VERMONT INTEGRATED
ARCHITECTURE, PC

VERGENNES OPERA HOUSE

ALL-ACCESS PROJECT

PROJECT MANUAL

APRIL 30, 2023 – ISSUED FOR CONSTRUCTION

VERMONT INTEGRATED ARCHITECTURE, PC

Vergennes Opera House Project Manual

DATE: 4/30/2023

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007316 VOH INSURANCE REQUIREMENTS

1. SUMMARY

This section includes administrative and procedural requirements for insurance.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Closeout submittals		
Other Documents	**X**	Certificates of Insurance

3. SECTION INCLUDES: Owner's additional requirements for insurance.

A. Conditions of the Contract: This section relates to General Conditions of the Contract for Construction.

B. Insurance Limits: See Article 11 of AIA Document A201–2017 General Conditions of the Contract for Construction.

C. Additional Insured's:
   i. The Owner and the Owner's representatives shall be added as Additional Insureds.
   ii. Other Funders may also be added as an Additional Insured.

D. Notice to Owner: Each insurance policy and certificate of insurance provided by the Contractor shall contain a provision that the Owner shall be notified of cancellation, non-renewal, or material change in coverage at least thirty days prior to the effective date of such cancellation, non-renewal, or material change.

E. Insurance Certificates: Provide evidence of coverage by Acord Certificates of Insurance.

F. Insurance Company Requirements: All companies providing insurance coverage shall be licensed as an admitted company in the State of Vermont and all policies represented shall be written on an admitted basis.

   1. A.M. Best Rating: All companies providing insurance coverage shall maintain an A.M. Best alphabetical rating of no less than A- and a numerical rating of no less than VII.

END SECTION 007316 VOH INSURANCE REQUIREMENTS

009318 VOH REQUESTS FOR INFORMATION

1. SUMMARY

This section includes administrative and procedural requirements for requests for information.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3. SECTION INCLUDES

Requirements for Contractor's Requests for Information [RFI].

A. Definition: "Request for Information" and "Request for Interpretation" are the same.

B. Contractor May Request Information: In compliance with General Conditions of the Contract.

C. Requirements for Requests for Information: The Contractor shall:

1. Issue all RFIs. RFIs will not be accepted from trade bidders, subcontractors, or suppliers.
2. Issue the RFI only after confirming the information is not already available.
3. Use a separate RFI form for each topic, question, and request.
4. Sequentially number each RFI.
5. Maintain a log of all RFIs including topic, date issued, date response received.
6. Not use RFIs as a "Request for Substitution".

D. General Contractor's Requests for Information After Bidding or After Contract Award: During bidding and pricing, the Contractor is required to study and understand the

Contract Documents, to compare the Contract Documents with each other, and to report errors, inconsistencies, and ambiguities discovered.

1. By submitting a bid or executing the Contract for Construction, the General Contractor affirms that the Contractor understands the Contract Documents. Consequently, there should be few RFIs after bidding and after Contract award.

2. The General Contractor shall avoid unreasonable RFIs. “Unreasonable RFIs” are RFIs which can be answered by information already available to the Contractor. The Architect may request payment from the Owner for costs associated with responding to excessive, unreasonable RFIs. The Owner may deduct excessive, unreasonable RFI costs from payments due to the Contractor.

E. RFI Form: Submit RFIs electronically on a form or software system approved by the Architect. The RFI shall include:

1. Unique RFI number [only one RFI per form and number].

2. Date and time RFI is received by the Architect.

3. Name and contact information of person and organization originating the RFI.

4. Contract Document references: drawing and detail numbers, specification paragraphs.

Substitution Requests: The Architect will not respond to substitution requests made via RFI. See Section 012500 - Substitution Procedures.

F. RFI Response: The Architect will respond in writing within 10 business days.

G. Priority RFIs: The Contractor may request priority, expedited response from the Architect for a maximum of 10 percent of total RFIs.

1. The Architect will endeavor to respond to Priority RFIs within 5 working days.

H. Limitations of Architect’s Response: The Architect’s response is an interpretation and not a “Construction Change Directive” or any other modification to the Contract Documents.

1. Contract Changes: Comply with Conditions of the Contract.

END SECTION 009318 VOH REQUESTS FOR INFORMATION

011100 VOH SUMMARY

1. SUMMARY

This section summarizes the project information and the contract work.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3.1 PROJECT INFORMATION

A. Project Name: "Vergennes Opera House – All-Access Project"

B. Project Location: 120 Main Street, Vergennes, VT 05491

C. Owner: Friends of Vergennes Opera House (FVOH) and The City of Vergennes

D. Project Team to Date:

Owner: Gerianne Smart, FVOH Chair
Norma LeBoeuf, FVOH
Susan Schaefer, FVOH
Suzanne Rood, FVOH
Jeffrey Glassberg, FVOH

Architect: Vermont Integrated Architecture, PC
PO Box 862
Middlebury, VT 05753
Ashar Nelson, AIA, LEED AP – Principal Architect
802-989-7249

Civil Engineer: Brent Rakowski
Otter Creek Engineering
404 East Main Street
East Middlebury, VT 05740
802-382-8522

Structural Engineer:	Engineering Ventures, PC 208 Flynn Avenue, Suite 2A Burlington, VT 05401 Julie Reilly, P.E. 802-863-6225
MEP FP Engineer:	Design-Build
Historic Preservation Consultant:	Lyssa Papoazian Historic Preservation Consulting 13 Dusty Ridge Road Putney, VT 05346 802-536-5262
Hazardous Materials Assessment:	Currently N/A
Geotechnical Engineering:	N/A

3.2 WORK IN CONTRACT DOCUMENTS

A. Contract Summary:

1. ELEVATOR ADDITION - A 166 square foot addition and minor renovations to the existing building to create new vestibule entries on two levels, with a LULA elevator to connect the levels. This work includes creating a new bridge/canopy to connect to grade at the north of the building, and associated site work around the addition and in the plaza.
2. INTERIOR LIFT – reconfiguration of the Dressing Room level of the building to insert a new wheelchair lift to connect both the auditorium level and the stage level to the Dressing Room level. This work requires the reconfiguration of bathrooms on the dressing room level, and the construction of a new guardrail-protect ramp exit to the east.

The proposed project is an addition to the Museum's existing National Register of Historic Places (NRHP)-listed building with the goals of improving the existing Museum's accessibility and providing additional exhibit space. Specifically, the "Science Annex" is a two-story structure, with one partially below grade level that connects all three existing levels with an elevator and protected egress stair. The three levels include:

B. Contract Does Not Include:

1. Furnishings, fixtures, and equipment, unless required by the Contract Documents.

2. Hazardous materials abatement.

C. Owner Furnished and Contractor Installed Items: Comply with Specification Section 016402 "Owner Furnished Requirements."

D. Work Limits: The work limits shown indicate the general limits of work, but the Contract includes additional work outside the work limits and property lines including, without limitation, connection of utilities, repair and restoration of existing surfaces damaged by Contract activities, and other work indicated.

E. Permits, Inspections: Obtain and pay for all work permits and inspections required by authorities having jurisdiction. Building permits have been or will be obtained by the Owner prior to construction start.

1. Legal Notices: Provide all legal notices required by authorities having jurisdiction.

F. Utility Company Fees:

i. Owner to pay Electric Utility Connection fees.

ii. Owner to pay for Electrical Usage during project construction.

iii. Owner to pay for water usage during construction.

G. Restrictions on Work Hours and Days: Contractors to have full access to the site and existing building between 6:30 am and 5pm during non-holiday weekdays. As required, access may be permitted on holidays or weekends, or daily from 5am to 7pm with the express permission of the owner. At least 24 hours notice on such occasions is requested.

H. Restrictions on Advertising, Promotion, and Publication: This project and the Owner's name may not be used for any advertising, promotions, or in any publications without the Owner's written prior permission. If any advertising, promotion, or publication is permitted, the Architect shall be credited.

I. Restrictions on Labor:

1. Comply with all applicable labor regulations.

2. Employ competent and experienced workers.

3. Avoid jurisdictional disputes, strikes, work stoppages, and delays.

4. Pay all costs associated with labor related schedule delays.

J. Restrictions on Noise: Comply with requirements of authorities having jurisdiction specific to noise pollution regulation.

3.3 SUBCONTRACTING

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

A. Contracts between the General Contractor and Subcontractors: Contracts between the General Contractor and Subcontractors shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the General Contractor by the terms of the Contract Documents and to assume toward the General Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the General Contractor, by the Contract Documents, assumes toward the Owner and Architect.

B. General Contractor May Subcontract: The General Contractor may subcontract portions of the work and is solely responsible for subcontracting and the limits of each subcontract. The General Contractor is responsible for all work of the Contract including work which is subcontracted and work which is not subcontracted.

C. Restrictions on Subcontracting: The Contract Documents may restrict subcontracting of certain assemblies for "single point responsibility".

D. Subcontracting Errors and Claims Related to Subcontracting Disputes: Subcontracting is difficult and error prone. Since the General Contractor is solely responsible for subcontracting and the limits of each subcontract, the General Contractor is solely responsible for subcontracting errors. Work indicated anywhere in the Contract Documents is included in the work of the Contract and is included in the Contract Amount. The Owner will not pay for change orders or increased costs related to subcontracting disputes or errors including claims that no subcontractor "owns" the work indicated. The General Contractor "owns" the entire work of the Contract. The General Contractor is responsible for all work of the Contract including work which is subcontracted and work which is not subcontracted. Work not subcontracted shall be provided by the General Contractor at no additional cost to the Owner.

E. Drawing References: Specifications may include references to specific drawings to assist the reader. These references are not a complete list of all applicable drawings and do not limit the scope, extent, or locations of work specified.

F. Imperative Mood: Specifications typically use imperative mood sentences. In the imperative mood, the subject of the sentence is not typically expressed. Imperative mood sentences take the form of commands such as "Do this." The General Contractor is the subject of imperative sentences. Any questions that may arise as the result of this mood shall be directed to the architect prior to construction occurring.

G. Revisions to Documents Issued for Construction: For convenience, revisions will be indicated by double underlined text, strike thru text, and other graphic means (usually colored text). Due to clerical error, not all revisions may be graphically indicated. Compare revised documents to original documents and confirm all revisions indicated.

3.4 COMPLIANCE WITH AUTHORITIES HAVING JURISDICTION AND REQUIREMENTS OF THE USDA

All work and services provided by the General Contractor shall comply with all codes, regulations, standards, and requirements of authorities having jurisdiction. See Section 014000 "Quality Requirements", *Item-1.1 A*.

A. The General Contractor is not required to confirm the Contract Documents comply with codes and requirements of authorities having jurisdiction.

B. All questions or concerns about code requirements shall be directed to the Project Architect prior to construction of any element in question.

C. Funding for this project per the USDA RD program requires compliance with the ABA Standards per USDA Instruction Regulation 1942.18 (d) (3).

D. Funding for this project per the USDA RD program requires compliance with Open and Free Competition (non-proprietary) regulation 1942.18 (j) (2).

END SECTION 011100 VOH SUMMARY

012300 VOH ALTERNATES AND ALLOWANCES

1. SUMMARY

This section includes administrative and procedural requirements for alternates, and a list of both alternates and allowances for the project.

An Alternate is an amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

An Allowance is a suggested budget for the scope of work described, but not completely defined at the time of bidding.

Related Sections:
All drawings and specifications included in the construction documentation.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	**Req.**	**Specifics**
Shop Drawings	**X**	-
Product Cut Sheets	**X**	-
Product Samples	**X**	
Mock-ups	NA	
Closeout submittals	**X**	

3. PROCEDURES FOR ALTERNATES:

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   i. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
B. Retain "Notification" Paragraph below for most projects. Failure to require notification could create problems later.
C. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
D. Execute accepted alternates under the same conditions as other work of the Contract.

4. PROCEDURES FOR ALLOWANCES:

Allowances: For certain work items, "allowances" are established instead of complete Contract Documents. Allowances may specify a dollar value or a quantity to be included in the Contract Amount.

A. Allowance Procedures:
   1. Additional Contract Documents may be issued for allowance items.
   2. The Contract Amount will be adjusted to account for the Owner approved differences between the allowance dollar value and the actual dollar value or the allowance quantity and the actual quantity.

B. Contractor's Responsibilities:
   1. At the earliest possible time to avoid project delays, advise the Owner and Architect when allowance related decisions are due.
   2. Offer suggestions, proposals, and recommendations for each allowance item.
   3. Do not make allowance related purchases until after receiving direction from the Owner and Architect.
   4. Do not exceed allowance amounts or quantities without the Owner's preapproval.
   5. Provide Change Order information including differences between the allowance dollar value and the actual dollar value or the allowance quantity and the actual quantity.
   6. Credit the Owner for trade and other discounts related to the actual purchase.
   7. Certify the actual quantities needed plus the quantity of waste and excess material added.
   8. Submit certified delivery receipts showing total quantities received.

C. Extra Materials and Products: After installation and acceptance of work related to each allowance, return excess materials and products to suppliers, where possible, for credit to Owner.
   1. When return for credit is not possible or feasible, package and deliver extra materials and products to the Owner's storage facility for Owner's maintenance stock.
   2. Remove and dispose of extra materials and products which the Owner does not want packaged and delivered to the Owner's storage facility.

D. Allowance Amount Includes: Purchase costs minus trade discounts, temporary offsite storage, freight, delivery to the site, and taxes [for projects subject to taxes].

E. Allowance Amount Does Not Include and the Base Contract Amount Includes: Unloading, handling, hoisting, temporary on site storage, installation, connection, labor, equipment, staging, permits, overhead, profit, and all other expenses and costs.

F. Change Orders Related to Allowances:
   1. When Owner approved actual cost or quantity is greater than the allowance amount or quantity, the Contractor will be paid for the additional cost or quantity

plus Contract specified Contractor overhead and profit only. No other expenses or costs will be added.

2. When actual cost or quantity is less than the allowance amount or quantity, the Contractor will credit to the Owner the cost savings plus Contractor's overhead and profit.

5. LIST OF ALTERNATES

A. NOT USED (was gray marble panels at addition foundation)

B. Walk-Off Matt – Lower Vestibule
Base Bid: No integrated walk-off mat in Vestibule 130
i. ADD ALTERNATE – Provide 8' x 5' Pedigrid G-1 (frameless) entrance mat system in slab recess in tile floor. Use Pedisystems Carpet Tread Inserts – mono tuft HD.

C. Walk-Off Matt – Upper Vestibule
Base Bid: No integrated walk-off mat in Vestibule 330
i. ADD ALTERNATE – Provide 6' x 5' Pedigrid G-1 (frameless) entrance mat system in wood-framed recess in the linoleum floor. Use Pedisystems Carpet Tread Inserts – mono tuft HD.

D. Snow Guards
i. Base Bid: No snow guards.
ii. ADD ALTERNATE: Provide Alpine Snow Guards PD-10R pad-style retrofit snow guards to the existing slate roof. Assume a three-row pattern for approximately 20 LF of roof edge, as shown on Drawing A-2.3.

