg F before and during installation.

2. Do not apply stain if air temperature is not between 50 and 85 deg F during installation, and for at least 48 hours after installation.

3. Substrates shall be uniformly dry, and free of standing water.

PART 2 - PRODUCTS

2.1 STAIN MATERIALS:

A. Stain: Chemically reactive penetrating stain designed for permanently color concrete floors.

1. Product: Butterfield Color® Perma-Cast® Sierra Stain™.:

2. Colors: Provide the following Color: BAS-14 Cordovan Leather.

3. No substitutions

B. Water: Potable.

C. Mixing: Combine equal parts of stain with water in a plastic container and mix well, according to manufacturer's instructions.

2.2 CURING AND HARDENING AGENT:

A. Manufacturer: Curecrete Distribution, Inc.
1. Contact: 1203 W. Spring Creek Place, Springville, UT 84663-0551; Telephone: (800) 998-5664, (801) 489-5663; Fax: (801) 489-3307; Email: info@ashfordformula.com; Website: www.ashfordformula.com.

B. Cure-Seal-Hardener: Ashford Formula, a water-based, chemically reactive penetrating sealer and hardener that densifies concrete to seal against water molecules, but allows air and water vapor to pass, so that concrete can achieve full compressive strength for minimized surface crazing and elimination of dusting.

1. Abrasion Resistance to Revolving Disks: At least a 32.5% improvement over untreated samples when tested in accordance with ASTM C779.

2. Surface Adhesion: At least a 22% increase in adhesion for epoxy when tested in accordance with ASTM D3359.

3. Hardening: As follows when tested in accordance with ASTM C39:

a. After 7 Days: An increase of at least 40% over untreated samples.

b. After 28 Days: An increase of at least 38% over untreated samples.

4. Coefficient of Friction: 0.86 dry, 0.69 wet when tested in accordance with ASTM C1028.

5. Rebound Number: An increase of at least 13.3% over untreated samples when tested in accordance with ASTM C805.

6. Light Exposure Degradation: No evidence of adverse effects on treated samples when tested in accordance with ASTM G23.

C. No substitutions.

2.3 SEALER:

A. Manufacturer: Prosoco, 3741 Greenway Circle, Lawrence, KS 66046, Phone: (800) 255-4255, Fax: (785) 830-9797, website: www.prosoco.com.

B. Sealer: Prosoco, Consolideck Concrete Flooring Products, LSGuard, a copolymer formulation that improves the surface sheen and stain resistance of conventional concrete, hardened concrete or cement terrazzo floors.

1. Active Content 22%

2. Total Solids 22 %

3. VOC Content <100 g/L

C. No substitutions.

PART 3 - PART 3 - EXECUTION

3.1 **MANUFACTURER'S INSTRUCTIONS**

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 EXAMINATION

A. Examine substrate and conditions for compliance with requirements.

B. If substrate preparation is the responsibility of another installer, notify General Contractor of unsatisfactory preparation before proceeding

C. Do not proceed with stained concrete installation until unacceptable conditions are corrected.

3.3 PREPARATION, GENERAL

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Do not use frozen material. Thaw and agitate prior to use.

D. If construction equipment must be used for application, diaper all components that might drip oil, hydraulic fluid or other liquids

3.4 SUBSTRATE PREPARATION FOR FLOOR STAIN APPLICATION

A. Allow concrete to cure minimum 21 days before staining

B. Protect surfaces not to be stained from over-spray, run-off, and tracking.

C. Clean substrates thoroughly using trisodium phosphate (TSP) and water with a scrub brush, according to manufacturer's instructions. Do not use acidic cleaners to clean substrates before staining.

D. For hard troweled surfaces, open surface of substrates by sanding with 80-grit sanding disk or black scrubbing pad. Test sanding in an unobtrusive location to assure that sand and aggregate are not exposed by excessive sanding.

E. Test substrates by spotting with water. If water beads, or does not penetrate surface, continue preparing substrates.

F. Rinse substrates until rinse water is clean. Collect cleaning residue by wet vacuuming or squeegee to drains.

G. Allow substrates to dry thoroughly prior to application of stains.

H. Divide substrates into small areas by natural stopping points, such as walls and joint lines.

I. Protection: Protect substrates during the construction period as follows:

1. Use safe-release blue painter's masking tape. Do not use adhesive or duct tape.
2. Prevent petroleum products from staining substrates.
3. Diaper hydraulic equipment.
4. Do not park vehicles on substrates.
5. Do not permit pipe-cutting equipment on substrates.
6. Do not place steel reinforcing bars on substrates to avoid rust stains.
7. Notify other trades of protection requirement before and after stain application.
8. Do not use red or blue chalk for snapping lines. Use orange chalk only.
9. Do not store stacks of lumber, drywall, chemicals or construction debris on substrates.

3.5 STAIN APPLICATION

A. Apply stain to concrete surfaces by acid-resistant sprayer or acid-resistant natural fiber brush, immediately scrubbing into surface in a random circular motion, according to manufacturer's instructions.

B. Maintain a wet edge, working newly applied stain into edges of adjacent wet edges of previously treated surfaces. Maintain consistent saturation throughout application. Do not splash, drip, or puddle stain on substrates to prevent darker effects.

C. After initial application of stain has reacted 4 hours minimum, test surface to determine if sufficient color has been applied to match field samples.

1. Remove residue from small section by wet scrubbing and rinsing.
2. If test indicates color is not sufficient, apply additional stain, allow to dry, and retest.

D. When color is sufficient, neutralize stain by mopping with a solution of one pound of baking soda mixed in 5 gallons of water. Remove stain residue by wet scrubbing with water and a stiff, acid-resistant brush. Do not use soap. Rinse until rinse water is clean

1. Collect rinse water by vacuuming or absorbing with inert material. Dispose of stain residue, rinse water, and absorbent materials legally.

3.6 CURING AND HARDENER AGENT APPLICATION

A. New Concrete: With colored concrete, wait a minimum of 30 days before application.

1. Spray on at rate of 200 ft2/gal (5 m2/L).

2. Keep surface wet with cure-seal-hardener for a minimum soak-in period of 30 minutes without allowing it to dry or become slippery. If slipperiness occurs before the 30 minute time period has elapsed, apply additional cure-seal-hardener, as needed, to keep the entire surface in a non-slippery state for the first 15 minutes; for the remaining 15 minutes, mist the surface as needed with water to keep the material in a non-slippery state. In hot weather conditions, follow manufacturer's special application procedures.
3. When the treated surface becomes slippery after this period, lightly mist with water until slipperiness disappears.
4. Wait for surface to become slippery again, and then flush entire surface with water to remove all cure-seal-hardener residue.
5. Squeegee surface completely dry, flushing any remaining slippery areas until no residue remains.
6. Wet vacuum or scrubbing machines can be used in accordance with manufacturer's instructions to remove residue.

3.7 SEALER APPLICATION

A. Acid-stained concrete must be thoroughly neutralized and rinsed prior to application.

B. Test a small area of each surface to confirm suitability, coverage rate and desired results before beginning overall application. Test with the same equipment, recommended surface preparation and application procedures planned for general application. Let surface dry thoroughly before inspection

C. Install product per manufacturer's written installation instructions.

3.8 CLEANING

A. Sealer Cleanup: Before product dries, Immediately wash off over spray from glass, aluminum, polished or other surfaces with fresh water.

3.9 PROTECTION

A. Protect stained concrete from damage or deterioration until the date of Substantial Completion.

END OF SECTION

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SECTION 099410 - ARCHITECTURAL SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section

1.2 SUMMARY

A. This Section includes surface preparation installation of the following:

1. Printed and adhered vinyl film

B. Related Sections include the following:

1. Division 9 Section "Gypsum Board Assemblies" for surface preparation of gypsum board.
2. Division 9 Section “Painting”

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Showing layout, profiles, splices, and product components including dimensions and accessories

C. Samples for Verification: 4” by 4” sample of printed film for color and image quality verification.

D. Mockup: Print one scaled image showing overall graphic layout and noting where wall protrusions, openings, and all other existing conditions that may affect wall graphic installation

E. Operation and maintenance data for installed product, including precautions against harmful cleaning materials and methods

F. Installer Qualifications: Certificate verifying that installer has completed manufacturer’s product training course and is an authorized installer for relevant products.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain all products in this section from a single supplier

B. Installer Qualifications: Installer must be an authorized installer who has completed manufacturer’s training relevant to products being applied.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Application instructions.

B. Store materials protected from weather, temperature, and other harmful conditions:

1. 40°F – 90°F (4°C – 32°C)

2. Out of direct sunlight
3. In original packaging
4. In a clean, dry area
5. Handle products in accordance with manufacturer's instructions.

1.6 PROJECT CONDITIONS

1. Confirm appropriate substrate is suitable for mounting of architectural finish components prior to start of installation
2. Apply materials when the following environmental conditions are met:
   a. Paint and finishing work is complete and dry
   b. Work above ceiling is complete
   c. Ambient temperature is above 40°F (4°C)

PART 2 - PRODUCTS (Confirm whether vinyl graphics are part of the project.)

2.1 MANUFACTURERS

A. Manufacturer, Basis of Design: ARLON

B. Basis-of-Design Products & System: Contractor may submit equal products by other manufacturers complying with all requirements listed in this Section and approved by the Architect.