E. Bridge Railing
i. Base case: Reuse of six +/- 6' sections of existing metal railings from the current bridge on the angled section of the new bridge, with new railing sections at the front section of the new bridge, and to tie into the existing railings to the north.
ii. ADD Provide all new railing sections for the new bridge.

F. Bridge Edge Trim
i. Base case: Painted wood trim.
ii. ADD ALTERNATE: Wrap the primed trim with kynar-coated brake metal. Note that this is a two-piece trim.

G. Cement Board Siding
i. Base case: Field or shop ripped panels of James Hardie cement board panels, installed over a vented cavity and flashed with metal flashing
ii. ADD ALTERNATE: Factory-cut Cembrit, Equitone, or Nichiha cement board panels, installed over a vented cavity as an open-joint rain screen.

H. Heat Trace for Roof Drain
i. Base case: Internal roof drain riser in the chase/closet next to the hoistway, with a 'Y' cleanout at the lower level, and an outlet in the chase area.

ii. ADD ALTERNATE: Install heat trace from thru the cleanout cover and through the remaining roof drain piping, under slab terminating at the daylight opening in the drip strip. This would be approximately 24 LF of heat tape. Provide heat trace cable design to be inside drain pipes.

6. LIST OF ALLOWANCES

A. Provide an allowance for Winter Condition if the exterior scope of work takes place during winter months.
   i. Amount: $10,000.

B. Provide an allowance for Landscaping and Planting adjacent to the plaza. Note – this includes the soils and plantings in the Opera House drip zone, but not the stone check dams. If damage occurs to the limited lawn areas adjacent to the plaza and the east dressing room exit. Restoration of those areas is part of the site work and not landscaping.
   i. Amount: $15,000.

C. Provide an allowance for Ledge Removal.
   i. Amount: $20,000.

D. Provide an allowance for relocating or internalizing the various cables and exposed wiring on the west face of the building.
   i. Amount: $5,000.

E. Provide an allowance for Underpinning at the Entry 117, including delegated design.
   i. Amount: $8,000.

END SECTION 012300 VOH ALTERNATES AND ALLOWANCES

012500 VOH SUBSTITUTION PROCEDURES

1. SUMMARY
This section includes administrative and procedural requirements for product substitutions.

A. In an effort to ensure maximum open and free competition for this project, wherever possible materials and systems have been specified with "or approved equal (OAE)." If a contractor notices an instance in the documentation where this is not the case, the contractor is welcome to make a recommendation for a substitution to the architect.

B. After bidding, if the General Contractor would like to suggest the use of materials or manufacturers other than those specified in the Contract Documents, the General Contractor shall notify the Architect in writing of the requested substitution prior to the installation of any product under consideration – see process outlined herein. If the architect agrees that the product substitution should be considered, the Architect will issue a potential change order (PCO).

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS
The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3. REQUIREMENTS

A. Substitution Conditions: Substitutions are discouraged, except under the following conditions:

1. Contractor believes specified item is no longer available.

2. Contractor believes specified item is incorrect, inappropriate, or incompatible.

3. Substitution offers the Owner substantial advantage in quality, time, or cost.

4. Submittal is related to an "or equal" clause in the Contract specifications, which was not addressed during the bidding process.

B. Substitution Requirements Apply To:

1. Proprietary “named” specifications when the submitted item is not listed in the specifications.

2. All deviations from the Contract requirements.

C. Substitution Requirements Do Not Apply To:

1. Performance specifications, unless the submitted item deviates from Contract requirements.

2. Descriptive specifications, unless the submitted item deviates from Contract requirements.

D. Substitution Procedure and Contractor’s Requirements:

1. Substitution for Major Items in the project - submit a substitution request to the project design team, noting consequences to the project, as listed in “A” above.

2. Identify each Contract required item for which the Contractor proposes a substitution.

3. Refer to specification section, article, paragraph numbers, product names, and models.

4. Certify the proposed substitution meets or exceeds the Contract requirements.

5. Provide evidence that proposed substitution meets or exceeds the Contract requirements.

   a. Provide tabulated side by side comparison of specified item and proposed substitution.

   b. Directly compare each feature, characteristic, and performance.

   c. Provide manufacturer’s product data for both specified item and proposed substitution.

   d. Clearly show origin of all information included on side-by-side comparison.

   e. Provide details showing how the proposed substitution interfaces with adjacent work.

7. Certify that Contract required warranty, if any, will be provided for the proposed substitution.

8. Certify that proposed substitution is coordinated with all related and adjacent work.

9. Provide complete and total cost change information related to the proposed substitution.

    a. Indicate if Owner's cost will be higher, the same, or lower [credit to Owner].

    b. No other costs will be considered other than costs submitted with the substitution request.

10. Submit proposed substitutions at the earliest possible time.

11. Allow 10 business days for Architect's and Owner's review, except allow 15 days when the Architect's consultants' review is also required. Architect's consultants' review is required for all proposed substitutions related to the consultant's work.

E. Appearance Characteristics: For items visible in the completed work, appearance is an important substitution evaluation factor. The Owner and Architect will decide if a proposed substitution has acceptable appearance. Proposed substitutions may be rejected for appearance alone.

F. Invalid Substitutions: Submittals made without a formal "Substitution Request Cover Sheet" or without following substitution procedures are invalid and any approvals given are invalid.

G. Substitution Assumptions: General Contractor bidding and the Contract Amount should only be based on the Contract Documents.

1. Do not assume any proposed substitutions including "or equals" will be accepted prior to substitution requests.

2. All substitutions require the Owner's and Architect's written approval prior to implementation.

END SECTION 012500 VOH SUBSTITUTION PROCEDURES

SAMPLE CONTENT FOR SUBSTITUTION REQUEST COVER SHEET
This cover sheet format and content is required for all proposed substitutions including "or equals".

Contractor or Subcontractor:
Unique Tracking Number:
Date of This Request:
Summary Description of This Proposed Substitution:

Specification Section and Paragraph Numbers:
Contract Drawing and Detail References:
This Request Prepared By:

Conditions: Indicate all conditions that apply to this proposed substitution:
[ ] Substitution requested because specified item is no longer available.
[ ] Substitution requested because specified item is incorrect, inappropriate, or incompatible.
[ ] Substitution requested because it offers the Owner substantial advantage in:
[ ] Quality
[ ] Time
[ ] Cost
[ ] This is an “or equal”.

Evidence: Indicate evidence attached:
[ ] Tabulated side-by-side comparison of specified item and proposed substitution directly comparing each feature, characteristic, and performance.
[ ] Manufacturer’s product data for both specified item and proposed substitution.
[ ] Details showing how the proposed substitution interfaces with adjacent work.
[ ] Certification that warranty, if any required, will be provided as required.
[ ] Certification that this proposed substitution is coordinated with all related and adjacent work.
[ ] Complete cost change information.
[ ] Higher cost to Owner as stated in cost change information
[ ] No change in cost to Owner
[ ] Lower cost to Owner, credit to Owner as stated in cost change information

012600 VOH CONTRACT MODIFICATION PROCEDURES

1. SUMMARY

This section includes administrative and procedural requirements for handling and processing Contract modifications. This section applies to all prime contracts.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.
See Section 012300 Alternates and Allowances for requirements for alternates.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Information	**X**	Name of Contractor contact for receiving change directive documents.
Sample Forms	**x**	Sample Change Order Form
Product Samples		
Mock-ups		
Closeout submittals		

3.0 REQUIREMENTS:

3.1 Work believed by the Contractor to be a Change in Contract scope shall not be performed without identification and communication of this work to the Architect, Owner, and potentially to project Funders, if requested by their funding requirements. The Owner is not obligated to compensate the Contractor for work performed without notification to the Owner.

3.2 Minor Changes in The Work:

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions," or using other systems as agreed upon by the Architect and Contractor. The form is intended to assist the architect in performing obligations as interpreter of the contract document requirements in accordance with the owner-architect agreement and the general conditions. This form is not used to change the Contract Sum or Contract Time.

3.3 Proposal Requests/Potential Change Order:

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are for information only. "Proposal Requests" and "Potential Change Orders (PCOs)" are used interchangeably in this project manual. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

    c. Include costs of labor and supervision directly attributable to the change.

    d. Include an updated General Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. General Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, General Contractor may propose changes by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated General Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests, or a Contractor-specific proposal request form if approved by the design team.

3.4 Change Order Procedures:

A. On Owner's approval of a Proposal Request, the General Contractor will issue a Change Order for signatures of Owner, Architect, USDA, and General Contractor on AIA Document G701, or an approved Contractor-specific form.

B. Promptly revise Schedule of Values and Application for Payment forms to record each executed Change Order (CO) as a separate line item and adjust the Contract Sum.

C. Promptly revise Construction Schedule to reflect change in Contract Time, revise sub-schedules to adjust times for other items of Work affected by the change, and submit with next Application for Payment.

3.5 Construction Change Directive:

A. Construction Change Directive: Architect may issue a Construction Change Directive. Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

3.6 Documentation of Change In Contract Sum/Price And Contract Time:

A. Maintain detailed records of work completed on a time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in Work.

B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of quotation.

C. Provide additional data to support computation:

1. Quantities of products, labor, and equipment.

2. Taxes, insurance, and bonds.

3. Overhead and profit.

4. Justification for change in Contract Time.

5. Credit for deletions from Contract, similarly documented.

D. Support each claim for additional costs or contract modification proposal, with additional information:

1. Origin and date of claim.

2. Dates and times work will be performed, and by whom.

3. Time records and wage rates to be paid.

4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

END SECTION 012600 VOH CONTRACT MODIFICATION PROCEDURES

012900 VOH PAYMENT PROCEDURES

1. SUMMARY

This section includes administrative and procedural requirements for contractor payment. This section applies to all work included in the Construction Manager's contract.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		
Other Documents		Items listed in 1.1 F below.

1.1 SECTION INCLUDES: General requirements for payment procedures.

A. Schedule of Values: Is a detailed cost break down of the Contract Amount.

1. A "Schedule of Values" is required for the project.
2. Submit the "Schedule of Values" with the GMP Amendment.
3. Submit the "Schedule of Values" in a format acceptable to Owner and Architect. AIA documents G702 and G703 are recommended.
4. Organize "Schedule of Values" in a clear and legible manner.
5. Itemize general conditions and general requirements costs.
6. Provide a separate cost line item for each major element of work.
7. Provide a summary cost for each of the specification divisions.
8. Coordinate Schedule of Values with Contract Progress Schedules.
9. Provide additional "Schedule of Values" information requested by Owner and Architect.

B. Schedule of Values Revisions: After approval, the Schedule of Values shall not change, except:

1. Contractor Proposed Changes: The General Contractor may propose a change and submit evidence to support the proposed change. The change will not be valid unless approved by the Owner and Architect.

2. Owner or Architect Changes: The Schedule of Values shall be changed as directed by the Owner or Architect.

C. Draw-down Schedule: To assist the Owner in making payments/managing cash flow, submit a Draw-down Schedule at least 15 days prior to the first application for payment. Coordinate Draw-down Schedule with approved Schedule of Values and Contract Progress Schedule. The Draw-down Schedule shall predict the amount of monthly requisitions for payment. Update the Draw-down Schedule as needed during the project.

E. Payment Procedures: Comply with the Owner-Contractor Agreement and the General Conditions of the Contract for Construction.

1. Retainage: Owner will retain 5% of contract value, per the Owner-Contractor Agreement. Retainage applies to all payments.

2. Application for Payment Form: Submit completely filled out copies of AIA G702 and G703.

3. Application for Payment Information: Include at least the following up to date items:

   Change Order information including change orders requested, pending, and approved.
   Schedule of Values.
   Contract Progress Schedule.
   Long Lead Time item status report.
   Certification that all Record Documents are up to date.
   Certification of payment to subcontractors and suppliers previously paid by Owner.
   Lien waivers for all payments previously paid by Owner, on a form to be provided by the Owner.
   Project photographs if required by the Contract.
   Certification of Payment of Prevailing Wages, as required by Owner's funding sources.
   Other information requested by Owner and Architect.

4. Number of Application for Payment and Substantiation Copies Required: One.

5. Scheduling of Application for Payment:
   a. Applications shall be monthly, based on the calendar month.

   b. Finalized Application for Payment due to the Owner by the 20th of each month.

   c. Submit Draft for Review: Submit a draft "pencil" copy of each Application for Payment to the Owner's Representative, Architect, and USDA Representative (if applicable), at the weekly Project Meeting at least 1 week prior to the 20th of the month, allowing at least 5 business days for Owner's Representative, USDA, and Architect to review and provide comments.

   d. Address review comments prior to submitting for Finalized Application for Payment.

   e. Payment to be issued by the 15th of following month.

F. Information **Required Before First Application for Payment**: The following must occur/Receipt of the following information is a prerequisite to payment:

1. Schedule Project Accounting Meeting with Owner's Representatives and Architect to understand accounting requirements specific to funders for the project.
2. Finalize Schedule of Values.
3. Contract Progress Schedule.
4. List of subcontractors and suppliers under contract by date of this submission.
5. Long Lead Time item status report.
6. Submittal Schedule coordinated with the Contract Progress Schedule.
7. Names, telephone numbers including cell phone, pager numbers, and e-mail addresses for Contractor's managers.
8. Contractor's emergency contact information and procedures.
9. Copies of all permits and communications from authorities having jurisdiction.
10. Contractor's Certificate of Insurance.
11. Contractor's Safety Plan.
12. Unit Price schedule and information, if required by the Contract.

G. Information Required Before Final Application for Payment: See "Section 017700 Closeout Procedures".

H. Payment for Items or Work Stored Off-Site: No payment will be made for raw materials or stock items stored off site, without prior approval by Owner and/or Architect.

I. Payment for Submittals: Since submittals are important parts of the Contract, payment will be withheld for missing and incomplete submittals.

K. Payment for Changes in the Contract:

1. Change Orders and Change Directives shall be in writing. Approved Change Orders shall be added to the Schedule of Values as a distinct line item, and billed on a percent-complete basis as with other project scope.

    a. The Owner will not pay for verbally directed changes in the Contract.

2. A formal, written Change Order or Change Directive issued or approved by the Owner and Architect is a precondition for payment for changes in the Contract.

END SECTION 012900 VOH PAYMENT PROCEDURES

013000 VOH ADMINISTRATIVE REQUIREMENTS

1. SUMMARY

This section includes administrative and procedural requirements for administration of the project.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

A. Submittal material review and Demonstration of compliance:
   a. Submitted materials as noted in the specification sections shall be reviewed by contractor, vendor, subcontractor, etc.
   b. Submitted materials should include highlights and/or mark-ups calling attention to the areas that demonstrate compliance with contract documents demonstrating that the materials have been reviewed and confirmed as compliant (I.e. meeting or exceeding the requirements of the contract documents.
   c. Submitted materials should include highlights and/or mark-ups calling attention to items that require further selection, direction, or information (i.e. color/finish selections, patterns, options, etc.)