2.2 ARCHITECTURAL GRAPHIC FILMS, PRINTED

A. Basis of Design: ARLON DPF8000 Ultra Tack
B. General: Printed vinyl film backed with pressure sensitive adhesive
C. Film: High-Tensile PVC Film
D. Adhesive: Permanent-pressure sensitive
   1. Peel Adhesion: PSTC-1, 15min 70 Degrees – 5.0 lb/in
E. Fire-Test-Response Characteristics: ASTM E-84 Certified
F. Acceptable Substrate types: Concrete block, Gypsum board
G. Artwork: Provided by Owner.
H. Location: As indicated on drawings.

2.3 ARCHITECTURAL GRAPHIC FILMS, OVERLAMINATE

A. Basis of Design: ARLON 3220 Overlaminate
B. General: Overlaminate film designed to protect and prolong the life of printed images
C. Film: 2-mil (50 micron) cast vinyl film
D. Adhesive: Clear, Permanent-pressure sensitive
   1. Peel Adhesion: PSTC-1, 15min 70 Degrees – 4.35 lb/in
E. Fire-Test-Response Characteristics: ASTM E-84 Certified
F. Acceptable Substrate types: Clean, dry printed vinyl film
   1. All printed images to dry for 48 hours prior to installation of overlaminates.

G. Location: To be used at all locations indicated to receive printed graphic films.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for graphic film application. Comply with procedures recommended by graphic film manufacturer.

B. Coordination of Work: Review other Sections in which paint and substrate materials are provided to ensure compatibility of the total system for various substrates.

1. Notify Architect about anticipated problems when using the materials specified over substrates painted by others.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

D. Proceeding with installation implies the installer's acceptance of substrate and conditions.

3.2 SURFACE PREPARATION, GENERAL

A. Prepare surfaces in strict accordance with the manufacturer's written instructions

B. Coordinate requirements of substrate with other trades as required to ensure the substrate meets required level of finish, texture, and porosity.

C. Installation area shall be closed to traffic and activity for a period to be set by the installer. Installation shall not begin until the installer is familiar with the existing conditions

D. Surface Preparation: Test and prepare surfaces to be according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Perform wall adhesion test according to manufacturer's recommendation

2. Use manufacturer's directed cleaning method to ensure surface is properly prepared to receive and hold graphic film

E. Repair damaged substrate in accordance with manufacturer's written instructions

1. Where damage is repaired, re-clean application surfaces in accordance with manufacturer's directed cleaning method

3.3 APPLICATION, GENERAL

A. Install product in strict accordance with manufacturer's written instructions

B. Application must be performed by a qualified installer, who has completed manufacturer's training program for all relevant products.

C. Do not proceed with installation until all finishing work has been completed in and around the work area.

D. Measure application surface, noting all penetrations and protrusions. Cut graphic film in accordance to manufacturer's installation procedure and recommended allowance for trimming

E. Install graphic film with no gaps, wire seams or overlaps. Form smooth, wrinkle-free, bubble-free surface for finished installation.

F. No exposed joints on outside or inside corners or other "open" type joints permitted.

G. Use approved application procedures to prevent formation of air bubbles, wrinkles, blisters, and other defects.

H. Do not install overlaminate films until printed films have completely dried, 48 hours is recommended.

3.4 CLEANING

A. Use cleaning methods and products recommended by graphic film manufacturer.

3.5 PROTECTION

A. Protect work of other trades against damage resulting from installation of graphic film. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Protect completed graphic film during remainder of construction period.

END OF SECTION 099410

SECTION 099600 - HIGH PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes surface preparation and application of high-performance coating systems on the following substrates:

1. Exterior Substrates: structural steel frames, purlins, roof deck and connections at exterior locations:

a. Section 05 12 00 Structural Steel; exterior exposed structural steel.

B. Related Sections include the following:

1. Section 09 91 20 Painting

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Indicate VOC content.

B. Samples for Initial Selection: For each type of finish-coat product indicated.

C. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.

1. Submit (3) Samples on rigid backing, 8 inches (200 mm) square.

2. Label each coat of each Sample.

3. Label each Sample for location and application area.

D. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.

E. Applicator qualifications demonstrating experience in coating applications.

F. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used. Include for Operation and Maintenance Manuals submitted at project closeout.

1.4 QUALITY ASSURANCE

A. Master Painters Institute (MPI) Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."

2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and coating systems indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacture's label with the following information:

1. Product name and type (description).
2. Batch date.
3. Color number.
4. VOC content.
5. Environmental handling requirements.
6. Surface preparation requirements.
7. Application instructions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F (10 and 35 deg C), or as recommended by manufacturer's written recommendation.

B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.

3. Provide products of same manufacturer for each coat in a coating system.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Anticorrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC content of not more than 250 g/L.

2. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.

C. Colors: As selected by Architect from manufacturer's full range

2.2 METAL PRIMERS

A. Inorganic Zinc Primer: MPI #19.

1. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include those by the following manufacturers, or other approved equal product:

a. Carboline Company; Carbozinc 11 or 11 HS Inorganic Zinc Primer
b. AkzoNobel, Cathacoat 304L
c. PPG Architectural Finishes, Inc.; Metalhide One-Pac, Inorganic Zinc Rich Primer, 97-676.
d. Sherwin-Williams; Protective & Marine Coatings, Zinc Clad II Ethyl Silicate, B69V3/D11.

B. Epoxy Zinc Primer: MPI #20.

1. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include those by the following manufacturers, or other approved equal product::

a. Carboline Company; Carbozinc 859 Organic Zinc-Rich Epoxy
b. AkzoNobel, Cathacoat, 313.
c. PPG Architectural Finishes, Inc.; Aquapon Epoxy Zinc Rich Primer, 97-670.
d. Sherwin-Williams Company (The); Industrial & Marine, Zinc Clad IV, B69A8/V8.

C. High-Build Epoxy Marine Coating, Low Gloss: MPI #108.

1. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include those by the following manufacturers, or other approved equal product:

a. Carboline Company; Carboguard 888 Epoxy Polyamide
b. AkzoNobel, Bar-Rust 235
c. PPG Architectural Finishes, Inc.; Aquapon, High Build Epoxy Marine Coating, 97-130/97-139.
d. Sherwin-Williams Company (The); Industrial & Marine, Macropoxy 646, B58W6 Series.

2.3 POLYURETHANE COATINGS

A. Polyurethane, Two-Component, Pigmented, Satin Matte: MPI #72.

1. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include those by the following manufacturers, or other approved equal product:

a. Carboline Company; Carbothane 134HG Aliphatic Acrylic Polyurethane
b. AkzoNobel; Devoe Coatings, Devthane 379 Aliphatic Urethane
c. PPG Architectural Finishes, Inc.; Pitthane, Urethane Aliphatic Pigmented Gloss, 95-850.
d. Sherwin-Williams Company (The); Acrolon 218 HS Acrylic Polyurethane

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
3. Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.

C. Steel Substrates: Remove rust, loose mill scale, and shop primer if any.

1. Clean using methods recommended in writing by coating manufacturer.

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

B. Apply high-performance coatings according to manufacturer's written instructions.

1. Use applicators and techniques suited for coating and substrate indicated.
2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

C. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

D. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

E. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when coatings are being applied.

B. All products will be shipped to the site in new, unopened containers each bearing a complete label and certification statement.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Steel Substrates: provide at exterior structural steel exposed to view.

1. Polyurethane, Pigmented, Over High-Build Epoxy Coating System:

a. Prime Coat: Inorganic zinc primer, MPI #19 or Epoxy zinc primer, MPI#20 as recommended by manufacturer.

b. Intermediate Coat: High-build epoxy marine coating, low gloss, MPI #108.

c. First Topcoat: Polyurethane, two-component, pigmented, gloss, MPI #72.

d. Second Topcoat: Polyurethane, two-component, pigmented, gloss, MPI #72.

END OF SECTION

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SECTION 099650 - ANTI-GRAFFITI COATING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY **(Confirm where/if this will be applied to bottom 14' +/- of exterior façade.)**

A. This Section includes surface preparation and the application of coating systems on the following substrates:

1. Concrete
2. Concrete masonry units (CMU)
3. Stone or stone like veneer.
4. Brick veneer.

B. Coatings: As used herein, means all graffiti resistant coating system materials, including base coatings and top coating required to achieve the performance requirements of this Section.

1. Clear (transparent) graffiti resistant coating.

C. Related Sections include the following:

1. Section 033000 - "Cast-in-Place Concrete"
2. Section 042000 - "Unit Masonry"
3. Section 099600 – "High Performance Coatings"

1.3 SYSTEM DESCRIPTION

A. Base coating and graffiti resistant top coating shall each be a permanent coating system.

B. Product shall be suited to architectural aesthetics of substrate and shall come in clear or color with a choice of finishes including dead flat, semigloss, or high gloss.

1. Finishes-must be measurable on a 60 degree meter to read not greater than:

a. 5 flat finishes
b. 45 to 55 for semigloss finishes
c. not less than 75 for high gloss finishes

C. Graffiti removal product shall be non-toxic, non-flammable, biodegradable, and with a neutral pH with a range between 7.0 and 8.5.

D. Dirt pickup on the substrate shall not be increased by the application of the anti-graffiti system.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data sheets on products to be used for the Work.

1. Base Coating.
2. Anti-graffiti top coating.
3. Graffiti removal agent.

B. Test Report: If requested, submit copies of the following reports:

1. Certified test reports indicating compliance with the requirements of ASTM D-2369-92, ASTM D-3960-93, ASTM B-1 17, ASTM D-714, ASTM D-52Z ASTM D-968, ASTM E-96-93, ASTM D-3359-90, ASTM D-61 0-85.

C. Samples for Verification:

1. Provide a 5'x5' mock-up concrete panel and a brick panel for Architect's approval of anti-graffiti coating.

D. Applicator qualifications: As indicated in 1.5 Quality Assurance, applicator demonstrating experience in coating applications. Include a list of recently completed graffiti-resistant coating projects. Supply name and location of project, name and telephone number of owner, and a description of products used, substrates, applicable local environmental regulations and application procedures.

E. Warranty: Submit copy of manufacturer's standard warranty.

F. Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where coating was used, product data pages, material safety data sheets. For the purpose of future maintenance, a list of manufacturer-approved products for cleaning of the surface of the anti-graffiti coating product(s) used on the Project. Include for Operation and Maintenance Manuals submitted at project closeout.

G. Subcontractor shall provide a demonstration of cleaning procedures according per manufacturer's Instructions to Owner's representative after completion of application and surface has properly cured. The Owner will coordinate the meeting.

1.5 QUALITY ASSURANCE

A. All products applied under this Project shall be supplied by the same manufacturer. Coating and removal products shall demonstrate a history of successful use on transportation, commercial or industrial projects.

B. The approved coating manufacturer shall conduct a training seminar for the purpose of training applicators on anti-graffiti product technology, substrates and application methods. Applicator trainers shall be approved by and shall be in good standing with the manufacturer.

C. Applicator shall be experienced in coating applications, with 3 years minimally similar experience, and shall be currently a Certified Applicator in Good Standing and/or will become certified per the Manufacturer's training procedures during the project with the graffiti resistant coatings as specified in this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, bearing manufacturer's name label with the following information:

1. Name of the material.
2. Manufacturer's stock number and date of manufacture.
3. Manufacturer's name.
4. Contents by volume for major pigment and vehicle constituents.
5. Application instructions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.7 PROJECT CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Do not apply under windy conditions such that base coating and/or graffiti resistant coating may be blown to surfaces not other than those being treated.

D. Do not apply to frozen substrate. Do not apply coatings when ambient temperature is expected to fall below 40 degrees F for 24 hours after application unless surface is protected and heated.

E. Do not apply earlier than 24 hours after rain, snow, fog, or mist if same is predicted for a period of 12 hours after application.

1.8 WARRANTY

A. Warranty shall cover the original purchaser or property owner for a period of twenty (20) years from the date of Substantial Completion.

B. Manufacturer shall warrant that coating will perform as stated herein for the entire warranty period.

C. Surface shall endure unlimited clean-downs with no damage to the coating or substrate.

1.9 EXTRA MATERIALS

A. Extra Products: Furnish the following extra products: Graffiti removal agent -- One and one-half (1.5) gallons per 2,500 square feet of covered area. GSS TYPICALLY PACKAGES IN A SINGLE CASE – TWELVE 16oz. bottles which equals 1.5 gallons.

1. Removal agent shall be packaged in 16 to 32 oz. bottles and boxed for storage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Graffiti Solution System (GSS Coatings) as manufactured by American Polymer Corporation
2. Conformal Anti-graffiti Coating as manufactured by Chemprobe Technologies, Inc.
3. Permaclean 1496 as manufactured by TK Products
4. Other approved products

2.2 MATERIAL

A. Anti-Graffiti Coating

1. Anti-graffiti coatings shall be a clear, multi-component, multi-coat system designed as a permanent, non-destructive, non-sacrificial coating system for exterior exposed surfaces. Product shall be compatible with any surface sealer and/or special surface finish that may have been previously applied to the substrate. It shall be compatible with porous products i.e. block, brick, concrete, stone etc. It shall be non-yellowing, non-chalking and UV-resistant, available in a flat, matte or semi-gloss finish. Coating shall not contain paraffin (wax) or elastomeric silicones. Acceptable products shall demonstrate protection from graffiti defacement, chemical staining, ghosting, shadowing and normal environmental

effects without yellowing, color change, increased dirt pick-up or damage to the coating or substrate.

B. Graffiti Removal Agent

1. Graffiti removal agents shall be non-toxic, non-flammable, biodegradable and have a pH of 7 - 8.5. After graffiti removal, no evidence of graffiti shall be present. The product(s) shall not cause a change in the appearance to the treated surface, including shadowing, ghosting or staining of the coating or substrate.

C. Anti-graffiti coatings shall be multi-component, multi-coat coating system. Single component systems are not acceptable.

D. Anti-graffiti coating shall not contain paraffin (wax) or elastomeric silicones.

E. Anti-graffiti coating shall have the capability of having all types of paints and graffiti materials (currently known to the general public) completely removed without damaging the anti-graffiti top coating, the base coating or the substrate.

F. Removal agent shall be non-toxic, non-flammable, biodegradable, and have a pH 7 to 8.5. After removal is complete, no evidence of graffiti shall be present.

G. The removal of graffiti material shall not cause a change in the appearance of the treated surface for the period of the warranty; i.e., there shall be no shadowing, ghosting, or staining of coating or substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Applicator to ensure that any acidic cleaner has been removed and that substrates to be treated are free of contaminants and are pH neutral prior to application of anti-graffiti coatings.

C. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.

2. Masonry (Clay and CMU): 12 percent.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes.

E. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations.

B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

2. Do not coating over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible coatings and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.

D. Repair, patch, and fill cracks, voids. Defects and damaged areas in surface as approved by the Owner. Allow repair materials to cure completely before application of graffiti resistant coatings.

E. Apply specified sealant and caulking and allow to each cure completely before application of graffiti resistant coatings.

F. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

G. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

H. Allow masonry, concrete construction and repainted surfaces to cure completely before applying graffiti resistant coatings.

3.3 APPLICATION

A. Apply coating according to manufacturer's written instructions.

1. Use applicators and techniques suited for coating and substrate indicated.

2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces.

B. Do not dilute anti-graffiti products, materials shall be used direct from the manufacturer's containers

C. Apply coating to produce surface films without cloudiness, spotting, holidays, laps, runs, ropiness, or other surface imperfections.

D. Do not apply in windy conditions

3.4 FIELD QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when coatings are being applied:

1. Owner will engage the services of a qualified testing agency to sample coating materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.

2. Testing agency will perform tests for compliance with product requirements.

3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-coating materials from Project site, pay for testing, and recoating surfaces with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coats are incompatible.

4. Refer to Division 1 “Allowances” for description of Contractor’s responsibility to pay for tests.

5. Application of the anti-graffiti coating to the test panels for quality assurance purposes shall be considered incidental and no direct compensation will be made therefore.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing application, clean spattered surfaces. Remove spattered coating without scratching or damaging adjacent finished surfaces.

C. Protect work of other trades against damage from coating application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. Surfaces adjacent the application area which are not to receive the coating, shall be protected from direct or indirect application. This includes but is not limited to glass, metal, equipment, vehicles, site accessories, etc. The contractor will be responsible for payment of damages / replacement / repair / restoration to the original condition of item(s) that are not specified to receive the coating.

3.7 COATINGING SCHEDULE

A. Exposed Concrete Substrates, Nontraffic Surfaces:

1. Anti-Graffiti System: Non traffic surfaces

a. First Coat: As recommended by manufacturer.

b. Topcoat: Same as above.

C. Exposed Masonry Substrates:

1. Anti-Graffiti System: Exposed Masonry Surfaces

a. First Coat: As recommended by manufacturer.

b. Topcoat: Same as above.

D. Color Schedule

1. Anti-graffiti Coating: clear

END OF SECTION

SECTION 101400 - INTERIOR SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. ADA Room Identification

B. ADA Regulatory

1.3 REFERENCES

A. American National Standards Institute (ANSI): ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

B. Architectural and Transportation Barriers Compliance Board (ATBCB): Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG).

1.4 DEFINITIONS

A. Terms:

1. Braille: Grade 2 Braille including 189 part-word or whole word contractions in addition to Grade 1 Braille 63 characters. Tactile is required whenever braille is required.
2. Non-tactile: Letters and numbers on signs with width-to-height ratio between 3:5 and 1:1 and stroke width ratio between 1:5 and 1:10 using upper case "X" to calculate ratios. Use type styles with medium weight; upper and lower case lettering are permitted; serif typestyles are permitted.
3. Symbols: Symbol itself is not required to be tactile but equivalent verbal description is required both in tactile letters and braille.
4. Tactile: 1/32 inch (0.80 mm) raised capital letters without serifs at least 5/8 inch (16 mm) height and not more than 2 inches (51 mm) height based on upper case "X". Braille is required whenever tactile is required.

1.5 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Signage shall comply with applicable requirements of ADAAG and ANSI A117.1:

1. Comply with all applicable provisions of the 2010 ADA Standard for Accessible Design.
2. Character Proportion: Letters and numbers on signs must have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.
3. Color Contrast: Characters and symbols must contrast with their background - either light characters on a dark background or dark characters on a light background.
4. Raised Characters or Symbols: Letters and numbers on signs must be raised 1/32 in (0.8 mm) minimum and be sans serif characters. Raised characters or symbols must be at least 5/8 in (16 mm) high but no higher than 2 in (50 mm). Symbols or pictograms on signs must be raised 1/32 in (0.8 mm) minimum.
5. Symbols of Accessibility: Accessible facilities required to be identified must use the international symbol of accessibility.