3.1 SECTION INCLUDES: General requirements for Contract and project administration.

A. General Contractor's Management Staff Requirements:

1. Personnel: The General Contractor shall supply qualified and experienced personnel to manage the project, both administratively and for the physical construction of the project.

2. Reassignment or Replacement: Do not reassign or replace management staff, unless preapproved by the Owner. Provide at least one week of advance notice to Owner of proposal to reassign or replace staff. If staff is reassigned or replaced, provide at least 60 working days overlap between existing and new staff to promote a good transition. The Owner and Architect reserve the right at any time during the Contract to request the replacement of Contractor's management staff with personnel acceptable to the Owner and Architect.

3. On Site: Contractor's management staff shall be on site whenever work is in progress on their Contract.

4. Work Restrictions: The Construction Manager's Management Staff shall manage, supervise, coordinate, plan, and direct the work.

5. Subcontractor's Management Staff: Each subcontractor's foreman or superintendent shall be on site whenever the subcontractor's employees are on site, where appropriate.

B. Project Management Softwares:

1. The General Contractor shall use a construction industry-specific project management software (like ProCore or approved alternative) to digitally manage submittals, Contract changes, RFIs, photos, and other project information. The Owner, Owner's Representatives, Architect, and other prime Contractors shall be assigned accounts to access this software and process information to support the project.

C. Regular Project Meetings: The General Construction Contractor shall convene regular project meetings to manage the project.

1. Schedule: Once per week on day and at time approved by Owner and Architect.

2. Agenda: Prepare a written agenda for each meeting including:

a. Review of previous meeting minutes.

b. Progress schedule including submittal status, long lead items, and critical path items.

c. Identify problems which impede planned progress.

d. Develop corrective action to maintain planned schedule.

e. Project coordination.

f. Review of conflicts and other problems, if any, and develop corrective action.

g. Review of requisitions for payment.

h. Review of in progress record documents.

i. Other current business.

3. Agenda Distribution: E-mail at least 24 hours prior to each meeting.

4. Attendees: Construction Manager, the Owner and/or Owner's Representative, and the Architect and other persons invited by them.

5. Architect's Consultants: Will attend only when directed by the Architect.

6. Authority: Each attendee shall have the authority to make binding agreements for their organization.

7. Meeting Chairperson: The Construction Manager.

8. Meeting Minutes Prepared By: The Construction Manager.

9. Meeting Minutes Content:

    a. Date and time of meeting.

    b. Meeting location.

    c. Persons attending and organizations they represent.

    d. Copy of the meeting agenda.

    e. Topics discussed at the meeting with a unique identifier for each topic.

    f. Summary of action items required, persons responsible, and date action due.

    g. Identification of items resolved.

    h. Identification of items outstanding and requiring resolution.

10. Meeting Minutes Distribution: E-mail and/or through the Project Management Software within 48 hours after meeting.

11. Meeting Minutes Amendments: Attendees may request revision to meeting minutes by written request e-mailed to the author of the meeting minutes within five days after the meeting.

D. Special Meetings: The Owner, Owner's Project Manager, or Architect may require Special Meetings which may be convened with little advance notice and at which attendance by the Contractors, subcontractors, suppliers, and other parties requested by the Owner or Architect is mandatory and a Contract Requirement.

E. Preconstruction Meetings: The Architect shall convene a preconstruction meeting prior to beginning work on site. The Construction Manager and their major subcontractors and suppliers shall attend. Agenda shall include at least the following:

1. Creation of project team directory listing contact person for each organization and "on call" schedule. At least one of the Contractor's personnel shall be "on call" 24/7 for the duration of the Contract.
2. Issuance of Contract Documents.
3. Review of project schedule.
4. Review of required monthly reports and updates.
5. Review of long lead time items.
6. Review of project constraints and work hours.
7. Delivery policies, storage locations, temporary office locations, and temporary facilities.
8. Safety, first aid, and security procedures.
9. Cleaning, housekeeping, and waste removal.
10. Change Order requirements.
11. Progress payment requirements including requisitions, lien waivers, stored materials documents and policy.
12. Submittal requirements, schedules, procedures, regular reports.
13. Record document requirements and procedures.
14. Contract quality control and inspection requirements including special inspection programs.
15. Public disturbance mitigation requirements and noise ordinance.
16. Parking and transportation requirements.
17. Contract implementation and auditing process.
18. Contract closeout, punch lists, warranty requirements.
19. Final payment requirements.
20. Other subjects determined by the Contractor, Owner, and Architect.

F. Pre-installation Meetings: Contractors shall convene pre-installation meetings prior to the first work on site by each subcontractor, each trade, and prior to work of each specification section. Require installers, subcontractors, relevant suppliers, and manufacturer's representatives to attend. Agenda shall include at least the following:

1. Scheduling, sequence of work, and critical path work.

2. Submittal and coordination requirements.

3. Manufacturer's and installer's requirements and recommendations.

4. Potential conflicts, incompatibility problems, and solutions.

5. Inspection and approval of substrates and supporting work by installers.

6. Environmental conditions and controls related to installation of work.

7. Protection of completed work.

8. Other topics determined by the Contractor.

G. Architect-Required Pre-Installation Conferences: This is a complex project. As a result, the following coordination meetings are required for this project:

1. Grant & Funding Administration (CM, Owner, Architect, Clerk, USDA, NPS)
2. Envelope Commissioning Pre-Installation Review Meeting (CM, Envl. Cx, Architect, Involved Subs, Clerk)
    a) & Mock-up Reviews @ weekly Site Visits as needed (CM, Cx, Architect, MEP, Involved Subs, Clerk)
3. Window Pre-Installation (CM, Envl. Cx, Architect, Involved Subs, Clerk) – May be coupled with Envelope Commissioning Pre-Installation Review Meeting
    a) Mock-up Review(s) and testing @ weekly Site Visits as needed (will follow Envelope Commissioning Pre-Installation Review Meeting)
4. Design-Build MEP&FP coordination review meeting (CM, Architect, MEP Engineer, Clerk) at outset of project.

H. Contract Progress Schedules and Reports: Digitally create and provide a Critical Path Method [CPM] progress schedules and reports.

1. Responsibility: The Construction Manager is responsible for the Contract Progress Schedule content and the construction sequence and the logistics of the Contract Progress Schedule. The Construction Manager shall be responsible for the creation of the initial Contract Progress Schedule, and the updating and management of it over the course of the project.

2. Review and Sign-Off: The Contract Progress Schedule shall be reviewed at the Project Pre-Construction Meeting. Any concerns shall be brought to the attention of the

Construction Manager, Owner/Owner's Representative, and Architect at that time. This schedule represents assumed coordination between the Construction Manager and its subcontractors.

3. Updated Contract Progress Schedule Submittals: Prepare and submit with each Application for Payment and before each Project Meeting.

4. Contract Progress Schedule and Schedule of Values: Make the Contract Progress Schedule work items with the Schedule of Value work items the same.

5. Distribution: Distribute Contract Progress Schedules and Reports including updates to Owner/Owner's Representative, Architect, subcontractors, suppliers, and all parties related to Contract schedules and deadlines.

J. Contract Progress Schedule Content: Include at least the following information.

1. All major and critical minor Contract activities.

2. Sequence and duration of each activity.

3. Project milestones.

4. Early start and early finish for each activity.

5. Late start and late finish for each activity.

6. Total float time for each activity.

7. Submittals related to each activity including dates of first submittal and last date for approval.

8. Fabrication and delivery time for each item requiring off site fabrication.

9. Start and completion dates for each mock up and sample including in place samples.

10. The critical path of work.

K. Contract Progress Schedule Reports: Submit reports including at least the following information:

1. The critical path of work and all work items on the critical path.

2. Bar chart plot.

3. Plot showing the content specified above.

4. Monthly activity plots for each month.

5. Two week “look ahead” plots.

6. “Executive Summary” indicating if on schedule or, if not on schedule, problem areas.

L. Contract Progress Schedule Updates: Update as specified above.

1. Update whenever the Contract Time is revised by Change Order.

2. Update whenever the critical path of work is affected.

3. Update planned start and completion dates to actual start and complete dates.

M. Recovery Plan: General Contractor shall prepare and submit a “Recovery Plan” whenever the work is 10 calendar days or more behind schedule. Show how the project will be managed back to “on schedule” condition.

N. Photographs: All Contractors shall document their work progress with digital photographs, to be provided digitally to the Owner and the Architect.

1. Photographer: Any competent person approved by the Owner and Architect.

2. Digital Photographs: Minimum 3 million pixel, clearly legible, “jpeg” file images.

3. Digital Submission: Upload photos weekly to project management software/online file storage. At project conclusion, provide CD of all photographs.

4. Prints: Not required.

5. Provide Weekly Construction Photographs:

a. Purpose: To document the progress of the work.

b. Quantity: At least 20 images per week.

c. Photo Identity: Give each photo a unique identity number.

d. Record: Date and time photo taken.

e. Log: Log each photo by number. Provide brief caption to describe view shown.

6. Preconstruction Photographs: Record existing conditions with emphasis on nearby existing improvements indicated to remain. Clearly record existing damage.

O. Daily Reports: Provide daily reports and submit to Owner/Owner’s Representative and Architect once per week. Include the following information:

1. Work in progress.
2. Subcontractors on site with numbers of workers on site for each subcontractor.
3. Deliveries received with copies of delivery receipts.
4. Weather information including temperature, humidity, rainfall, snow.
5. Interior environmental information including temperature and humidity.
6. Unusual events including accidents.
7. Visitors to site including authorities having jurisdiction.
8. Communications and directions received from authorities having jurisdiction.
9. Meetings with clear reference to meeting minutes.

P. Long Lead Time Items: Time is of the essence in the Contract. Expedite and provide special management for “long lead time” items.

1. Identify and create a list of long lead time items as early as possible.
2. Notify Owner and Architect of problematic long lead items which affect project completion.
3. Expedite submittals related to long lead time items.
4. Place orders for long lead time items at the earliest possible time.
5. Monitor production and delivery of long lead time items.
6. Identify unexpected delays in long lead time items and notify Owner and Architect.

R. On-Site Documents: Maintain the following documents on site and up-to-date:

1. Contract Documents.
2. Modifications and changes to Contract Documents.
3. Coordination drawings.
4. Meeting notes for all types of meetings: progress, safety, pre-installation, special, and others.
5. Progress schedules and related information.
6. Project photographs.

7. Daily reports.

8. Submittal log and all submittals.

END SECTION 013000 VOH ADMINISTRATIVE REQUIREMENTS

013300 VOH SPECIFICATIONS AND SUBMITTAL REQUIREMENTS

1. SUMMARY

This section includes administrative and procedural requirements for submittals.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. FORMAT OF SPECIFICATION

Vermont Integrated Architecture, P.C. (VIA) has prepared these architectural specifications in totality. These specifications are intended to be easy to navigate yet more focused than a traditional specification, defining specific methods and materials as appropriate. Each specification section is organized as follows:

1. SUMMARY
   Describes the products and processes applicable in this section.

2. SUBMITTAL PROCESS
   Matrix indicates what type of submittal is required and any specific information or material required as part of the submittal. Blank matrix appears below:

Submittal	**Req.**	**Specifics**
Shop Drawings	**X**	
Product Cut Sheets	**X**	
Product Samples	**X**	
Mock-ups	**X**	
Closeout submittals	**X**	

3. PRODUCTS
   A list of all products represented in this specification section is listed here. Where possible, we try to identify specific manufacturers. In addition, material-specific information is also noted (i.e., dimension, tested values, finishes, colors, etc.)

4. EXECUTION & QUALITY CONTROL
   Often this section includes a general description for installation and quality control. In addition, it includes specific required practices for each product listed in Section 3. These practices always consider the manufacturer's recommended installation practices and often include measures above and beyond such practices. This section may also indicate any testing or inspection required to ensure quality and condition of material and installation.

NOTE: VIA welcomes input regarding the format and content of these specifications from contractors, installers, and manufacturers. Such input may be directed to Andrea Murray at andrea@vermontintegratedarchitecture.com .

3. SUBMITTAL PROCESSES & PROCEDURES

Submittals are critical to the success of this project. Each specification section herein features the matrix shown above. Required submittals are clearly marked and specifics noted. By preparing and submitting a submittal, the contractor confirms that the material submitted is in compliance with the contract documents. If submitting a substitution, contractor must clearly identify the substitution on the coversheet and elsewhere as necessary in the submittal. You can expect the following for the review process:

TIMING: Submittals will be reviewed within 10 business days of receipt. If VIA is unable to achieve this turnaround, VIA will request an extension of this time from the contractor. If a review is required in less than 10 days, it should be clearly noted in the submittal transmittal, and VIA will make every effort to meet the deadline requested.

The Contractor is required to review, check, and coordinate submittals prior to submission to the Architect, and specifically confirm that the submittal complies with the Contract Documents. The Contractor shall also confirm that work in the submittal is coordinated with adjacent and related work, including the work of other Contractors.

Re-submittal: The contractor shall clearly and boldly identify all revisions from the previous submittal. Revisions that are not clearly and identified will not be reviewed.

Re-submittal Restriction: If a submittal is rejected twice, the contractor shall take special action to ensure approval of third submission. Further architect and engineer review and refinement will be at the expense of the contractor per the architect and engineer's hourly rates for additional services.

Rejected Submittals: The contractor must ensure that rejected submittals are not used at the site, for fabrication, or anywhere work is in progress.

Contractor's Responsibility for Managing Submittal Process and Delays: The contractor shall manage the submittal process to achieve the Contract Completion Date, to maintain the Project Schedule, and to avoid delays. The Contractor is responsible for delays related to deficient submittals.

Incomplete and confusing submittals will be rejected without review, will require re-submittal, and will delay submittal approval.

SUBMITTAL SCHEDULE & LOG:

The contractors shall:

1. Before the first submittal, create a Submittal Schedule for all submittals required.

2. Give each submittal item a unique submittal number and identity.

3. Indicate the date each submittal will be first submitted for review. Indicate the date each submittal requires approval to maintain project schedule.

4. Indicate actual dates of: first submittal to Architect, return to Contractor, and re-submittals, if any. Indicate Architect's response to each submittal.

5. Maintain Submittal Schedule and Record Log continuously up to date and accurate.

6. Allow the Architect to review the Submittal Schedule and Record Log at any time.

SUBMISSION: VIA requests that all submittals be accompanied by a transmittal that clearly identifies the specification section(s) to which it is responding. The transmittal shall also identify everything that is included in the submission, the name of the Contractor and sub-contractor, a unique submittal number corresponding to specification division, and the date of submittal.

VIA requests that all shop drawings, product cut sheets, and warranty information be submitted in electronic format (Adobe pdf file preferred). Individual file sizes should not exceed 10 MB. See Section 011300 Administrative Requirements for requirements of project management software to manage the submittal process.

Drawings shall be to scale and not exceed 24" x 36" when printed as such.

Actual product samples and sample mock-ups shall be accompanied by a transmittal, and all samples shall be clearly labeled for reference.

If the Contractor provides multiple concurrent submittals to the Architect, the Architect retains the right to request a prioritization of submittal review.

SUBSTITUTIONS:

See specification Section 012500 for Substitution Procedures.

4. REVIEW ACTIONS

After review, VIA will return submittals marked as follows:

1. **Reviewed (no comment)**: Work covered by submittal may proceed provided it complies with requirements of Contract Documents. Final acceptance will depend upon that compliance. The term "Reviewed" shall only indicate that there is no exception taken to the submittal.

2. **Reviewed (see comments)**: Work covered by submittal may proceed provided it complies with notations and corrections on submittal and requirements of Contract Documents. Final acceptance will depend upon that compliance.

3. **Reviewed (revise and resubmit)**: Do not proceed with work covered by submittal including purchasing, fabricating, and delivering. Revise or prepare new submittal in accordance with notations and resubmit.

5. DISTRIBUTION:

Provide and distribute copies of Architect reviewed submittals to subcontractors, suppliers, manufacturers, fabricators, and other parties needing copies.
Upon receipt of approved submittals from the Architect, each Contractor shall also provide digital copies of the approved submittals to all other prime contractors on the project, for coordination purposes.

6. REQUESTS FOR INFORMATION:

"Request for Information" and "Request for Interpretation" are the same. RFI is the acronym for these inquiries. All RFIs must be submitted in a timely manner and with clear communication.

Contractor's RFIs are intended for use after Bidding and Contract Award: During bidding and pricing, the Contractor is required to study and understand the Contract Documents, to compare the Contract Documents with each other, and to report or submit questions on errors, inconsistencies, and ambiguities discovered.

By submitting a bid or executing the Contract for Construction, the Contractor affirms that the Contractor understands the Contract Documents. Consequently, there should be few RFIs after bidding and after Contract award.

The Contractor shall avoid unreasonable RFIs. "Unreasonable RFIs" are RFIs which can be answered by information already available to the Contractor. The Architect may request payment from the Owner for costs associated with responding to excessive, unreasonable RFIs. The Owner may deduct excessive, unreasonable RFI costs from payments due to the Contractor.

The contractor shall:

1. Issue all RFIs. RFIs will not be accepted from trade bidders, subcontractors, or suppliers.
2. Issue the RFI only after confirming the information is not already available.
3. Use a separate RFI form for each topic, question, and request.
4. Sequentially number each RFI.
5. Maintain a log of all RFIs including topic, date issued, date response received.
6. Not use RFIs as a "Request for Substitution."

VIA recognizes that a timely flow of information is important to a successful construction process. VIA will attempt to respond to RFIs in a timely manner to keep the construction process moving. VIA shall:

1. Respond to RFIs in writing in no less than 10 days.
2. If a Contractor requests an expedited response, VIA will evaluate that request in relation to the associated work and make every attempt to meet the request.
3. Not all RFIs can be requested as "expedited response".
4. VIA response to an RFI shall not be interpreted as a "Construction Change Directive". If a Contractor believes that an RFI response requires a contract change, that request for contract change must be noted immediately.

7. QUALITY CONTROL

Quality Assurance:
Activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements is the responsibility of the individual contractors.

Quality Control:
Tests, inspections, procedures, and related actions during and after execution of the work to evaluate that actual products incorporated into the work and completed construction are the responsibility of the contractor. In addition, the contractor will regularly take photographs which demonstrate quality of workmanship.

Recommended Standards - Compliance:
Standards referenced in the Contract Documents are part of the Contract Documents and have the same force and effect as if bound into the Contract Documents.

1. Governing Date and Edition: Unless specified otherwise, the latest date, edition, and revision issued by the bid due date or, if no bids received, by the date of the Contract.

2. Copies: Obtain copies directly from the publisher. Keep one copy of each reference standard filed at the job site by specification section number[s] in which the reference is made.

3. Conflicts: Where reference standards conflict with other referenced standards or with the Contract Documents or with requirements of authorities having jurisdiction, contact Architect for clarification.

All products shall be stored, protected, and installed in compliance with manufacturer's recommendations. In addition, material warranties shall be consulted by contractors to ensure installation practices do not, in any way, void a manufacturer's or installer's warranty. Any

discrepancies shall be brought to the attention of the Architect during the submittal review process.

END SECTION 013300 VOH SPECIFICATIONS AND SUBMITTAL REQUIREMENTS

013524 VOH SAFETY REQUIREMENTS

1. SUMMARY
   This section includes administrative and procedural requirements for safety.

   Related Sections:
   This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS
   The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		
Other Documentation		Safety Plan Must be Submitted – See 013000 Administrative Requirements

3. GENERAL REQUIREMENTS FOR SAFETY

   A. Work Place Safety: The Contractors are solely responsible for work place safety.

   B. Public Safety: The Contractors are solely responsible for public safety affected by Contract activities. Note that portions of the Opera House will be open to the general public during construction and must remain accessible and safe at all times.

   C. Standards, Requirements: Comply with applicable codes, laws, rules, regulations, and requirements of authorities having jurisdiction including, without limitation, Building Codes and OSHA regulations.

   D. On-Site Personnel: The on-site staff shall be trained in safety procedures.

   E. Safety Officers: Designate a Primary Safety Officer and Deputy Safety Officer for the project.

   F. Safety Plan: Prepare a project specific safety plan.

   G. First Aid: Provide and maintain, well supplied, industrial quality, first aid kits.

   H. Emergency Response: Post emergency telephone numbers for medical, fire, and police in clearly visible locations. Provide readily available and accessible telephones and radios.

END SECTION 013524 VOH SAFETY REQUIREMENTS

013553 VOH SECURITY PROCEDURES

1. SUMMARY
   This section includes administrative and procedural requirements for project security.

   Related Sections:
   This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS
   The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3. GENERAL REQUIREMENTS FOR SECURITY

   A. Project Security: The General Contractor shall take responsibility for overall project security, coordinating with all subcontractors. Project security planning shall consider security of the project site during work hours and during non-work hours. Workday jobsite security shall include access control to all areas under the Contractor's control.

   B. Opera House Security: The General Contractor shall meet with the Owner and Owner's Representatives to understand security and access requirements for the existing Opera House building.
      i. Construction efforts to be closely coordinated with the City staff, FVOH representatives and Clerk of the Works (if applicable) regarding access to existing spaces and how spaces are to be secured and protected during construction.
         1. lock-up for nights and weekends to prevent entry,
         2. provide site fencing for safety

   C. Observance of Laws: The General Contractor shall do all work required to protect the property from damage and persons from harm. The General Contractor shall protect and guard the premises in compliance with all Federal, State, and Municipal laws having jurisdiction, and shall be insured against public and private liability.

END SECTION 013553 VOH SECURITY PROCEDURES

014000 VOH QUALITY REQUIREMENTS

1. SUMMARY

This section includes administrative and procedural requirements for managing project quality.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3.1 SECTION INCLUDES: General quality requirements

A. Codes and Regulations: Comply with all applicable laws, building codes, ordinances, regulations, and requirements of all authorities having jurisdiction.

1. Part of Contract Documents: Laws, building codes, ordinances, regulations, and requirements of all authorities having jurisdiction are an integral part of the Contract Documents.

2. Governing Date and Edition: Unless specified otherwise, the latest date, edition, and revision adopted by the bid due date or, if no bids received, by the date of the Contract.

3. Submit Copies: Submit to Owner and Architect copies of all permits, licenses, certifications, notices, judgments, and all other communications from authorities having jurisdiction.

B. Abbreviations: Abbreviations used typically have well known meanings. Ask the Architect for clarification when necessary.

1. Trade Association Abbreviations: Consult the “Encyclopedia of Associations”.

C. Reference Standards: Standards referenced in the Contract Documents are part of the Contract Documents and have the same force and effect as if bound into the Contract Documents.

1. Governing Date and Edition: Unless specified otherwise, the latest date, edition, and revision issued by the bid due date or, if no bids received, by the date of the Contract.

2. Copies: Digital reference of standards is acceptable.
3. Conflicts: Where reference standards conflict with other referenced standards or with the Contract Documents or with requirements of authorities having jurisdiction, the most restrictive requirement is required by the Contract Documents.
4. Requirements and Recommendations: Comply with all requirements and recommendations included in reference standards.

D. Coordination Meetings and Pre-Installation Conferences (See 013000 Administrative Requirements). These conferences and meetings are essential for establishing quality control expectations across disciplines. At these meetings/conferences, the following, at minimum, will occur:

1. Establish expectations for subcontractor responsibilities;
2. Review products, installation, mock-ups, etc.;
3. Confirm sequencing, conditions, etc. for installation;
4. Address all installation questions and concerns;

E. Definitions:

1. Provide: Means furnish and install.
2. Furnish: Means supply and deliver to the site, complete with all necessary components.
3. Install: Means unloading, storing, handling, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, placing in service, cleaning, protecting, and similar operations to make ready for intended use.
4. Final Connection: Means placing in service, connecting to utilities and services, and make operational and ready for intended use.
5. Indicated, Shown: Is a reference to other Contract Documents.
6. Approved: Means “approved by Architect” and is limited by the Conditions of the Contract.
7. Day: Means calendar day, unless “business day” or “working day” is specified.
8. Match: Means identical in visual characteristics, quality, construction, material, and other features and characteristics. For appearance, “match” means as judged by the Architect.
9. Contractor: Defined in the Owner-Contractor AIA Agreement.
10. Reference Products, Basis of Design: Is a product used to help the reader understand a specification. Since the specification may require options, custom features, and other special characteristics, the “Reference Products” and “Basis of Design” is not the specification and does not supersede the specification. “Reference Products” and “Basis of Design” are not proprietary specifications and are not intended to restrict competition, unless identified as “proprietary”.

11. Authorities Having Jurisdiction (AHJ): Means all governing agencies, organizations, bodies, and authorities which have authority or jurisdiction over aspects of the Contract.
12. Proprietary Products: Are specific items which shall be provided without substitution or equal. Procurement for this project is intended to be an open and fair process,

which allows for substitutions as approved equals. The General Contractor is welcome to submit substitutions for any product indicate din these documents. See 012500 Substitution Procedures.

13. Exposed: Means visible. Interiors of closets, mechanical/electrical rooms, and similar spaces are visible and are exposed.
14. Concealed: Means not visible. Interiors of chases, shafts, and crawl spaces are concealed. Areas above continuous ceilings are concealed. Conditions above lay in ceilings are not "concealed" or "unknown" for the purposes of claims.
15. Shall: Is an auxiliary verb which expresses obligation and necessity.

E. Tests and Inspections: Contractors shall schedule and coordinate all tests and inspections by authorities having jurisdiction and testing agencies employed or paid by the Owner or Contractor.

1. Test and Inspection Schedule and Record: Create, submit, and maintain a Test and Inspection Schedule and Record. Give each test and inspection a unique identifier related to specification section number. Schedule testing and inspection dates. Record and file test results and reports. Submit Test and Inspection Schedule and Record at least monthly and when requested by Owner or Architect.

2. Test and Inspection Limitations: Since all Contract requirements are not tested or inspected, successful test and inspection does not mean the work is acceptable. Work with satisfactory tests and inspections may be rejected if non-conforming with other Contract requirements.

3. Tests and Inspections by Owner: Individual specification sections may require tests and inspections by Owner. Cooperate with the Owner and testing agencies employed by the Owner. Permit free access to all work at all times including off site during manufacture and fabrication. Schedule and coordinate all tests and inspections by Owner. For onsite sampling, tests, and inspections, provide incidental labor, safe access, utility services, and on-site storage.

4. Advance Notice for Tests and Inspections by Owner: Maintain the approved Test and Inspection Schedule and Record. Make request to the Owner at least 5 working days in advance of all tests and inspections by Owner.

5. Tests and Inspections by Contractor: Provide all tests and inspections assigned to the Contractor in the Contract Documents. Employ independent testing agencies preapproved by the Owner, Architect, and authorities having jurisdiction.

6. Advance Notice for Tests and Inspections by Contractor: Maintain the approved Test and Inspection Schedule and Record. Notify the Owner and Architect at least 48 hours in advance of all tests and inspections by Contractor.

7. Cost of Failed Tests and Inspections: Pay all costs related to failed tests and inspections.

8. Manufacturer's Standard Test Data and Information: Submit complete test reports and not only test results or test summaries. Tests and inspections by other than independent testing agencies may be rejected as unacceptable or biased. All tests and inspections shall be less than two years old and certified by the manufacturer to be applicable to current production.

F. Discrepancies in Documentation: Any discrepancies in the design documentation shall be brought to the attention of the architect prior to purchase and/or installation of any product or material involved in the discrepancy. Proceeding with construction where a discrepancy or conflict occurs without contacting the architect shall be done at the risk/cost of the General Contractor.

END SECTION 014000 VOH QUALITY REQUIREMENTS

014339 VOH MOCK UPS

1. SUMMARY

This section includes administrative and procedural requirements for mock ups.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		Per related systems
Product Cut Sheets		-
Product Samples		
Mock-ups	x	
Closeout submittals		

3.1 SECTION INCLUDES: General requirements for mock ups.

A. Mock Up General Requirements:

1. Intent 1: To permit Owner and Architect's review and approval of assemblies prior to full implementation or production.

2. Intent 2: Approved mock ups serve as examples of acceptable work.

3. Intent 3: To allow subcontractors to establish coordination and quality control efforts for a specific project component.

4. Schedule: Construct mock ups at the earliest possible time and before ordering production quantities of materials.

5. Materials: Provide actual materials to be used in the Project including actual finishes and colors. Do not provide simulations, unless preapproved by Architect.

6. Locations: Window location as mutually agreed by Architect, Owner and Contractor.

7. Protect: Protect approved mock ups from damage and modification.

8. Disposal: Mock-ups may be left as part of the work, if approved by the Architect and Owner. If not approved to remain as part of the work, mock-ups shall be offered to the Owner, Architect, and Subcontractors. If none would like to keep the mock-up(s), they shall be demolished, removed, and disposed of.

B. Required Mock Ups:

1. Size: As necessary.

2. Scope: A complete assembly sufficient to judge for acceptability.

3. Locations – as noted in individual specification sections, including but not limited to:
    a. Window Install – see Window specification.

END SECTION 014339 VOH MOCK UPS

014400 VOH ENGINEERING BY CONTRACTOR

1. SUMMARY

This section includes administrative and procedural requirements for engineering provided by the contractor.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	As required for each instance
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3.0 INSTANCES: Engineering by Contractor (delegated design) is noted in individual specification sections and in on-drawing specifications. On this project, Delegated Design is required for the Concrete Underpinning and for engineering of Mechanical, Electrical, Plumbing and Fire Protection systems, provided by Design-Build subcontractors.

3.1 REQUIREMENTS: General requirements for engineering by Contractor required in individual specification sections.

A. Engineer's Qualifications: A Vermont State-Registered Professional Engineer employed by the Contractor. The engineer shall be registered in the discipline for which the engineering is required.

B. Professional Liability, Errors and Omissions Insurance for Design Professionals Employed by the Contractor: The Contractor's Professional Engineers shall provide the same insurance coverage and limits required by the Contract, except insurance shall cover design and engineering work.