6. Braille: Grade II with accompanying text.

B. Fire Performance Characteristics:

1. Provide photopolymer signage with surface burning characteristics that consist of a flame spread of 75 and a smoke development of 120 when tested in accordance to UL 723 (ASTM E 84).
2. Self-Extinguishing: Provide photopolymer signage with a CC1 classification for .060 in thick material when tested in accordance with the procedures in ASTM D 635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning Plastics in a Horizontal Position.
3. Vertical Burn: Provide photopolymer material that is classified as 94V-2 for material .118 in thick or greater and 94HB for material .118 in thick or less when tested in accordance with UL 94, Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
4. Self-Ignition Temperature: Provide photopolymer material that has a self-ignition temperature of 800 degrees F (427 degrees C) when tested in accordance with ASTM D 1929.

1.6 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Installation methods.
2. Maintenance methods.
3. Cleaning methods.

B. Interior Signage Schedule: Signage Contractor shall be responsible for coordinating with the Owner to develop a room numbering and naming system for all rooms in new and existing construction.

1. Signage Contractor shall prepare an Interior Room Signage Schedule identifying each sign by each assigned Room Number and/or Name and identifying them in relation to Architect’s room numbers on the floor plan.
2. Identify each sign with its room number, room name, sign size and type and pictogram if any.

C. Shop Drawings: Submit shop drawings for each sign type to be used, including:

1. Show layout, profiles, and product components, including edge conditions, accessories, finish colors, and textures.
2. Show sign mounting types, heights, anchorage methods, and attachment devices.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and available pictograms, characters, and Braille indications.

E. Verification Samples: For each finish product specified, two full-size signs representing actual product, color, and patterns.

1.7 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: Provide signage that is the product of one manufacturer, who has provided signage as specified for a minimum of three (3) years.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in accordance with manufacturer's requirements.

B. Store products in manufacturer's unopened packaging with labels intact until ready for installation.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

A. Environmental Requirements: 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.

1.10 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty against defects in materials and workmanship.

PART 2 - PRODUCTS

2.1 INTERIOR SIGNAGE

A. Manufacturers:

1. Basis of Design: ASI, 3860 W. Northwest Highway, Suite 350, Dallas, TX 75220; (214) 352- 9140 telephone; (214) 352-9741 facsimile; (800) ASI-SPEC [274-7732]
2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
3. Provide all interior signage systems from a single manufacturer

B. Products:

1. Acceptable Product: EmBoss™ ADA-Ready™ Sign System by ASI with requirements as indicated for materials, thickness, finish colors, designs, shapes, sizes and details.
2. Sign materials

a. Mounting Panel: Acrylic.
b. Face: Vacuum formed 1.5 mil, clear, scratch resistant PVC/vinyl acetate bonded to acrylic mounting panel.

C. Materials and Design:

1. Mounting Panel: .125 inch thick matte finished black acrylic.
2. Background Appearance: Solid color: As selected by Architect from manufacturer’s standard range
3. Edges: Buffed
4. Mounting: Wall mounted with double sided vinyl tape.
5. Tactile Graphics and Text

a. Fabrication process: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque first surface by manufacturer’s vacuum formed embossing process
b. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors
c. Color: Selected by Architect from manufacturer's standard colors
d. Font: Arial Style.
e. Manufacturer pictograms: Comply with Section 4.30.4 in Title III of Americans with Disabilities Act (ADA) requirements

6. Sign Types:

a. ADA Room Identification:

1.) Rectangular 8 inches wide by 4 inches high

2.) Room number text: 2 inches high

3.) Room name text: 1 inch high

b. ADA Regulatory:

1.) Square: 8 inches wide by 8 inches high

2.) Text: 2 inches high

3.) Pictogram: ADA compliant and as selected from manufacturer's standards.

4.) Provide at all toilet rooms containing accessible fixtures, at accessible exit locations, at automatic door opening devices, at fire extinguisher locations and other locations as required by code.

D. Fabrication:

1. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

a. Preassemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in a location not exposed to view after final assembly.
b. Conceal fasteners if possible; otherwise, locate fasteners to appear inconspicuous.
c. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.
d. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

PART 3 - EXECUTION

1.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

1.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

1.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Locate signs in accordance with ADAAG requirements.

1. Tactile graphics signs mounting requirements:

a. Single doors: Mount 60 inches (1524 mm) to sign centerline above finish floor and on wall adjacent to latch side of door.
b. Openings: Mount 60 inches (1524 mm) to sign centerline above finish floor adjacent opening.
c. No wall space adjacent latch side of door, opening, or double doors: Mount

60 inches (1524 mm) to sign centerline above finish floor on nearest adjacent wall.

C. Install signs plumb and square.

1.4 CLEANING

A. Clean all exposed surface not more than 48 hours prior to Date of Substantial Completion in accordance with manufacturer's written cleaning instructions.

1.5 PROTECTION

A. Protect installed products until completion of project.

B. Repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 102113 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes: High density polyethylene units as follows:

1. Toilet Enclosures: Floor anchored; wall braced with continuous top rail brace.
2. Urinal Screens: Wall hung.

B. Related Sections include the following:

1. Division 10 "Toilet and Bath Accessories" for toilet tissue dispensers, grab bars and similar accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Selection: Furnish samples of manufacturer's full range of colors for initial selection

D. Samples for Verification: Of each type of color and finish required for units, prepared on 2-inch- square Samples of same thickness and material indicated for Work.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum 5 years' experience in the manufacture of toilet compartments.

B. Installers Qualifications: Experienced Installer regularly engaged in installation of toilet compartments for minimum 3 years.

C. Source Limitations: Obtain toilet compartment components and accessories from single manufacturer

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating toilet compartments without field measurements. Coordinate wall, floor, ceilings, and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by qualified testing agency. Identify products with appropriate markings from an applicable testing agency.

1. Flame-Spread Index: Not greater than 75.
2. Smoke-Developed Index: 450

2.2 PLASTIC TOILET COMPARTMENTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Scranton Products
2. ASI Global Partitions.
3. Provide equal product by other manufacturers matching all requirements listed in this Section.

B. Toilet-Enclosure Style: Floor anchored, wall braced with continuous top rail brace.

C. Urinal-Screen Style: Wall hung with brackets.

D. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface.

1. Fire Resistance Rating: NFPA 286: Pass
2. Toilet partitions shall be minimum 55” high and mounted at 14” above finish floor.
3. Provide panels with 100 percent post-consumer recycled content.
4. Provide exposed surfaces free of pitting, visible seams and fabrication marks, stains, or other imperfections.
5. Provide aluminum heat sink at bottom edge of panels and doors
6. Finish: Manufacturer’s standard impregnated finish, with one color in each room.
    a. Color: As selected by Owner from manufacturer's full range
5. Door, Panel, and Pilaster Construction, General: HDPE, with a 3/16" (4.8mm) radiused edge:
    a. Doors: 1 inch (25 mm) thick.
        1) Unless otherwise indicated, 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments indicated to be accessible to people with disabilities
    b. Panel Construction: 1 inch (25 mm) thick.
    c. Pilaster Construction: 1 inch (25 mm) thick.

E. Headrail: Extruded anodized aluminum headrail with anti-grip profile. Clamps around pilaster and is secured to the wall with stainless steel brackets

F. Pilaster Shoes and Sleeves (Caps): Stainless steel, ASTM A 666, Type 302 or 304, not less than 0.0312 inch specified thickness and 4 inches high minimum, finished to match hardware.

G. Brackets (Fittings):
   1. Full-Height (Continuous) Type at urinal screens only: Manufacturer’s standard design; stainless steel

H. Hardware and Accessories: Manufacturer’s standard design, heavy-duty operating hardware and accessories.
   1. Material: Stainless steel
   2. Hinges: Self-closing integral, nylon, gravity-type adjustable to hold doors open at any angle up to 90 degrees, with emergency access by lifting door.
   3. Latch and Keeper: Surface-mounted slide latch with flat rubber-faced combination door strike and keeper, with provision for emergency access, meeting requirements for accessibility at accessible compartments
   4. Coat Hook: Combination hook and rubber-tipped stop, sized to prevent door from hitting compartment-mounted accessories. Provide wall bumper where door abuts wall. Provide formed L-shaped hook without stop at outswing doors. Mount with stainless steel through-bolts
   5. Door Pull: Standard unit on outside of inswing doors. Provide pulls on both sides of outswing doors.

I. Anchorages and Fasteners: Manufacturer’s standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION

A. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with leveling adjustment at bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine work area to verify that measurements, substrates, supports, and environmental conditions are in accordance with manufacturer's requirements to allow installation.

B. Proceed with installation once conditions meet manufacturer's requirements

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
   1. Maximum Clearances:
      a. Pilasters and Panels: 1/2 inch.
      b. Panels and Walls: 1 inch.

B. Floor-Anchored Units: Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.

C. Wall-Hung Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position

3.4 FINAL CLEANING

A. Remove packaging and construction debris and legally dispose of off-site.

B. Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 102600 - WALL PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rub rails.

1.2 SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

B. Shop Drawings: For each impact-resistant wall protection showing locations and extent. Include sections, details, and attachments to other work.

C. Samples for Verification: For each type of exposed finish required, provide sample of finished product

D. Remaining paragraphs are defined in Division 01 Section "Submittal Procedures" as "Informational Submittals."

E. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining optimum condition under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

F. Warranty: Sample of warranty.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
2. Keep sheet material out of direct sunlight.
3. Store wall protection components for a minimum of 72 hours, or until material attains a minimum room temperature of 70 deg F (21 deg C).

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F (21 deg C) for not less than 72 hours before beginning installation and for the remainder of the construction period.