C. Engineering Requirements: Meet design intent and performance, appearance, minimum, and other requirements indicated in the Contract Documents.

1. Minimum Requirements: Meet specified minimum requirements [example: specified minimum metal gage] even if the Contractor's engineer determines that a lower requirement [example: thinner metal gage] will satisfy indicated Contract requirements.

D. Engineer's Responsibilities: The Professional Engineer employed by the Contractor shall:

1. Be solely professionally responsible for the work.

2. Calculate, design, engineer, and document the work.

3. Prepare, professionally seal, sign, and submit calculations, shop fabrication drawings, erection and installation drawings, and other documents needed.

4. Meet requirements of authorities having jurisdiction including applicable Codes.

5. Meet requirements specified in the Contract Documents including visual requirements.

6. Meet industry standards, unless higher performance is specified in the Contract Documents.

E. Substitutions: All work engineered by the Contractor that deviates from Contract requirements shall comply with Section 012500 Substitution Procedures.

F. Limitations of Architect's Review: Architect's (or Architect's Consultant's) review of submittals related to work engineered by Contractor shall be limited to review of visible appearance and design intent only.

G. Design Loads: See Structural Basis of Design for minimum design loads. Design loads shall never be less than minimum design loads per applicable building codes.

END SECTION 014400 VOH ENGINEERING BY CONTRACTOR

014517 VOH FIELD TESTING OF EXTERIOR ASSEMBLIES

1. SUMMARY

This section includes administrative and procedural requirements for field testing.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements

See Section 019119 Exterior Envelope Commissioning.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3. REQUIREMENTS

3.1 Requirements for field testing and inspection of exterior assemblies.

A. Owner's Responsibilities: The Owner may employ a testing agency to field test exterior assemblies for air and water leakage.

1. Testing Agency Qualifications: Independent from Owner, Architect, and Contractor, and accredited by International Accreditation Service Inc. or American Association for Laboratory Accreditation

2. Testing Agency Selection: The Owner may comply with ASTM E699 Standard Practice for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating of Building Components.

B. Intent: Owner's field testing is intended to confirm performance of actual, field installed assemblies.

1. Manufacturer's product test information is not a substitute for field testing of installed work.

2. Owner's testing is intended for the Owner's benefit.

3. Owner is not obligated to perform tests for the Contractor's benefit.

C. Field Test Methods: Owner's option will include, at minimum:

1. Soils compaction testing.

2. Concrete testing.

3. Special Inspections as required by structural contract documents.

4. Envelope testing

D. Reports: The Testing Agency will provide written reports for all tests performed including:

1. Each test location, test date and time.

2. All test procedures including deviations, if any, from published test methods.

3. Test results.

4. Identification of failures, if any.

5. Opinions about cause of failures, if any

6. Suggestions for remedial work, if any failures.

F. Acceptance: The Contract requires installed work to meet Contract requirements.

1. No increase in specified air and water leakage limits is permitted.

2. Field test pressures may be lower than Contract specified performance test pressures, but not less than 6.24 pounds per square foot.

3. Any uncontrolled water leakage into the interior is a failure. From AAMA 503-03, 4.8.1: "Controlled water leakage is defined as any water that is contained in an area with provisions to drain back to the exterior, or the collection of up to 14 grams [0.5 ounce] of water collected in the 15 minute test period on top of an interior horizontal frame surface that does not spill onto adjacent finishes or materials.".

G. Product and Assembly Warranties: Because Owner's field testing is non destructive and will not impair performance of exterior assemblies, product and assembly warranties shall not be revoked or modified because of Owner's testing.

3.2 SCOPE OF TESTS AND TEST SEQUENCE:

A. Tests of Completed Air Barrier System for Air and Water Leakage: Test actual wall construction [not mock up] after air barrier system, flashings built into walls, and all glazed assemblies located in test areas are complete, but before any covering construction is installed.

1. Test Locations: Owner's option.

B. Tests of Completed Wall for Air and Water Leakage: Test actual wall construction [not mock up] after entire wall assembly including sealants and weeps in test areas are complete.

1. Test Locations: Owner's option.

3.3 PROCEDURE FOR EACH FAILED TEST:

A. The Owner, Architect, Testing Agency, and Contractor shall determine the cause[s] of failure[s].

B. Remedial work shall be provided.

C. Retesting shall be done at the original failed test location.

D. Procedure shall be repeated until test results are acceptable.

3.4 CONTRACTOR'S RESPONSIBILITIES FOR FIELD TESTING OF EXTERIOR ASSEMBLIES:

A. Cooperate with the Owner and the Owner's testing agency.

B. Fully complete construction of test locations at the earliest possible time.

1. Allow joint sealants to cure for at least 10 days prior to testing.

C. Notify Owner 10 working days prior to dates test areas will be ready for test.

D. Provide safe access to both interior and exterior sides of test areas.

1. As needed, provide scaffolding, staging, and man-lift.

E. Provide clear, unobstructed interior space at each test area.

F. Provide exposed, open interiors at test areas with no visual or access obstructions.

G. Provide water for testing. (3/4" hose connection within 300' of the test location)

H. Provide 120 Volts AC, 30 Amps and 220 Volts AC, 30 Amps electric power for fan motors.

L. Contractor's Responsibilities for Test Chamber Construction: None.

M. Contractor's Responsibilities for Modifications of Exterior Assemblies At Test Locations: To provide more accurate test results by reducing extraneous air and water, modify exterior assemblies at each test location as directed by Owner's testing agency.

1. Required modifications will not damage exterior assemblies.

2. Required modifications will not impair performance of exterior assemblies.

3. Required modifications may include, without limitation, foamed in place foam closure of mullion ends, additional joint sealants, and other modifications.

3.5 OWNER'S INSPECTION RESPONSIBILITIES FOR EXTERIOR WALL ASSEMBLIES: The Owner may employ a testing agency to inspect exterior wall assemblies.

A. Testing Agency Qualifications: Independent from Owner, Architect, and Contractor, and accredited by International Accreditation Service Inc. or American Association for Laboratory Accreditation

B. Testing Agency Selection: The Owner may comply with ASTM E699 Standard Practice for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating of Building Components.

C. Testing Agency Services Required:

1. Attend preconstruction and pre-installation meetings.

2. Provide intermittent inspection of exterior wall construction.

3. Provide continuous, full time inspection of all field tests.

4. Approve flashings, sealants, sill pans, and other exterior wall work prior to concealment. (A representative random sampling of locations to be reviewed and confirmed as acceptable performance.)

5. Identify deviations from the Contract requirements.

6. Identify problems, deficiencies, and failures.

7. Determine causes of problems, deficiencies, and failures.

8. Recommend remediation of problems, deficiencies, and failures.

9. Consult with and advise Architect about exterior wall details, performance, and construction.

10. Provide a "punch list" of incomplete and non conforming work.

11. Certify that work was completed in compliance with Contract Requirements, except for deviations identified by the Inspector.

END SECTION 014517 VOH FIELD TESTING OF EXTERIOR ASSEMBLIES

014610 VOH REMEDIAL WORK TO CORRECT ERRORS

1. SUMMARY
   This section includes administrative and procedural requirements for remedial work to correct errors.

   Related Sections:
   This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS
   The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3. GENERAL REQUIREMENTS FOR REMEDIAL WORK TO CORRECT ERRORS

   A. Applicability: Remedial work includes cutting and patching associated with:

      1. Defective, non-conforming, ill-timed and improperly fitting work.
      2. Removing samples of installed work for testing, inspection, and verification.
      3. Patching of sample removal locations.

   B. Submittals: For each patching material and product, submit manufacturer's data including instructions, recommendations, and restrictions.

   C. General Requirements for Remedial Work:

      1. Cutting: Minimize cutting to amount required for remedial work, and cut in such a manner as to reduce visual impact of cutting work.
      2. Patching Materials: Match materials to be cut and patched in quality, durability, and appearance.
      3. Craft: Employ highly skilled trade workers for all patching work.
      4. Subcontractors: Shall coordinate their work with the General Contractor to avoid remedial work.
      5. Make durable, permanent patches.
      6. Comply with specified tolerances for similar new work.
      7. Match the visual quality and character of adjacent un-patched work in good condition.
      8. Create true, even surfaces with uniform, continuous appearance.

9. Extend patched area onto adjoining un-patched areas to eliminate visible evidence of patching.
10. Repaint entire assemblies, not only the patched area, to nearest major change of plane.
11. Obtain Architect's visual approval of each patch.
12. Visible evidence of patching is cause for rejection and replacement.

END SECTION 014610 VOH REMEDIAL WORK TO CORRECT ERRORS

015000 VOH TEMPORARY FACILITIES AND CONTROLS

1. SUMMARY
   This section includes requirements for controlling dust, dirt, and noise as well as environmental protections during construction.

   Related Sections:
   This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS
   The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	NA	-
Product Cut Sheets	NA	-
Product Samples	NA	
Mock-ups	NA	
Closeout submittals	NA	
Other	**X**	Temporary Facility & Logistics Planning Plans/Material

3.1 SECTION INCLUDES: General requirements for temporary facilities and controls.

A. Scope of Temporary Facilities and Controls: This section does not limit or restrict the scope of temporary facilities and controls required.

1. The General Contractor is solely responsible for means, methods, and techniques used to complete the work of the Contract, including all temporary facilities and controls.
2. Remove and dispose of all temporary facilities and controls when they are no longer needed.
3. Relocate temporary facilities and controls as needed to accommodate phased work, if any.
4. Relocate any temporary facilities if they interfere with on-going museum operations unless otherwise approved by the Owner and the Owner's Representative.

B. Permits and Fees: The General Contractor will obtain and pay for all permits, fees, and charges related to temporary work. The Owner (with assistance from the Architect and Civil Engineer) is responsible for obtaining the general building permit from the State of Vermont Division of Fire Safety (DFS), and the local zoning permit. All other required permits are the responsibility of the General Contractor and appropriate subcontractors.

C. Authorities Having Jurisdiction (AHJ): Comply with all requirements of authorities having jurisdiction including, but not limited to, the following:

Vermont Division of Public Safety

The City of Vergennes
OSHA/VOSHA

D. Temporary Water: Temporary water is available on site. There is a sillcock currently located on the south-east corner of the building just outside the old boiler room. It may be easier to tap into water inside the building in the boiler room or mechanical spaces.

E. Temporary Electric Power and Lighting: Major revisions to the electrical service are part of this construction project. The Electrical subcontractor shall work with the Construction Manager and the Owner to manage power supply and metering for the Opera House, to provide and maintain safe, Code complying, electric service throughout the Contract, including the temporary lighting and electric power required for the construction. Provide all utility connections and make all arrangements for this service. Provide conductors, panel boards, circuit breakers, outlets, light fixtures, lamps, and all other items needed.

1. A meter is required to be provided by the Electrical Contractor. The General Contractor will coordinate the location of this meter with the Owner's Representative.

2. Contractor provides temporary electric power and lighting system.

3. Owner pays for power used.

4. Lighting: Provide as needed for work and to ensure safety and security.

5. Lighting for Finish Work: Sufficient light levels to install finishes.

F. Temporary Heat: Provide and maintain safe, Code complying, temporary heating as required for the installation of finishes at the later portion of the Contract. Use of any air-based HVAC systems for temporary heat or cooling is prohibited until after sanding of sheetrock and any other dust-creating construction activities are complete. Provide all utility connections and make all arrangements for this service. Provide all fuel, equipment, distribution, controls, and other items needed.

1. Fuel use is required to be metered by the Contractor, and reported to the Owner.
2. Contractor provides temporary heat system:
3. Contractor pays for heat and fuel: Electric heat is not permitted.
4. Minimum Ambient Temperature: 40 degrees F, unless higher required by manufacturers.
5. Minimum Substrate Temperature: 40 degrees F, unless higher required by manufacturers.
6. Finish Work: Higher ambient and substrate temperatures typically required by manufacturers.
7. Relative Humidity: Maximum 50 percent during temporary heating.
8. Temperature and Humidity Records: Record in daily reports.
9. Restrictions: Prevent damage from soot, smoke, water vapor, and fire. Do not use heating systems which interfere with curing of mortar and grout.

10. Heating After Substantial Completion: Responsibility of the Owner.

G. Permanent Heating System: After the permanent heating system is operational for any reason including, without limitation, temporary heating for non-dust creating finishes, testing, and balancing, the following conditions and restrictions apply:

1. Maintain the system in “like new” condition.
2. Install all permanent filters specified.
3. Provide additional temporary filters at all system openings to prevent contamination.
4. Change filters at least weekly and more frequently as needed to prevent contamination and deterioration. Comply with Section 018120 “Air Quality” including requirements for new filters at Substantial Completion. See Mechanical Specifications for flush-out requirements.
5. Completely inspect, service, and, as needed, restore the entire system immediately prior to Substantial Completion.
6. Temporary operation of the permanent heating system does not mean acceptance by Owner.
7. Warranties start as specified in Section 017836 “Warranties” and not upon first temporary use.
8. For heating systems specified to have chemical treatment, do not operate systems without chemical treatment fully installed and operational.

H. Temporary Toilets: Provide and maintain clean, well-supplied portable toilet facilities for all workers throughout the Contract.

1. Comply with requirements of authorities having jurisdiction.
2. Do not use permanent facilities within the building.
3. Location: Where preapproved by Owner.

I. Temporary Building Enclosures: See 011200 Multiple Contract Summary. Design and provide temporary enclosures to protect the building interior from weather and to control access to building interior.

1. Do not obstruct life safety egress or ADA Accessibility.
2. Provide weather and wind resistant temporary enclosures.
3. Provide temporary enclosures appropriate for their intended service and duration.
4. Maintain ventilation to allow the building interior to dry.

J. Contractor’s Field Offices: Contractor's option subject to the following conditions and constraints:

1. A field office is not required for the General Construction Contract. The Owner has agreed to provide space onsite for a field office throughout construction and has requested to not have a construction trailer provided as a field office for the contractor and subcontractor’s team use.

2. Office equipment and communications for field office space as required by the Contractor.
3. Project meeting space large enough to accommodate the General Construction Contractor staff, the Owner, the Owner's Project Manager, the Architect, staff of the other prime Contractors, and occasional guests will be provided by the Owner. Per COVID requirements, meetings may occur outside as weather permits.
4. Maintain Contractor's field office throughout the Contract until substantial completion.
5. Confine Contractor's field office to location and area preapproved by Owner.
6. Electrical Contractor is responsible for providing a code-compliant power connection to the field office.
7. Data Connection: The General Construction Contractor will be able to connect a router to the internet service at the Opera House.
8. Telephone: Use cell phone for project telephone needs.

K. Equipment and Tools: Provide and maintain all equipment and tools required to safely complete the Contract.

L. Material Handling, Hoists, Rigging, Protection: Provide all equipment and work required.

M. Safe Access: Provide safe access to all parts of the work for construction, review, inspection, and observation.

N Unused.

O. Scaffolding and Staging: Provide all scaffolding and staging needed to safely execute the Contract. Protect scaffolding and staging from unauthorized use.

1. Engineering Responsibility: Engineer to comply with OSHA requirements and requirements of authorities having jurisdiction.

P. Access, Traffic Control, and Parking: Limit site traffic to access and egress points approved by the Owner, Architect, and authorities having jurisdiction.

1. Flaggers: Control traffic and provide flag persons to ensure safety. See Civil specs.

2. Parking: Parking resources on the Project site are extremely limited. The Contractor shall work with the Owner and City Officials to develop a parking plan for the project, accommodating the parking needs of the various phases of the work. Some ofgfsite parking may be required.

3. Emergency Vehicles: Maintain clear access for emergency vehicles. Do not obstruct hydrants.

4. Police Details: Provide police details required by authorities having jurisdiction.

S. Trucking: Comply with authorities having jurisdiction.

1. Restrict truck traffic to approved truck routes.

2. Schedule truck traffic outside of normal commuter rush hours.

3. Comply with truck engine idling laws and ordinances.

4. Do not over load trucks.

5. Cover all open trucks entering and leaving the site. Do not spill load on public way.

6. Wash truck tires and wheels prior to leaving the site. Do not soil the public way.

T. Pedestrian Traffic: Comply with authorities having jurisdiction.

1. Maintain safe pedestrian traffic around the work site.

2. Provide barriers to protect pedestrian traffic from vehicular traffic.

U. Temporary Fencing: General Contractor to provide temporary fencing and locked gates to protect the work, protect materials, prevent injury, and to control access.

1. Scope and Extent: As shown or, if not shown, continuously enclose the entire work limits.

2. Fence: Structurally stable, plumb, and aligned galvanized steel chain link fence.

3. Height: As shown or, if not shown, minimum 6 feet above grade.

4. Appearance: A high quality, neat, permanent appearance is important and required.

5. Gates: Provide at all entrances and exits.

6. Locks: Use padlocks. Provide two sets of keys to Owner.

7. Vision Screen: Not required. If visuals are screened, please provide “windows” for viewing in as an educational opportunity related to museum programming.

V. Water Control, Pumping and Drainage: See Civil Drawings and Specifications. Effectively control water to prevent erosion, siltation, and damage to the work of the Contract, the Project site, and other properties. Control and dispose of standing water and running water regardless of its source.

W. Erosion Control: See Civil Drawings and Specifications. Control erosion and siltation of drainage systems. Provide and maintain effective temporary controls including, without limitation, filter fabric fences, staked hay bales, drainage mats, and other controls. See civil documentation.

X. Snow and Ice Control: General Contractor to control and remove all snow and ice which interferes with work or safety. Do not obstruct public ways. Snow may need to be removed from the site. Do not obstruct emergency access or egress. Use the minimum necessary snow melt chemicals, and NEVER use snow-melt salt around new or existing concrete.

Y. Security: General Contractor to be primarily responsible for security of and access to all areas under the Contractor's control.

Z. ADA Access to Existing Building: As part of the demolition necessary for the Elevator Addition, the current access and wheelchair lift will be removed. The Contractor shall provide an accessible pathway at the main building entrance for the duration of the construction.

3.2 FIRE PROTECTION:

A. Fire Prevention and Protection: Take precautions to prevent fire.

1. Standard: NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.

2. Inspections: Obtain inspections by fire department and Owner’s and Contractor’s insurance underwriters. Abide by their instructions and recommendations.

3. Information to Owner and Architect: Notify Owner and Owner’s Project Manager prior to all fire and safety inspections. Submit copies of all inspection communications and reports.

4. Permits: Obtain permits as required by authorities having jurisdiction.

5. Burning: Intentional burning of debris and waste on site is prohibited.

6. Equipment Restrictions: Use spark arrestors on combustion equipment.

7. Storage: Store flammable materials in UL listed safety cabinets or containers and in fire resistant locations preapproved by authorities having jurisdiction.
8. Welding and Torch Cutting: Protect combustible materials from ignition.

9. Compressed Gases: Securely restrain compressed gas tanks. Prevent falling. Protect from high temperatures, direct sunlight, and combustion.

10. Welding Equipment: Employ competent, experienced persons to install, connect, inspect, maintain, and operate welding equipment.

11. Smoking: Smoking is prohibited within 50 feet of flammable materials and hazardous areas.

B. Fire Watches: Provide fire watches for at least 30 minutes after hot work is stopped or interrupted.

1. Hot Work Definition: Includes soldering, welding, torching, and work which could ignite fires.

2. When: During coffee breaks, lunch, end of day, and whenever work is stopped or interrupted.

3. Reference Standard: Comply with NFPA 51B "Standard for Fire Prevention During Welding, Cutting, and Other Hot Work".

C. Fire Fighting: Maintain continuous access to hydrants, stand pipes, and other equipment.

1. Temporary Fire Extinguishers: General Construction Contractor to provide at least one for each 5,000 square feet.

2. Hot Work: Provide portable fire extinguishers immediately at hand during hot work.

3. Permanent Fire Protection Systems: Make systems operational at the earliest possible time.

3.3 HOUSE KEEPING, CLEANING, WASTE MANAGEMENT: Maintain all areas within the work limits and all areas under the Contractor's control clean and orderly at all times. Also see section 015240 Construction Waste Management. Each Contractor is responsible for dust control, cleaning during and after their work as well as managing the waste streams created by their work.

A. Daily Cleaning: Clean up waste and debris each day.

B. Dumpsters: Provide and pay for all dumpsters and waste removal.

1. Confine and contain waste and debris in steel dumpsters.

2. Locate dumpsters where preapproved by Owner.

3. Permits: Obtain all permits required by authorities having jurisdiction.

C. Trash Barrels and Containers: Use steel containers with tightly fitting lids.

F. Disposal: Legally dispose of waste off site. Dispose of waste regularly.

1. Burning On Site: Prohibited.

2. Burial On Site: Prohibited.

3. Liquid Disposal into Storm or Sanitary Sewers: Prohibited

4. Hazardous Material Disposal: Comply with requirements of authorities having jurisdiction.

G. Adjacent Areas: Keep adjacent areas free of construction debris and waste.

H. Dust Control - Exterior: Effectively control dust resulting from work of the Contract.

1. Wet travel areas, debris stockpiles, soil material stockpiles, and other work.

2. Do not create ice hazards in freezing weather.

3. Cover stockpiles with weighted, dust proof tarpaulins.

4. Locate soil material storage piles away from public ways and pedestrian areas.

I. Dust Control - Interior: Effectively control dust resulting from work of the Contract. Contain dust within the Work Limits.

1. Do not allow dust to damage any new work.

2. Effectively prevent dust from entering ventilation systems.

3. Effectively cover, seal, and protect ducts, diffusers, grilles, louvers, and vents.

4. Effectively cover, seal, and protect fire detection and alarm system components.

5. Effectively cover, seal, and protect light fixtures and lamps.

6. For dust producing activities, use tools with directly attached vacuum hoses.

7. Vacuum or wet clean instead of dry sweeping to minimize dust from brooming.

a. Do not wet clean surfaces which could be damaged by water.

8. Do not clean by using blown compressed air unless concurrent vacuums are used.

J. Street Cleaning: See “Trucking” above and requirement to wash tires and wheels.

1. Comply with requirements of authorities having jurisdiction.
2. Clean public ways to remove soil and debris resulting from Contract work.
3. Clean Owner’s private roads to remove soil and debris resulting from Contract work.

3.4 TEMPORARY SIGNS:

A. General Construction Contractor to provide jobsite signs per Grantor requirements.

B. Zoning Ordinances: Comply with requirements of authorities having jurisdiction prior to erection.

1.. Sign Restrictions: Only project identification sign and safety and warning signs are permitted.

2. Construction Entrance Signs: Provide signs to clearly identify and direct drivers to construction entrances. Provide signs prohibiting construction traffic from other entrances and drives.

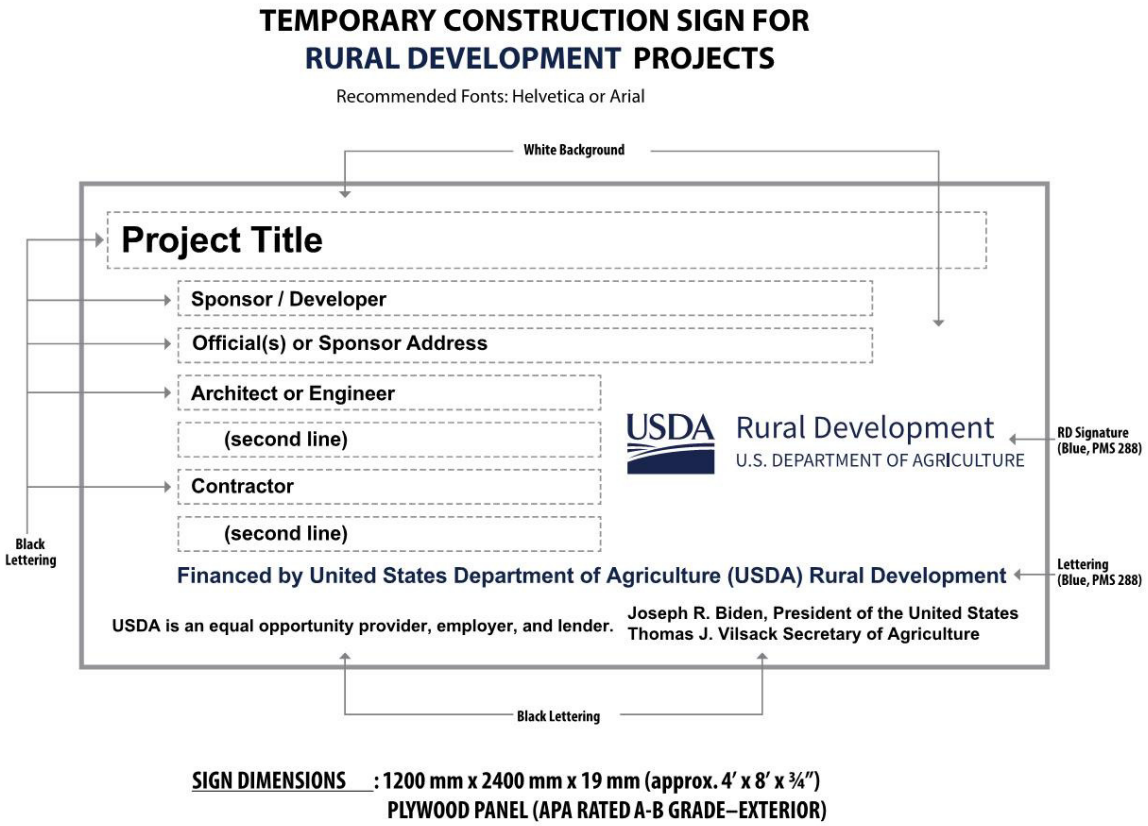
C. Project Identification Sign: NOTE - THIS SECTION IS GRANT FUNDING DEPENDENT. Provide professionally prepared project identification sign as defined below per NPS and USDA RD Job Sign Template (see below and Appendix):

a. A project sign is required due to funding and shall be provided as follows:
   i. Signage/notification must be submitted for approval by the funders in advance.
   ii. The sign must be of reasonable and adequate design and construction to withstand weather exposure;
   iii. Be of a size that can be easily read from the public right-of-way;
      1. shall include the name and logo of the following team members:
         a. Architect: Vermont Integrated Architecture, PC
         b. Structural Engineer: Engineering Ventures
         c. Civil Engineer: Otter Creek Engineering
         d. Construction Manager: Naylor & Breen Builders, Inc.
         e. Historic Preservationist: Lyssa Papazian
   iv. and be accessible to the public throughout the project term as stipulated in the Grant Agreement.
   v. At a minimum, all notifications must contain the following statement:
      "[Project Name] is being supported in part by a Save America's Treasures grant from the Historic Preservation Fund administered by the National Park Service, Department of the Interior."
      See Appendix RD Job Sign for USDA Requirements.

   vi. Additional information briefly identifying the historical significance of the property and recognizing other contributors is encouraged and permissible.
   vii. The NPS arrowhead logo may only be used in conjunction with the Historic Preservation Fund (HPF) approved signage format that can be provided upon request. Any other use of the logo is prohibited.

   viii. Sign Size: As shown or, if not shown, 4 feet by 8 feet.
   ix. Graphics: Full color 3M "Scotch Print" and vinyl die cut sign computer graphics.
   x. Location: Locate and orient sign as field directed by Architect.
   xi. Sign Erection: Support sign panel with 4 x 4 posts and 2 x 4 rails, braces and stakes.
   xii. Painting: Paint support posts, framing, braces, and stakes. Color directed by Architect.

xiii. Final Disposition: Remove sign panel and provide to Owner when directed by Owner.
xiv. Disposal: Remove and dispose of posts, framing, braces, and stakes.
xv. USDA RD Sign Template (below):



3.5 REMOVAL OF TEMPORARY WORK: Demolish, remove, and dispose of all temporary work.

A. Definition of "Temporary Work": All items including, without limitation, utilities, services, construction, assemblies, partitions, trailers, and other items which are not intended to be part of the permanent work of the Contract.

B. When: When each item of temporary work is no longer needed, Contractors shall propose date of removal and obtain Owner's and Architect's approval prior to removal.

1. Owner Directed Dates: The Owner retains the option and right to direct the Contractor to remove temporary work on specific dates and the Contractor shall comply.

D. Patching: When removal of temporary work results in need for patching or repair, provide all patching and repair needed.

3.6 OTHER CONTRACTORS EMPLOYED BY THE OWNER AND WORKING CONCURRENTLY: Other contractors employed by the Owner and working concurrently within the work limits may include, without limitation, specialty system contractors and furnishing contractors.

A. General Contractor's Responsibilities: Cooperate with other contractors employed by the Owner and working concurrently within the work limits. Allow them to work as if they were a minor sub-contractor. Provide the following temporary facilities and controls to support the work of other contractors employed by the Owner:

B. Other Contractor's Responsibilities: Other contractors employed by the Owner must cooperate with the General Contractor and respect their needs on the site and their schedules. Other contractors employed by the Owner shall not rely on tools, equipment, labor or supervision from the prime Contractors. Other contractors employed by the Owner shall follow jobsite protocols set by the General Construction Contractor, especially in regards to site safety.

END SECTION 015000 VOH TEMPORARY FACILITIES AND CONTROLS

015240 VOH CONSTRUCTION WASTE MANAGEMENT

1. SUMMARY

This section contains administrative and procedural requirements for the recycling and reuse of non-hazardous construction waste as well as the disposal of any non-hazardous construction waste.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		
Product Cut Sheets		
Product Samples		
Mock-ups		
Closeout submittals		
Other	**X**	1. Contractors' Waste Management Plan – for review at least 7 days prior to the commencement of construction.