1.6 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. 2 percent of each type, color, and texture of units installed

B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

PART 2 - PRODUCTS

2.1 RUB RAILS

A. MANUFACTURER
1. InPro Corporation

B. Palladium Rigid Vinyl Rubrails
1. Thickness: .060”
2. Width: 8”
3. Length: See plan
4. Material: Vinyl - Palladium Rigid Vinyl Rubrails shall be manufactured from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers.
5. Adhesives: Manufacturer’s recommended adhesive
6. Finish: Designer White 0101

C. FABRICATION
1. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing wall protection components.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

1. Install impact-resistant wall protection units in locations and at mounting heights indicated on Drawings.

3.4 CLEANING

A. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

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SECTION 102800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Toilet accessories

1.2 SUBMITTALS

A. Product Data: Manufacturer's specifications and technical data including the following.

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.
3. Certified test reports indicating compliance with performance requirements specified herein.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with provisions of the Americans with Disabilities Act, ANSI 117.1 and local building codes.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Deliver products in original unopened packaging with legible manufacturer's identification.

B. Storage and Protection: Comply with manufacturer's recommendations.

1. Protect from elements and damage.

1.5 COORDINATION

A. Install owner supplied toilet accessories

B. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

C. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

PART 2 - PRODUCTS

2.1 TOILET AND BATH ACCESSORIES

A. Manufacturers:

1. Subject to compliance with requirements, provide products from the following manufacturer, unless noted otherwise:

a. Bobrick Washroom Equipment, Inc.

2. Subject to compliance with requirements, other acceptable manufacturers offering acceptable products are:

a. A & J Washroom Accessories, Inc.
b. American Specialties, Inc.
c. Bradley Corporation.

d. General Accessory Manufacturing Co. (GAMCO).

3. Where model numbers are indicated, manufacturer shall custom fabricate unit to conform to construction and detailing of specified model of other manufacturer.

2.2 MANUFACTURED UNITS

A. Drawings and Specifications are based on manufacturer's proprietary literature from Bobrick Washroom Equipment, Inc. Other manufacturers shall comply with minimum levels of material and detailing indicated on Drawings or specified herein.

B. Toilet Tissue Dispenser:

1. Install owner-supplied dispensers, verify with Owner.

C. Paper Towel Dispenser:

1. Install owner-supplied dispensers, verify with Owner.

D. Liquid-Soap Dispenser:

1. Install owner-supplied dispensers, verify with Owner.

E. Mirror: Frameless stainless steel mirror shall be 18-8, type-304, 20-gauge (0.9mm) stainless steel polished to a No. 8 mirror finish. Mirror shall have 1/4" (6mm) return concealing 1/4" (6mm) tempered masonite backing. Four corner countersunk holes provide flush fit of mounting screws with mirror surface.

1. Mirror size:
   a. 24 inches wide by 36 inches high.
2. Basis of design product:
   a. Bobrick Washroom Equipment, Inc.: No. B-1556-2436

F. Grab Bars: Grab bar and concealed mounting plates shall be constructed of 304 stainless steel with satin finish. Grab bar shall have wall thickness of 18 gauge and outside diameter of 1-1/2”. Distance from inside of grab bar to finished wall shall be 1-1/2”. Flanges shall be 1/8” thick stainless steel plate, 2”x3-1/8” in diameter, and each shall have two screws holes. Flange covers shall be 11 gauge and shall snap over mounting flanges to conceal mounting screws. Grab bar shall have 90 degree return to flange. Ends of grab bar shall pass through flanges and be heliarc welded to form one structural unit. Manufacturer’s service and parts manual shall be provided to Owner upon completion of Project.

1. See Drawings for lengths and locations of grab bars required.
2. Where grab bars are mounted on dissimilar adjacent surfaces that do not meet on an equal plane, modify end post lengths as required to mount grab bars plumb and true.
3. Basis of design product:
   a. Bobrick Washroom Equipment, Inc.: No. B-6806 Series.

G. Sanitary Napkin Disposal Unit: Surface-mounted sanitary napkin disposal shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Door shall be secured to cabinet with a full-length stainless steel piano-hinge and equipped with a tumbler lock. Unit shall have a self-closing panel covering disposal opening. Unit shall be furnished with a removable, leak-proof molded polyethylene receptacle, 1.2-gal. (4.6-L) capacity

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.: B-254

H. Shower Curtain Rod with Concealed Mounting:
1. Acceptable Manufacturers/Products:
   a. Bobrick Washroom Equipment, Inc.: No. B-207 x 36, B-207 x 60.

b. 1" (25mm) diameter rod is 20-gauge (1.0mm), type 304 stainless steel, satin finish. 1 3⁄8" (35mm) diameter flanges are chrome-plated plastic, bright-polished finish; mount on concealed wall brackets

I. Shower Curtain Hooks: Type 304 stainless steel. For use on 1" and 1-1/4" (25 and 32mm) dia. shower curtain rods.

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.: 204-1.
2. Provide 7 hooks for specified curtain. Verify quantity for substituted curtain if required.

J. Shower Curtain: 42" W x 72" H (1065 x 1830mm), Opaque, matte white vinyl, .008" (0.2mm) thick, contains antibacterial and flame retardant agents. Nickel-plated brass grommets along top, one every 6" (150mm). Hemmed bottom and sides.

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.: 204-2

K. Folding Shower Seat:
1. Basis of Design: Elcoma, 60/61 Series, HDP "L-Shaped" Folding Shower Seats.
2. Model: L #60/61-PO34520, See Plans for right or left-handed locations.
3. Type 304 stainless steel tubing with #4 finish; Solid 1/2" Thick HDPE (High Density Polyethylene) seat, 34 1/2" WIDTH,
4. Color: White

L. Underlavatory Guard:

1. Specified under Division 22.

2.3 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, No. 4 finish (satin), 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, ASTM B 16/B 16M, or ASTM B 30.

C. Sheet Steel: ASTM A 1008/A 1008M, 0.036-inch (0.9-mm) minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, G60 (Z180).

E. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

F. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

G. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

H. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

B. Adjust accessories for unencumbered, smooth operation, and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

END OF SECTION

SECTION 105113 - METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Corridor Metal Lockers
2. Athletic Metal Lockers.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.

B. Shop Drawings: For metal lockers. Include plans, elevations, sections, details, and attachments to other work.

1. Show locker trim and accessories.
2. Include locker identification system and numbering sequence.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For metal lockers, in manufacturer's standard sizes.

E. Qualification Data: For qualified Installer.

F. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

G. Warranty: Sample of special warranty.

1.3 QUALITY CONTROL

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain metal lockers and accessories from single source from single manufacturer.

C. Regulatory Requirements: Where metal lockers are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.6 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Full-size units of the following metal locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:

a. Locks.
b. Identification plates.
c. Hooks.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.

B. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.

C. Anchors: Material, type, and size required for secure anchorage to each substrate.

1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.2 METAL LOCKERS

A. Corridor Metal Lockers: Provide knocked down metal lockers constructed from powder-coated steel.

1. Manufacturer, Basis of Design: ASI Storage Solutions Inc., Traditional Collection.
2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

a. Art Metal Products; Standard KD Lockers.
b. Hadrian Manufacturing Inc.; Emperor Corridor Lockers.
c. List Industries Inc.; Superior Classic KD Wardrobe Lockers
d. Lyon Workspace Products, LLC; Standard Steel Lockers.
e. Penco Products, Inc.; Vanguard Lockers
f. Republic Storage Systems Company; Standard Lockers.

3. Sizes and Configurations:

a. Single tier locker, size to match existing lockers and as required to fit within existing openings, Contractor shall field verify existing opening sizes to determine sizes and quantities.
b. No legs or base
c. Provide shelf
d. 3 wall hooks

4. Material: Cold-rolled steel sheet.

a. Door Frames: - Shall be 16 gauge formed in a channel shape. Vertical members shall have additional flange to provide a continuous door strike. Cross frame members shall also be 16 gauge channel shaped, including intermediate cross frames on double tier lockers
b. Doors: Shall be 16 gauge, with louvers for ventilation channel shaped on both the lock and hinge side, with angle formations across the top and bottom
c. Body: Fabricate from unperforated steel sheet with thicknesses as follows:

1) Bottoms shall be 16 gauge. Tops, sides, backs and shelves shall be 24 gauge. Bolt spacing shall not exceed 9” o.c.
2) Shelves: 16 gauge, with double bend at front and single bend at sides and back.

d. Hinges: Shall be full length 16 gauge continuous piano type riveted to both door and frame.

e. Recessed Door Handle and Latch: Shall be one-piece 20 gauge deep drawn stainless steel cup designed to accommodate locks.

1) The lifting trigger shall be 14 gauge steel, attached to the latching channel.
2) The trigger shall have a padlock eye for use with 9/32" diameter padlock shackle.
3) Doors shall have latch clip engaging frame at three points on doors over 42" high and two points on all other doors.
4) Locking device to be positive automatic type, whereby locker door may be locked when open, then closed without unlocking.
5) A rubber silencer shall be firmly secured to the frame at each latch hook

f. Accessories:

1) Number Plates - Each locker shall have a polished aluminum number plate riveted to door face with black numerals ½" high
2) Recess Trim: Fabricated from 0.048-inch nominal-thickness steel sheet.
3) Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.

g. Color(s): As selected by Architect from Manufacturer's full line of standard colors to match existing locker color.

B. Athletic Metal Lockers: Provide knocked down metal lockers constructed from powder-coated steel:

1. Manufacturer, Basis of Design: ASI Storage Solutions Inc., Competitor Collection.

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

a. Art Metal Products; AMP-1002 Champ Athletic Lockers
b. Hadrian Manufacturing Inc.; Athletic (Gladiator) Lockers
c. List Industries Inc.; Team Lockers
d. Lyon Workspace Products, LLC; Heavy Duty Ventilated Lockers.
e. Penco Products, Inc.; Invincible II – Metal Gym Lockers
f. Republic Storage Systems Company; Heavy Duty Ventilated Lockers

3. Sizes and Configurations, See Drawings for locations, quantities of each.

a. Single Tier, 18" deep, 18" wide and 60" column height
b. Double Tier, 18" deep, 18" wide and 60" column height, 30" opening height.
c. Double tier, 12" deep, 12" wide and 60" column height, 30" opening height.
d. Provide for each size and configuration.

1) No legs or base.
2) 3" wall hooks and 1 ceiling hook.
3) Provide sloped top

4. Material: Cold-rolled steel sheet.

a. Door Frames: - Shall be 16 gauge formed in a channel shape. Vertical members shall have additional flange to provide a continuous door strike. Cross frame members shall also be 16 gauge channel shaped, including intermediate cross frames on double tier lockers.
b. Doors - Shall be 14 gauge, channel shaped on both the lock and hinge side with angle formations across the top and bottom. Single, double and triple tier locker doors shall have a 16 gauge full height reinforcement channel
c. Ventilation - All locker sides and doors 20" or higher shall be perforated with diamond-shaped openings ¾" wide x 1-1/2" high in a quantity and pattern to ensure maximum ventilation and maintain structural strength. All other doors shall have small diamond-shaped perforations 7/16" wide x 15/16" high.
d. Backs shall be 18 gauge; all other body parts shall be 16 gauge. Bolt spacing shall not exceed 9" o.c.
e. Hinges - Shall be full length 16 gauge continuous piano type riveted to both door and frame.
f. Handles - Shall be one-piece 20 gauge deep drawn stainless steel cup designed to accommodate lock

g. All lockers shall have an 11 gauge frame hook secured to the frame. The frame hook shall have a padlock hasp protruding through the recessed handle. A rubber silencer shall be firmly secured to the frame at each latch hook.

h. Accessories:

1) Number Plates - Each locker shall have a polished aluminum number plate riveted to door face with black numerals ½" high
2) Recess Trim: Fabricated from 0.048-inch nominal-thickness steel sheet.
3) Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.
4) Continuous Sloping Tops: Fabricated from 0.048-inch nominal-thickness steel sheet, with a pitch of approximately 20 degrees.

i. Colors, Two colors will be selected by Architect from Manufacturer's full line of standard colors. See Drawings for locations and quantities of lockers of each color.

2.3 FABRICATION

A. Fabricate metal lockers square, rigid, and without warp and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.

1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.

C. Knocked-Down Construction: Fabricate metal lockers using nuts, bolts, screws, or rivets for nominal assembly at Project site.

D. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.

E. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.

F. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.

1. Sloping-top corner fillers, mitered at corners.

G. Recess Trim: Fabricated with minimum 2-1/2-inch face width and in lengths as long as practical; finished to match lockers.

H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.

I. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

2.4 STEEL SHEET FINISHES

A. Factory finish steel surfaces and accessories except stainless-steel and chrome-plated surfaces.

B. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard, baked-polymer, thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install level, plumb, and true; shim as required, using concealed shims.

1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
2. Anchor back-to-back metal lockers to floor.

B. Knocked-Down Metal Lockers: Assemble with standard fasteners, with no exposed fasteners on door faces or face frames.

C. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.

1. Attach hooks with at least two fasteners.
2. Attach door locks on doors using security-type fasteners.
3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
    a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
    b. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.
4. Attach recess trim to recessed metal lockers with concealed clips.
5. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
6. Attach sloping-top units to metal lockers, with closures at exposed ends.
7. Attach boxed end panels with concealed fasteners to conceal exposed ends of non-recessed metal lockers.
8. Attach finished end panels with fasteners only at perimeter to conceal exposed ends of non-recessed metal lockers.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding.

B. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.

C. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION

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SECTION 105200 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Fire extinguishers and mounting brackets.

1.3 REFERENCES

A. International Code Council (ICC): International Building Code (IBC) - Current Edition

B. National Fire Protection Association (NFPA): NFPA 10-2013, Standard for Portable Fire Extinguishers

C. Underwriters Laboratories, Inc. (UL)

1.4 SUBMITTALS

A. Product Data:

1. Extinguishers: Materials description for fire extinguishers; include ratings and classifications.
2. Installation instructions for each product specified.
3. Warranty.

1.5 QUALITY ASSURANCE

A. Provide fire extinguishers, produced by a single manufacturer.

B. Provide fire extinguishers of type approved by UL, State Fire Marshal's Office, and local regulatory agencies, if any.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle fire protection specialties and related materials using means and methods that will prevent damage, deterioration, or loss.

B. Deliver components in manufacturer's original packaging, properly labeled for identification.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide named product or comparable product by one of the following:

1. Larsen's Manufacturing Company
2. Potter Roemer Fire Pro.
3. Strike First.

2.2 MANUFACTURED UNITS

A. General: Provide fire extinguishers of type, size, and capacity for location indicated.

1. Valves: Manufacturer's standard.
2. Handles and Levers: Manufacturer's standard.
3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

C. Accessories:

1. Standard Brackets: Provide manufacturer's standard steel bracket, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated.

2.3 SOURCE QUALITY CONTROL

A. Ship extinguishers to the Project site fully charged, EXCEPT those which contain water as an extinguishing agent, if any.

B. Obtain Fire Extinguishers and Fire Extinguisher Brackets from same manufacturer to ensure compatibility.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged units.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

B. General: Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

1. According to NFPA 10, maximum mounting height for fire extinguishers weighing 40 lb (18 kg) or less is 60 inches (1524 mm); for those weighing more, it is 42 inches (1067 mm).

C. Securely fasten mounting brackets to structure, square and plumb, to comply with manufacturer's instructions. Provide wood blocking with-in wall structure per Section 061000.

3.3 FIELD QUALITY CONTROL

D. Ensure that each extinguisher is fully charged, and that inspection of each extinguisher has been performed, as evidenced by the National Association of Fire Equipment Distributors certification tag, just prior to turnover

END OF SECTION

SECTION 116623 - GYMNASIUM EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Ceiling suspended camber forward fold backstop system
2. Basketball Backboards
3. Basketball Goals
4. Gymnasium Divider Curtain
5. Wall Padding
6. Associated athletic equipment accessories.

1.2 DESIGN REQUIREMENTS

A. Basketball Backstops: Locate overhead attachments of basketball backstops in keeping with static equivalent loading and point reactions

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data, including materials, components, fabrication, finish, and installation instructions.

B. Shop Drawings:

1. Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating locations, quantities, dimensions, tolerances, materials, fabrication, connections, hardware, fasteners, finish, electrical wiring diagrams, options, and accessories.
2. Show location and detail of attachment to building structure

C. Samples: Submit manufacturer's color samples

1. Basketball backboard padding

D. Design Data:

1. Basketball Backstops:

a. Submit manufacturer's design data, indicating static loads and point reactions.
b. Submit calculations complete, showing hanger and hoist pulley points.
c. General load charts or generic product laboratory test data will not be considered sufficient data

E. Test Reports: Submit manufacturer's certified test reports from testing performed by accredited independent testing laboratory, indicating compliance of materials with requirements as specified.

F. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

G. Manufacturer's Project References: Submit manufacturer's list of recently completed projects, including project name and location, name of architect, and type and quantity of gymnasium and play field equipment installed.

H. Operation and Maintenance Manual: Submit manufacturer's operation and maintenance manual; including operation, maintenance, adjustment, and cleaning instructions; trouble shooting guide; parts list; and electrical wiring diagrams.

I. Warranty: Submit manufacturer's standard, lifetime, and additional warranties

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Provide equipment and accessories for each game system from a single manufacturer.

B. Manufacturer's Qualifications: Minimum of 5 consecutive years of experience manufacturing gymnasium and play field equipment similar to that specified.

C. Installer's Qualifications: Trained and approved by manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions. Keep temporary protective coverings in place.

C. Handling: Protect materials and finish from damage during handling and installation.

1.5 WARRANTY

A. Provide 1-year warranty against defects in materials and workmanship, unless otherwise specified

PART 2 - PRODUCTS (Confirm all with Nova.)

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Basis of Design: Porter Athletic, Inc., 601 Mercury Drive, PO Box 1790, Champaign, Illinois 61824-1790. Toll Free (888) 277-7778. Phone (217) 367-8438. Fax (217) 239-2255. Web Site www.porterathletic.com. E-Mail porter@porterathletic.com.

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:

a. Aalco Manufacturing, Inc.
b. Architectural Design Products (ADP)
c. Bison Inc.
d. Draper Inc.
e. Kodiak Industries Ltd.
f. Performance Sports Systems
g. Other equal manufacturer supplying comparable product, as approved by the Architect by Addendum prior to submission of bid.

2.2 BASKETBALL BACKBOARDS

A. Basketball Backboards: Model No. 204 rectangular backboard.

1. Provide for each backstop.
2. Backboards: 2-5/16-inch-thick frame, 72 inches by 42 inches, 1/2-inch tempered plate glass cushioned in unitized steel-tubing frame.
3. Perimeter: Glare-free aluminum.
4. Unitized Frame: Vertical center strut welded to upper 2 goal mount hole location to absorb shock from slam dunks and to conform to requirements of NCAA and NFHS.
5. Standard White Borders and Target Area: Fired into glass permanently.
6. Warranty: Limited lifetime warranty against breakage.