3. PRODUCTS - STRATEGIES

A. CONTRACTORS' WASTE MANAGEMENT PLAN

i. General: Develop a plan consisting of waste identification and reduction. The plan shall be submitted to the Owner and Architect for review prior to mobilization on site.

ii. Waste Identification: Indicate and anticipate types and quantities of demolition, site-clearing, and construction waste to be generated by the project.

iii. Waste Reduction: Prepare a guide indicating types of waste, whether it will be recycled, reused, or disposed of in a landfill.

a. Recycled Materials

b. Reusable Materials: Include a list of materials to be set aside and reused in the new construction as well as those that are of good condition to be made available to members of the community/re-use shed at transfer station.

c. Disposed Materials: Indicate how and where remaining materials will be disposed of.

iv. Develop construction site plan that highlights locations established for salvage, recycling, and disposal.

4. EXECUTION & QUALITY CONTROL

A. WASTE MANAGEMENT CONFERENCE

i. General Construction Contractor shall conduct a conference at the start of construction and routinely to inform workers and subcontractors of requirements and desired outcomes for waste management practices.
ii. Plan Implementation: Implement waste management plan as approved by architect and owner. Provide handling, containers, storage, signage, transportation, and other support as needed to implement the plan for the entire duration of the project.
iii. Training: Train workers, subcontractors, and suppliers on proper waste management procedures as appropriate for their specific work on the project.
    a. Distribute Waste Management Plan to all Train workers, subcontractors, and suppliers.
    b. Distribute Waste Management Plan to entities when they first begin work on site. Review plan, procedures, and locations established for salvage, recycling, and disposal.
iv. Site Access & Temporary Controls: Conduct waste management practices to ensure minimum interference with roads, streets, walks, walkways, and adjacent occupied facilities.
    a. Designate and label specific areas on the site for separating materials to be salvaged, recycled, reused, donated, and sold.
    b. Comply with Division 1 Section Temporary Facilities and Controls for controlling dust and dirt, environmental protection, and noise control.

B. RECYCLING CONSTRUCTION WASTE, GENERAL
i. Procedures: Separate recyclable waste from other waste materials, trash and debris. Separate recyclable waste type to the maximum extent practical.
    a. Provide marked containers for controlling recyclable materials. Include a list of acceptable materials for each bin at each bin.
    b. Inspect each bin for contamination and correct as necessary.
    c. Stockpile materials on site without intermixing. Place, grade, shape, stockpiled material to drain surface water. Cover to minimize windblown dust.
    d. Stockpile material away from construction area. Do not store within the dripline of any tree.
    e. Store components off the ground and protect from the weather.
    f. Remove all recyclable waste off the property periodically and at project end and transport as appropriate to recycling receiver or processor.

C. RECYCLING CONSTRUCTION WASTE
i. Packaging
    a. Cardboard & Boxes: break down into flat sheets. Bundle and store in dry location.
    b. Polystyrene Packaging: Separate material.
    c. Pallets: As much as possible, require deliveries that use pallets to remove pallets from project site. For pallets that remain on site, offer to owner, workers before breaking down and adhering to policies for recycling wood.
    d. Crates: Break down crates and adhere to policies for recycling wood.
ii. Site Clearing Wastes: chip brush, branches and trees at landfill facility.
iii. Wood Materials:

a. Clean lumber cut-offs: Offer to owner, workers, before grinding or chipping into small pieces.
b. Clean sawdust: Bag sawdust that does not contain painted or treated wood.
c. Engineered Wood Products: Offer any segments 3'-0" or longer to owner, workers, before disposal.

iv. Gypsum Board: Stack large, clean pieces on wood pallets and store in dry location.

v. Metal: All metals shall be sorted for recycling and salvageable scrap. Any scrap metal shall be salvaged and proceeds returned to the owner.

vi. Insulation:
a. Excess cellulose insulation shall be vacuumed up by the insulation contractor/installer for reuse.
b. Any spray foam insulation scraps, which should be minimal as it is primarily being used for air sealing, shall be separated from other construction debris and disposed of appropriately.
c. Any rigid foam scraps exceeding 1'-0" in either dimension shall be set aside and offered to the owner or workers prior to disposal.
d. Any fiberglass insulation removed from the existing facility or scrap from mechanical insulation shall be bundled and disposed of properly – landfill waste.

D. DISPOSAL OF WASTE

i. General: Except for items to be salvaged, recycled, or otherwise reused, remove waste materials from project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
a. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on site.
b. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

ii. Burning: do not burn waste materials.

iii. Disposal: Transport Waste Materials off Owner's property and dispose of them legally.

END SECTION 015240 VOH CONSTRUCTION WASTE MANAGEMENT

016000 VOH PRODUCT REQUIREMENTS

1. SUMMARY
   This section includes administrative and procedural requirements for building products.

   Related Sections:
   This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS
   The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		
Other	**X**	Compatibility Matrix for All Product in contact with each other.

3. GENERAL REQUIREMENTS FOR PRODUCTS

   A. New Products Required: Unless specifically required to be salvaged or reused, provide only new, recently produced materials, products, and equipment of the latest versions or models.

   B. Single Source Required: There are no single-sourced materials specified as part of this project. The architect and Owner will entertain substitutions for products specified – see 012500 Substitution Procedures.

   C. Packaging and Labels: Deliver items in original, undamaged, factory packaging with complete manufacturer's labels.

   D. Permanent Labels, Trade Marks, & Trade Names: Locate in inconspicuous locations acceptable to Architect.

   E. Equipment Data Plates: Provide permanent data plate on each item. Include manufacturer, model, serial number, date of manufacture, capacity, ratings, power requirements, and other essential data.

   F. Strikes, Delays: Before contracting for materials, products, and equipment, investigate potential for strikes and other delays. Avoid purchasing items subject to known possible delays.

   G. Asbestos Restrictions: For all work of the Contract, do not use or incorporate into the work any material containing asbestos in any form.

1. Contractor is solely responsible for all costs of remediating materials containing asbestos brought to the Owner's property by the Contractor, subcontractor, or supplier.

H. Hazardous Materials Restrictions: Do not use or incorporate into the work any hazardous materials.

1. "Hazardous material" includes materials regulated under OSHA Hazard Communication Standard, 29 CFR 1910.1200.

2. The General Contractor is solely responsible for all costs of remediating hazardous materials brought to the Owner's property by the General Contractor, subcontractor, or supplier.

I. Material Safety Data Sheets: Obtain, study, and submit Material Safety Data Sheets for every material and product prior to first use on site.

1. Identify all hazardous materials and conditions.

2. Comply with all safety information and recommendations.

3. Maintain complete MSDS file on site organized by specification section.

J. "Right to Know" Laws: Comply with "Right To Know" laws and requirements of authorities having jurisdiction.

K. Odors: Use no or low odor materials.

1. When odor is unavoidable, submit sample and obtain Owner's approval prior to bulk purchase. Note: Most products specified herein are low or no VOC containing products. The General Contractor shall confirm that any odor-producing materials do meet the VOC thresholds specified.

L. Compatibility: For all materials in contact:

1. Provide evidence of compatibility. The architect requires use of a compatibility matrix for all products to demonstrate compatibility. and will share this format with the General Contractor upon request.

2. When evidence is not available, provide custom testing to prove compatibility.

3. When materials in contact are not compatible, provide additional, compatible transition interface materials and provide details of each transition.

3.1.1 DELIVERY, STORAGE, HANDLING: Transport, deliver, unload, handle, and store items in compliance with the manufacturer's instructions and recommendations. Protect items from all

damage, deterioration, loss, and theft. Minimize on site storage time. Maintain environmental conditions, temperature, ventilation, and humidity within range recommended by manufacturer.

A. Additional On-Site Storage Requirements: Store off the ground and under cover, or indoors in dry, well ventilated areas.

1. Confine storage to within the Work Limits. Note that opportunities for onsite storage are very limited. Coordinate with the Owner on off-site storage locations.
2. Store flat, stacked or leaning as appropriate for each product or material.
3. Provide separators between finished materials to prevent marring and damage.
4. Provide temporary storage trailers for items subject to weather damage and which cannot be stored inside buildings.

B. Additional Off-Site Storage Requirements for Items and Work Paid For or Partly Paid For By Owner:

1. Provide Bill of Sale giving Owner total and sole ownership of property.
2. Store in a bonded warehouse preapproved by Owner. Pay all warehousing costs.
3. Provide written warehouse contract allowing Owner to inspect property during business hours.
4. Provide written warehouse contract allowing Owner to take possession of property at any time during business hours.
5. Provide and maintain insurance against all losses for the full value of the property.
6. Pay all insurance costs.
7. If insurance is in the name of the General Contractor, the Owner shall be named on the Insurance Certificate as an “Additional Insured” party.

END SECTION 016000 VOH PRODUCT REQUIREMENTS

016115 VOH FASTENER REQUIREMENTS

1. SUMMARY

This section includes administrative and procedural requirements for fasteners.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3.0 GENERAL REQUIREMENTS FOR FASTENERS

A. Fasteners: “Fasteners” includes nails, screws, bolts, wedge bolts, expansion bolts, chemical bolts, epoxy anchors, pins, powder actuated devices, and all other types of mechanical connections.

B. Completely Specified Fasteners: Where fasteners are completely specified in the Contract Documents, provide the specified fasteners.

1. “Completely specified” means the fastener type, material, finish, size, diameter, length, and spacing are specified.

C. Fasteners Not Completely Specified: Fasteners may not be completely specified in the Contract Documents:

1. To allow the Contractor to control means, methods, and techniques of construction.

2. When “Engineering by Contractor” is required.

D. Fasteners Selected by Contractor: For fasteners not completely specified in the Contract Documents, the Contractor shall:

1. Select fasteners appropriate for each condition, substrate, load, and exposure.

2. Use fastener manufacturer’s published load tables to determine fastener size and spacing.

3. Provide a factor of safety of four or higher.

    a. Working load shall be maximum 25 percent of ultimate load capacity.

4. Provide corrosion resistance at least equivalent to items being fastened.

5. Obtain Architect's approval of each fastener prior to use.

6. Install fasteners in compliance with the fastener manufacturer's recommendations.

E. Fasteners for "Engineering by Contractor": Provide fasteners indicated on the approved, engineered shop drawings.

F. Submittals: For each fastener used, submit manufacturer's data including load capacity, factor of safety, instructions, recommendations, and restrictions.

3.1 GENERAL REQUIREMENTS FOR STRUCTURAL FASTENERS: See structural drawings for structural fasteners requirements and specifications. Some fasteners will require submittals. In selecting structural fasteners without submittals, ensure compliance with structural specifications, and comply with fastener manufacturer's instructions, recommendations, and limitations.

A. Working Load Capacity: Install each fastener to achieve the fastener manufacturer's published working load capacity.

1. Working load capacity is not ultimate load capacity.

2. Working load capacity, if not published, shall be maximum 25 percent of manufacturer's published ultimate load capacity.

B. Torque: Torque each fastener within the min/max range recommended by fastener manufacturer.

C. Fasteners Requiring Pre-drilling or "Pilot" Holes:

1. Use only the fastener manufacturer's recommended coordinated drill bit diameter.

2. Drill hole to depth recommended by fastener manufacturer.

3. Clean holes prior to installation of fasteners.

4. These are important requirements that significantly impact structural capacity.

D. Quantity: As shown or, if not shown:

1. Provide one fastener for each factory provided fastener hole in item being fastened.

2. Provide at least two fasteners for each individual item being fastened.

3. Provide quantity to provide fastener working load capacity at least four times the actual load.

3.2 INSPECTING AND TESTING FASTENERS:

A. Scope of Inspection and Testing: 100 percent of installed:

1. Structural fasteners.

2. Fasteners penetrating air barriers, water barriers, flashings.

B. "Deficient Fastener" Definition: A fastener with one or more of these characteristics:

1. Fastener is not the specified or approved fastener.
2. Fastener is not the correct size, diameter, type, material, alloy, thread, finish, or appearance.

3. Drive head or threads are stripped.

4. Fastener is broken or damaged.

5. Fastener misses the intended framing or substrate.

6. For light gage metal substrates, less than three threads penetrate completely through.

7. Fastener cannot be tightened.

8. Fastener cannot be torqued to the fastener manufacturer's recommended torque.

9. Fastener does not provide the intended or required load capacity.

10. Required washers are missing.

11. Visible appearance is damaged.

3.3 DEFICIENT FASTENER PROCEDURE:

A. Report deficient fasteners to Owner and Architect in writing with location photos and diagrams.

B. Mark head of each deficient fastener bright red. Do not mark adjacent surfaces.

C. Do not conceal deficient fasteners, until approved remediation is completed.

D. Do not remove deficient fasteners, unless removal is part of approved remediation procedure.

1. Removing deficient fasteners may cause unwanted holes, air infiltration, and water leaks.

E. Propose remediation procedure to Owner and Architect including, without limitation:

1. Removal, correction or replacement of deficient fasteners.

2. Restoration of damaged air barriers, flashings, sheathings, and related work.

F. Execute approved remediation procedure.

G. Re-inspect and retest every remediated fastener to prove the fastener is no longer deficient.

END SECTION 016115 VOH FASTENER REQUIREMENTS

016402 VOH OWNER FURNISHED REQUIREMENTS

1. SUMMARY

This section includes administrative and procedural requirements for owner furnished items.

Related Sections: This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		
Other	**x**	Owner & Architect to share any layout information required for the GC to assist in coordinate installation efforts.

3. GENERAL REQUIREMENTS

3.1 SECTION INCLUDES: General requirements for “Owner Furnished” items.

A. The majority of Owner-Furnished items on this project are loose items such as furniture and specialized equipment. The General Contractor is not responsible for receiving or installing these items. The Owner will arrange for the install of these items, including coordinating with the General Contractor’s work to prevent work conflicts.

B. The Owner will furnish the following. Installation as noted below:
   i. Furniture and equipment for the dressing room
   ii. Toilet accessories as noted in specs – some are to be reused.
   iii. Metal Fabrications – bridge railings to be reused.
   iv. Testing and special inspections by owner’s consultant, coordinated with contractor
   v. Mech Cx by owner’s consultant, coordinated with contractor
   vi. Utility connections– contracted directly by owner, coordinated by contractor

END SECTION 016402 VOH OWNER FURNISHED REQUIREMENTS

017302 VOH EXECUTION REQUIREMENTS

1. SUMMARY
   This section includes administrative and procedural requirements for execution of the construction work.

   Related Sections:
   This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS
   The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3. GENERAL EXECUTION REQUIREMENTS

   A. Manufacturer's Instructions and Recommendations: For each product and material including systems and assemblies, comply with the manufacturer's installation and execution requirements and recommendations, except where more restrictive requirements are specified.

   B. Examination By Contractors: Examine and inspect work daily to ensure compliance with Contract Documents.

   C. Examination Required By Installers: Examine previous work, related work, and conditions under which work is to be performed.

      1. Notification Required: Installer shall notify the General Contractor in writing of all deficiencies and conditions detrimental to the proper completion of the installer's work.

      2. Acceptance: Beginning installation means the installer accepts and approves substrates, previous work, related work, and conditions.

   D. Measurements and Tolerances: Confirm all measurements and dimensions.

      1. Do not deviate from measurements and dimensions indicated in the Contract Documents. If a question or conflict occurs, request information from the design team.