2.3 BASKETBALL BACKBOARD PADDING

A. Basketball Backboard Padding: Model No. 326 Pro Pad bolt-on positive-attachment backboard pad.

1. Provide for each rectangular glass backboard, along bottom of backboard and up 15 inches on each side, meeting NCAA, NFHS, NBA, and FIBA rules.
2. Pads: 2-inch thick, molded from 9-pound density polyurethane foam with integral skin.
3. Color: As selected by Architect from manufacturer's full range of standard colors.
4. Warranty: 8 years.

2.4 BASKETBALL GOALS

A. Basketball Goals: Model No. 236154 Powr-Flex II goal.

1. Provide for each Model No. 204 rectangular backboard.
2. Goal: Shock-absorption feature by offset-hinge arrangement goal ring, back-plate mounting housing, and concealed spring mechanisms. 5/8-inch diameter cold-drawn alloy steel.
3. Front of Goal Rim: Deflect downward when static load of 250 pounds is applied and return to playing position when load is released.
4. Cover: Conceal mounting bolts and entire spring mechanism and protect against finger entrapment.
5. Net Attachment: Tube-tie net attachment system on rim to eliminate conventional wire-formed net locks.
6. Braces: Rigidly braced by formed die-cut steel braces on underside for maximum support.
7. Net: Anti-whip, white net
8. Finish: Official orange powder coated.

2.5 CEILING SUSPENDED BACKSTOP SYSTEM

A. Backstop System: 90950000 – Forward Fold Backstop

1. Provide for each backstop location.

2. Main center mast of 6-5/8" O.D. heavy-wall structural steel tube with diagonal side sway braces of 2-1/2" x 1-1/2" rectangular steel tubing. Main stem of the drop frame shall be suspended diagonally from the superstructure with a 15 deg. angle and a 4'-6" long vertical member for attachment of a backboard. Top horizontal mast member to be of a heavy 4" structural channel to support adjustable suspension hangers. Mast shall be fully welded and suspended by adjustable hangers (2) to provide for precise plumbing of frame during installation. The 15 deg. camber of the main drop frame will properly weight lock unit in the playing position.

3. Backstop to operate with a 1-7/8" O.D. front brace assembly with a folding knee joint. Knee joint to incorporate an internal torsion spring design to lock brace assembly firmly in playing position. Hoist cable shall automatically disengage brace knee joint during the hoist cycle through a three-pulley system.

4. Backstop shall be supported from pipe anchored to roof framing members by precision die formed support fittings or custom attachments as required. All cap screws shall be rated a minimum SAE Grade 5. Backstop manufacturer shall be responsible for the structural design and provision of all structural members required to fully secure backstop to ceiling structure.

5. All metal parts shall receive a powder coat paint finish. Color shall be selected by Architect from manufacturer's full line of standard colors.

6. Provide manufacturer's standard 2- year limited warranty

2.6 CENTER STRUT HEIGHT ADJUSTER

A. 00900506 - Center-Strut Height Adjuster

1. Provide one for each backstop
2. Specifically designed for use with specified backstop system to provide an adjustable, direct-mount goal attachment system.
3. Allow goal height settings from 8'-0" to the official 10'-0".
4. Manually operated by awning crank type mechanism.
5. Internal, spring-loaded height locking mechanism to automatically lock and hold unit at any desired goal height
6. Height setting scale shall be located on the side of the unit to visually determine height settings from 8'-0" to 10'-0" in 3" increments.
7. Provide manufacturer's Standard 1 – year limited warranty.

2.7 ELECTRIC WINCH

A. 00706-000 1/2 H.P. Electric Winch

1. Hoisting capacity of 1,200 lbs.
2. Winch to be operated mechanically by means of a 1/2 H.P. (9 amp) capacitor type 60 cycle, 115-volt single phase electric motor with automatic thermal overload protection manufactured to NEMA specifications.
3. Worm gear type, designed to hold backstop at any position when raising or lowering.
4. Provide limit switch.
5. Standard key switch control
6. Finish: Clear anodized

2.8 FLOOR SLEEVE AND COVER PLATE FOR VOLLEYBALL STANDARDS

A. Floor Sleeves and Cover Plates: – CONTRACTOR TO VERIFY FLOOR SLEEVE COMPATIBILITY WITH SCHOOL'S CURRENT STANDARDS.

1. Manufacturer: Gared
2. Product Number: 6405 floor sleeve.
3. Floor Sleeve: 4-inch O.D. steel tubing, extending 12 inches into concrete footing.
4. Cover Plate: Chrome plated. 8-inch O.D. by 1/2-inch-thick recessed collar, cork gasket, and cover.
5. Swivel Retainer Pin in Collar: Prevent theft.
6. Cover removal key.

2.9 GYMNASIUM DIVIDER CURTAIN

A. 92082000 Belt Guided Center-Roll Divider Curtain

1. Configuration: All Solid, Solid vinyl polyester reinforced 19 oz. vinyl coated fabric.
   a. Meet NFPA-701 large scale requirements
   b. Meet ULC S-S-109 large and small scale requirements
   c. Top and bottom of curtain shall be fabricated with a pocket to conceal continuous 1-5/16" O.D. tubes to conceal full length of the fabric. Top tube shall be supported from the overhead support structure with threaded rod-style support fittings.
   d. Bottom edge of the upper section and the top edges of the lower section shall be hemmed and contain a 3/16" diameter cable to fit and hold the curating sections in a 3" O.D. grooved center drive anodized aluminum batten tube.

2. Upper and lower curtain sections shall roll to the overhead storage positions by means of a tubular-type motor (115-volt, 3.8 amp single phase), gear reducer, brake mechanism concealed inside the horizontal batten tube.

   a. Provide up and down, push button type limit switches and automatic reset, thermal load protection.
   b. Curtain raises or lowers at a rate of approximately 26’ per minute.
   c. Key control switch.

2.10 ROLL UP GYM DIVIDER

a. Type: Electrically operated, roll-up gymnasium divider including motor, belts, controls, clamps for attachment to building structure, threaded rod supports, and other components required for complete functional installation; Roll-Up Gym Divider as manufactured by Draper, Inc.
b. Operation: Curtain rolled up and down by belts wound onto overhead rotating drive pipe operated by electrical motor.
c. Configuration: Rectangular shape with straight bottom and extending across room as indicated on Drawings.
   i. Maximum dimension of stored divider: 2 feet from bottom of structural support to bottom of rolled curtain.
   ii. Minimum required clearance between vertical curtain edges and adjacent fixed objects: 6 inches.
   iii. Provide 36 inches space between curtain ends and walls or fixed objects to allow passage space around divider.
d. Operating mechanism: Drive pipe winch powered with 3/4 HP, 110VAC, 60-cycle, single-phase, reversible capacitor, C-Face motor with thermal overload protection. Winch assembly shall carry a five-year warranty. Provide with load holding worm gear reduction and integral limit switches to control curtain travel. Drive pipe shall rotate in pipe support assemblies spaced at approximately 9 feet.
e. Attachment: Attach to structural support with beam clamps, hanger brackets, and 1/2 inch diameter threaded rods. Attachment clamps designed to be capable of supporting a minimum of 5,000 lbs. each and provided in sufficient number to provide a combined minimum 45:1 attachment point safety factor.
f. Hoist belts: 5 inches wide white polyester webbing attached to drive pipe, passing under bottom batten, and terminating at top batten. Space belts at approximately 15 feet
g. Bottom roller: 4 inches diameter steel pipe with aluminum strip for attachment of curtain.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which equipment and related items are to be installed and notify the Architect and Owner’s Representative in writing of any conditions encountered that would be detrimental to proper and timely completion of the work.

B. Verify that the building structure and surfaces are sufficient to support loads and forces that are imposed by the equipment.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. General: Comply with manufacturer's written recommended procedures and installation sequences. Install equipment rigid, straight, plumb and level. Secure all equipment with manufacturer's recommended anchoring devices
2. Install in conformance with manufacturer's recommendations. Provide installation that is complete and to the standards required by League rules

B. Install concrete footing for volleyball standard sleeves prior to installation of concrete floor slab.

3.3 ADJUSTMENTS AND CLEAN UP

A. General: All equipment shall be cleaned and given a final adjustment including lubrication, if recommended by manufacturer, prior to acceptance by Owner.

B. Remove all excess materials, tools, packaging, and other debris from the work area, and dispose of legally.

END OF SECTION

SECTION 116643 - INTERIOR SCOREBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Single-sided LED basketball scoreboard

1.2 REFERENCES

A. Standard for Electric Signs, UL 48
B. Standard for CSA C22.2 #207
C. Federal Communications Commission Regulation Part 15
D. National Electric Code

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s product illustrations, data and literature that fully describe the scoreboards and accessories proposed for installation.

B. Shop Drawings: Submit mechanical and electrical drawings.

C. Maintenance data: Submit manufacturer’s installation, operation, and maintenance manuals

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions. Keep temporary protective coverings in place.

C. Handling: Protect materials and finish from damage during handling and installation.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of scoring equipment and electronic displays through one source from a single manufacturer.

B. ETL listed to UL 48

C. NEC compliant

D. FCC compliant

E. ETLC listed to CSA 22.2 #207

1.6 WARRANTY

A. Provide 5 years of no cost parts exchange, including standard shipping on electronics parts and radios due to manufacturing defects
B. Provide toll-free service coordination
C. Provide manufacturer’s technical online and phone support.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Basis of Design: Daktronics, Inc., 201 Daktronics Drive, P.O. Box 5128, Brookings, SD 57006-5128
2. Subject to compliance with requirements, provide named product or comparable product by other equal manufacturers supplying comparable product, as approved by the Architect by Addendum prior to submission of bid.

2.2 SCOREBOARD (Provide 2) **- Confirm Nova's Selection, #, and Locations**

A. Daktronics BB-2107 single-sided basketball scoreboard displays period time to 99:59, HOME and GUEST scores to 199, PERIOD to nine, team FOULS to 19, PLAYER number to 99, player FOUL to nine, T.O.L. (time outs left) to nine and indicates possession and bonus. During the last minute of the period, scoreboard displays time to 1/10 of a second. Scoreboard can also score volleyball, wrestling and any sport requiring a clock, score and period function.

B. General information

1. Dimensions: 6'-0" (1.83 m) high, 10'-0" (3.05 m) wide, 0'-6" (152 mm) deep
2. Base weight: 260 lb (118 kg) – options may increase weight
3. Base power requirement: 200 W – options may increase wattage
4. Color: To be selected by Architect from manufacturer's standard range of colors.

C. Construction

1. All-aluminum construction
2. Scoreboard back, face, and perimeter: 0.063" (1.60 mm) thick
3. Cabinet withstands high-velocity impact from air-filled sports balls without the need for protective screens

D. Digits & Indicators

1. UniView® (UV) – enhanced digits with diffusant lenses over the LEDs that blend the light for a uniform bar look and 140° viewing angle
2. Clock and score digits: 13" (330 mm) high
3. PERIOD, FOULS, PLAYER/FOUL and T.O.L. digits: 10" (254 mm) high
4. Bonus indicators: 4" (102 mm) high
5. Possession arrows: 3" (76 mm) high
6. Clock/colon, PERIOD, PLAYER/FOUL and T.O.L. digits and bonus indicators: amber LEDs
7. Score and FOULS digits and possession indicators: red LEDs
8. Seven bar segments per digit

E. Captions

1. Vinyl applied directly to scoreboard face
2. HOME and GUEST captions: 6" (152 mm) high
3. PERIOD, FOULS/SCORE, PLAYER/FOUL/MATCH and T.O.L. captions: 4" (102 mm) high
4. Color: standard white

F. Horn

1. Vibrating horn mounted inside the scoreboard cabinet behind the face
2. Sounds automatically when period clock counts down to zero
3. Sounds manually as directed by operator

G. Power Cord

1. Minimum 11' (3.35 m) long
2. Cord plugs into a standard grounded outlet

H. Additional Equipment

1. Vinyl striping applied around the clock and scoreboard face
2. Custom team name caption in place of HOME
3. Two 17" (432 mm) high, 33" (838 mm) wide aluminum panels in upper corners with vinyl logo/sponsor decoration

2.4 SCORING CONSOLE

A. Console is an All Sport® 5000 controller
B. Scores multiple sports using changeable keyboard inserts
C. Controls multiple scoreboards, stats displays and shot clocks, including other All Sport 5000 controlled displays currently owned by customer
D. Recalls clock, score, and period information if power is lost
E. Runs Time of Day and Segment Timer modes
F. Console includes:

1. Rugged aluminum enclosure to house electronics
2. Sealed membrane water-resistant keyboard
3. 32-character backlit LCD to verify entries and recall information currently displayed
4. Power cord that plugs into a standard grounded outlet; 6 watts max
5. Control cable to connect to the control receptacle junction box (wired system only)
6. Hand-held switch for main clock start/stop and horn
7. Soft-sided carrying case

G. Additional Equipment

1. 2.4 GHz spread spectrum radio system with frequency hopping technology and 64 non-interfering channels; system includes a transmitter installed inside the console and a receiver installed inside the scoreboard(s)
2. Hard Sided Carrying Case

2.5 SPONSOR IDENTIFICATION PANEL (Provide 2): Confirm.

A. Non-backlit logo/sponsor panels: 2’-0” high, 10’-0” wide

1. Construction

a. Signage cabinetry and metal parts shall be made of durable, lightweight aluminum
b. All sheet metal parts shall be constructed of 0.050"aluminum with an alloy content of 5052-H34 minimum.
c. All painted surfaces shall be primed and painted using automotive industrial finish or better.

2. Sign decoration

a. Sign decoration shall be constructed using self-adhesive vinyl materials with a minimum of a 3-year outdoor warranty

3. Digitally produced graphics shall be 3M Scotchprint® or equivalent

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that mounting surface is ready to receive scoreboard. Verify that placement of conduit and junction boxes are as specified and indicated in plans and shop drawings.

3.2 INSTALLATION

A. Power conduit, cables and outlet boxes to be provided and installed by the electrical contractor. Signal raceways, conduit and boxes to be provided by the electrical contractor. Electrical contractor is also responsible for any required wire and terminators between each scoreboard and control location.

B. Mount scoreboards and interior displays to wall in location detailed and in accordance with manufacturer's instructions. Unit to be plumb and level.

3.3 INSTALLATION - CONTROL CENTER

A. Provide boxes, cover plates and jacks as required to meet control specification requirements. Control cables to control panels shall be concealed.

B. Test the operation of the scoreboard, controller and all control jacks; leave control unit in carrying case and other loose items with owner's designated representative.

C. Conduct operator training on the scoreboard/controller operation

END OF SECTION

SECTION 124940 - ROLLER SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

B. Manually operated room-darkening shades to include mounting and operating hardware.

C. Motor operated room-darkening shades to include mounting and operating hardware.

1.2 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. NFPA 70 - National Electrical Code.

C. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

1.3 SUBMITTALS

A. Product Data: Manufacturer’s data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
3. Storage and handling requirements and recommendations.
4. Mounting details and installation methods.

B. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

C. Copy of compliance with UL standards for electric shade motors.

D. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shade cloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

F. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

D. Flame Resistance Ratings: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

E. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 WARRANTY

A. Provide under the provisions of Section 017000 Contract Closeout: 5 years warranty against defects in materials and workmanship for clutch operating mechanism.

PART 2 - PRODUCTS

2.1 MANUFACTURERS (Confirm.)

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Basis-of-Design: Hunter Douglas Contract/ 13915 Danielson St., Ste.100/ Poway, CA 92064/ Phone: 800-727-8953 Fax: 800-205-9819/ Website: www.hunterdouglascontract.com.
2. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
    a. MechoShade
    b. Draper, Inc.
    c. Levolor; Levolor-Kirsch Window Fashions
    d. Lutron Shading Solutions by VIMCO;
    e. Shade Techniques, Inc.;
    f. Verosol USA, Inc.; OEM Shades Inc.

2.2 APPLICATIONS/SCOPE

A. Provide roller shades at all locations indicated on the drawings.

2.3 MANUAL OPERATED WINDOW SHADES: RLR-1 (Confirm.)

A. Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation: Hunter Douglas Contract “RB 500 Manual Roller Shades”

B. Control System:

1. Clutch Operated:
   a. Engineered heavy duty chain drive pulley operating system consisting of metal clutch housing and locking plug.
   b. Lift torque enhancement provided by Counterbalance System with integrated spring support module.
   c. Adjustment-free continuous T304 stainless steel ball chain with 110 lbs. breaking strength.
   d. Chain tensioner to be compliant with WCMA safety standard A100.1.
   e. Components will be maintenance free from adjustments or lubrication for trouble-free operation
2. Roller Tube: Circular-shaped aluminum tube extruded from alloy and temper 6063 T-6. 2”outside diameter extruded tube to have a .063” wall thickness (2.5” outside diameter to have a .079” wall thickness). Heavily reinforced with minimum six internal ribs providing additional tensile strength and allows for secure placement of clutch & end plug
3. Heavy Duty Tube Bearing Plug: Die cast metal and reinforced idler assembly containing spring loaded end plug with positive locking wheel allows for up to 7/8” adjustment and provides for a secure installation and removal of shade.
4. Bottom Bar: Extruded aluminum weight in a Sealed Pocket Hem Bar, or RB Bottom Bar for fabrics that are not seamable.
5. Mounting hardware: Manufacturer’s standard heavy duty bracket constructed of hardened 1/8” thick steel to support full weight of shade with bracket & screw hole covers to provide uniform look. Integrated leveling device for enhanced level adjustment of overall shade. Locking mechanism on bracket adapter provides for a secure installation and removal of the shade
6. Fascia: L shape removable aluminum extrusion valance that attaches to brackets and conceals roller shade. (Confirm.)
7. Fabric: E Screen 7505 (Confirm.)
   a. Content: 36% Fiberglass, 64% Vinyl.
   b. 5% openness factor.
   c. Meets or Exceeds Fed. FR Spec. NFPA 701 (small scale)
   d. Fire Classification: NFPA 701-10 TM#1 California U.S. Title 19, M1
   e. Color: Charcoal/charcoal
   f. Bottom Hem: Fabric wrapped and electronically sealed at ends. Sewn hems and open hem pockets are not acceptable.

2.5 FABRICATION

A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise. Fabricate shade cloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shade cloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design.

B. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting roller, and operating hardware and for hardware position and shade mounting method indicated.

C. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.

D. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

E. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances.

B. Do not begin installation until substrates have been properly prepared.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades

B. Clean surfaces thoroughly prior to installation.

C. Coordinate installation of recessed shade pockets with construction of suspended acoustical panel ceilings specified in Section 09 51 00

D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions

B. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.

C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

D. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

E. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 DEMONSTRATION

A. Demonstrate operation method and instruct Owner’s personnel in the proper operations and maintenance of the roller shades, motors and controls.

END OF SECTION