2. Field check measurements and tolerances as the work progresses and at major mile stones.

    a. Examples: Completion of foundations, structure, interior framing, ADA clearances.

3. Notify Architect of differences between field dimensions and Contract Document dimensions.

    a. Prepare and submit drawings showing deviations from Contract dimensions.

4. Cumulative Tolerances: Confirm tolerances at each step in the work.

    a. Do not allow tolerances to accumulate or “grow”.

E. Installation Tolerances:

1. Plumb, Level, Aligned, Straightness:

    a. 48 Inches or Less: Within 0.06 inch.

    b. Over 48 Inches to 10 Feet: Within 0.125 inch.

    c. Over 10 Feet to 20 Feet: Within 0.18 inch.

    d. Over 20 Feet: Within 0.25 inch.

2. Flush Across Joints: Within 0.03 inch.

3. Curved Work: Provide true radii. Do not provide straight line, faceted approximations of curves.

    a. Tolerance for Radii Up To 12 Inches: 0.06 inch.

    b. Tolerance for Radii Over 12 Inches To 48 Inches: 0.125 inch.

    c. Tolerance for Radii Over 48 Inches To 10 Feet: 0.18 inch.

    d. Tolerance for Radii Over 10 Feet: 0.25 inch.

F. Approval before Concealment: Obtain inspections and approvals before concealing any work.

1. Acoustical Ceilings: This requirement also applies to acoustical ceilings.

G. Layout of Work: Employ competent persons to establish all lines, elevations, and measurements.

1. Provide and maintain lines, bench marks, and other temporary working points.

2. Convert temporary working points to permanent working points at the earliest practical time.

3. Do not deviate from indicated lines and elevations without Architect's written prior approval.

H. Architect's Review of Interior Layout:

1. Layout interior partitions and doorways on floor with temporary markings.

2. Obtain Architect's approval of layout prior to continuing work.

3. Make minor adjustments directed by Architect at no change in Contract Amount. If the Contractor claims the adjustment directed by Architect is not minor, the Contractor shall notify the Architect and follow Contract construction change procedures.

5. Do not perform any work which would change the Contract Amount without first obtaining an approved Change Order.

I. Extent of Floor Finishes: Extend finishes:

1. Continue under all open bottom items, movable fixtures, movable equipment, furnishings, and casework, and into closets, recesses, alcoves, and toe spaces.

3. Over removable and fixed covers and plates. Keep removable items removable.

4. Close to walls, columns, and other permanent items.

J. Galvanic Isolation: Isolate dissimilar metals with non-absorptive dielectric material, isolation tape, isolation coatings, or other isolator preapproved by Architect.

K. Foundation Survey: Survey foundation form work prior to placement of concrete.

1. Use an experienced site layout worker or a Registered Professional Engineer or Land Surveyor to conduct survey.

3. Coordinate this survey check with a site visit by the project architect or engineer for timely confirmation of the survey before proceeding with foundation construction.

L. Site Concrete Joints: Review layout/scoring pattern of saw cuts and construction joints with Architect prior to installation.

END SECTION 017302 VOH EXECUTION REQUIREMENTS

017600 VOH PROTECTING INSTALLED CONSTRUCTION

1. SUMMARY
   This section includes general requirements for protecting installed and existing to remain construction in areas of work.

   This pertains especially to the building structural systems as they are meant to be exposed to finish.

   Related Sections:
   This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS
   The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3. REQUIREMENTS

   A. Protection - General: Protect and keep clean all installed work from all damage and deterioration.

      1. The General Contractor is responsible for means, methods, and techniques used.

      2. Protect doors, door frames, and hardware.

      3. Protect floors from traffic, rolling loads, static loads, drags, marks, damage, and deterioration.

      4. Protect walls from impact, dents, marks, damage, and deterioration.

      5. Protect glass from damage including staining and etching. Keep glass clean.

      6. Protect fibrous, paper faced materials, and water sensitive materials from water and moisture.
      7. Protect Mass-timber structural elements – columns, beams, and NLT floor/ceiling systems.
      8. Protect exterior wood columns and steel bases and capitals/connectors.

   B. Roofing, Waterproofing: Restrict and control work *over* installed roofing and waterproofing.

1. Provide temporary walkways and work platforms.

2. Work and traffic directly on roofing and waterproofing is prohibited.

3. Protect roofing and waterproofing from solvents and contamination.

C. Remediation: Remove all damaged and deteriorated materials including materials which show evidence of biological growth, mold, or mildew.

1. Replace with new work complying with Contract requirements.

END OF SECTION 017600 VOH PROTECTING INSTALLED CONSTRUCTION

017700 FM&P CLOSEOUT PROCEDURES

1. SUMMARY

This section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Closeout Submittals
2. Substantial Completion procedures.
3. List of Incomplete Items (Punch List)
4. O&M Data and Manual
5. Final cleaning.
6. Repair of the Work.
7. Final completion procedures.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals	**X**	Closeout Submittals

3. REQUIREMENTS

3.1 SUBSTANTIAL COMPLETION PROCEDURES

A. Punch List/Contractor's List of Incomplete Items: Prepare a list (punch list) of incomplete items and/or items that require correction in order to bring work into compliance with Contract Documents, indicating the value of each item on the list and reasons why the Work is incomplete. Submit list to Architect, Owner's Representatives, and Owner. Work with Architect, Owner's Project Manager, and Owner to verify accuracy and completeness of the list including any revisions, additions or deletions as necessary. Submit revised list that incorporates any required revisions to Architect, Owner's Project Manager, and Owner, indicating the value of each item on the list and the timeline for correction or completion. See Section 3.2 below for additional punch list information.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Consent of Surety/Sureties: if applicable for any reduction in or partial release of retainage or final payment.
3. Submit test/adjust/balance records.
4. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
5. Other documentation or certifications required by Owner's lender, releases of lien, bond waivers, etc.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
    1. Advise Owner of pending insurance changeover requirements.
    2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
    3. Complete startup and testing of systems and equipment.
    4. Perform preventive maintenance on equipment used prior to Substantial Completion.
    5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
    6. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
    7. Complete final cleaning requirements, including touchup painting.
    8. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
    9. Submit Warranties, Record Documents, Certificates of Occupancy, Project Photographs, and all required digital files.
    10. Remove temporary facilities, change lock cylinders and cores and submit any keys to Owner, and deliver specified maintenance stocks of materials.

D. Inspection: To be Substantially Complete, the work shall be at least 99 percent complete as indicated on approved payment requests. Submit a request for inspection to determine Substantial Completion a minimum of ten days prior to date the work will be completed and ready for final inspection and tests. Architect will prepare the Certificate of Substantial Completion after inspection or will notify General Contractor of items, either on the General Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
    1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. The architect or the architect's consulting engineers will perform no more than two re-inspections. Thereafter, the General Contractor will be responsible for reimbursing the Owner for these additional services.
    2. Results of completed inspection will form the basis of requirements for final completion.

E. Architect's action at Substantial Completion: After Contractors complete all prerequisites to Substantial Completion, the Architect and Owner's representatives will review the project and the Architect will either issue a 'Certificate of Substantial Completion' or notify the contractors of the reasons said certificate will not be issued.

3.2 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
    1. Organize list of spaces in sequential order.
    2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
    3. Include the following information at the top of each page:
        a. Project name.
        b. Date.
        c. Name of Contractor.
        d. Page number.
    4. Submit list of incomplete items in the following format:
        a. MS Excel electronic file. Architect and/or Owner's Project Manager may revise or supplement the Punch List. Architect will return an annotated file.

B. Completion of Punch List: Complete Punch List work items within 15 days.

3.3 SEE SECTION 017836 – WARRANTIES FOR PROJECT WARRANTY REQUIREMENTS

3.4 OPERATIONS AND MAINTENANCE DATA

A. Format:
    1. PDF electronic files with composite electronic index on digital media acceptable to Architect. Include a complete O+M table of contents.
    2. Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, one set of copies.

B. Emergency Manuals: Types of emergencies, emergency instructions, and emergency procedures.

C. Operation Manuals: System, subsystem, and equipment descriptions, operating procedures, wiring diagrams, control diagrams and sequence of operation, and piped system diagrams.

D. Product Maintenance Manuals: Source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds.

E. Systems and Equipment Maintenance Manuals: Source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds.

F. Final listing/matrix of all installed finishes organized/identified by room/space name and including material type/product, manufacture name, finish/color, etc. for the owner's reference and ease of use for future replacement and/or repair.

G. Copies of Inspections and Inspection Reports and notations from regulatory agencies (AHJs) including but not limited to:
    1. Fire Safety
    2. Electrical
    3. Plumbing
    4. Town

H. Final inspection and commissioning reports including responses from Contractor and/or subcontractor(s) noting how the raised concerns/issues were addressed and/or resolved.

I. Final Record submittals including review comments and/or notations.

3.5 FINAL CLEANING – Interior spaces to be left broom clean. Exterior spaces to be free of all construction materials, equipment and tools, and other related items. Clean and obtain approval immediately before Owner occupancy.

A. Remove surplus materials.

B. Locate and store maintenance stock where directed by Owner.

C. Remove debris. Broom clean all interior surfaces.

D. Remove dust, soil, markings, stains, contamination, and foreign substances from all surfaces.

E. Remove dust and debris from all horizontal elements including tops of frames and moldings.

F. Clean all surfaces in compliance with the surface manufacturer's recommendations.

G. Remove temporary labels and signs.

H. Remove "permanent" labels except when in inconspicuous locations approved by Architect.

I. Remove visible contractor and installer signs, labels, tags, names, and markings.

J. Clean painted and shiny surfaces.

K. Clean all interior and exterior glass surfaces with commercial glass cleaner.

L. Vacuum carpets, rugs, and mats.

M. Clean hard floors as specified.

O. Clean and polish plumbing fixtures and fittings.

P. Vacuum all HVAC system air inlets and outlets.

Q. Clean light fixtures and lamps.

R. Remove temporary construction and services.

S. Remove temporary protection.

3.6 REPAIR OF THE WORK

A. Complete repair and restoration operations, as identified by the Punch List, before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
    1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
    2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
        a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
    3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
    4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.7 FINAL COMPLETION PROCEDURES

A. Prerequisites to Final Completion (complete prior to requesting Final Completion):
    1. Obtain Architect and Owner approval for a completed punch list;
    2. Apply for Final Payment;
    3. Submit final lien waivers and Affidavits if Release of Lien;
    4. Submit final Consent of Surety to Final Payment;
    5. Submit evidence of ongoing insurance coverage;

B. Upon completion of the above procedures and delivery of the above referenced materials, certifications and documents: Submit a request for final inspection to the Architect for their

review and to determine Final completion of the project and as described in AIA contract B101-2017.

C. Architect's Action at Final Completion: After the General Contractor submits all prerequisites to Final Completion, the Architect will either issue a 'Certificate of Final Completion' or respond with a list of reasons a 'Certificate of Final Completion' will not be issued.

D. If the General Contractor's submission for Final Payment requires multiple attempts, time spent processing this information by the Architect and/or the Owner's Project Manager will be deducted from the Contractor's Final Payment.

END SECTION 017700 FM&P CLOSEOUT PROCEDURES

017800 VOH RECORD DOCUMENTS

1. SUMMARY

This section includes administrative and procedural requirements for record documentation.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals	**X**	Record Documents

3. REQUIREMENTS

3.0 RECORD DOCUMENT REQUIREMENTS:

A. Record Documents Required: The following Record Documents are required:

1. Record Drawings.

2. Binders:

a. Contract Specifications.

b. Maintenance and Owner's manuals.

c. Warranties.

d. Maintenance agreements.

e. Test reports and inspections.

3. Building mounted charts and data.

4. Record submittals.

B. Record Document Information and Content Required: Compile and incorporate information from:

1. Original Contract Documents.

2. Addenda.

3. Coordination drawings.

4. Change Order modifications.

5. Construction change directives.

6. Field directions and instructions from the Owner or Architect.

7. All changes and deviations from the original Contract Documents including, without limitation, actual installed locations, elevations, and inverts, including site work, measured from building structure with 0.1 foot accuracy.

C. Cost of Record Documents: Record Documents are required under "General Conditions" and "General Requirements". The cost of General Conditions and General Requirements are included in the Contract Amount.

1. Changes in the Work: Recording changes in the Work is an essential function of Record Documents. The cost of preparing Record Documents related to changes in the work shall be included in the "General Conditions" and "General Requirements" cost of each change in the work.

D. "In Progress Record Documents": "In Progress Record Documents" are working drafts of "Final Record Documents".

1. Identify, file, and store "In Progress Record Documents" separately from other documents.

2. Maintain "In Progress Record Documents" neat, clean, and well ordered at all times.

3. Maintain "In Progress Record Documents" accurately up to date at least weekly.

4. Keep "In Progress Record Documents" readily accessible at all times and at least weekly.

5. Maintaining "In Progress Record Documents" is required for approval of progress payments.

6. Approval of "In Progress Record Documents" is a prerequisite for Substantial Completion.

E. Additional Requirements for "In Progress Record Drawings":

1. Provide and maintain a separate “In Progress Record Drawing Set” for each major trade.

2. The separate “In Progress Record Drawing Sets” may be stored and marked up in the General Contractor’s on-site office or in each trade’s office.

3. At appropriate intervals, the General Contractor shall collect and compile all separate “In Progress Record Drawing Sets” in the General Contractor’s on-site office for review and checking by the General Contractor.

4. At least once per month, the General Contractor shall collect and compile all separate “In Progress Record Drawing Sets” in the General Contractor’s on-site office for review by the Owner’s Project Manager.

F. “Final Record Documents” - General: After approval of “In Progress Record Documents” at Substantial Completion, prepare and submit “Final Record Documents”.

1. Identification: Clearly label as “Final Record Document” and submission date.

2. Title Blocks: Keep original Contract Document title blocks and sheet numbers.

3. Professional Seals: Remove all professional seals and signatures from Record Documents.

4. Room Numbers: Convert Contract Document room numbers to Owner's final room numbers.

5. Information Incorporation: Revise, change, and modify original Contract Documents with Record Document information.

   a. Transfer and insert the Record Document information into the original Contract Documents.

   b. Do not simply append Record Document information to the original Contract Documents.

H. Additional Requirements for “Final Record Documents In Binders”:

1. “Record Documents In Binders”: Provide separate binders for each of the following:

   a. Contract Specifications.

   b. Maintenance and Owner’s manuals.

   c. Warranties.

d. Maintenance agreements.

e. Test reports and inspections.

2. Binders: Extra heavy duty, three ring.

3. Labels: Laser printed job name and record document titles on cover and spine

4. Copies: Submit two identical hard copies of each binder.

   a. Electronic Copy: Submit three complete copies of entire contents of each binder electronically as Acrobat PDF documents.

5. Contents: Insert a table of contents in the front of each binder.

6. Tab Dividers: Provide color coded tab dividers related to the table of contents.

   a. In general, organize by specification section number and division.

7. Plastic Sleeves: Insert all pages in heavy gage, clear, archive quality sleeves.

   a. Exclusion: This requirement does not apply to Record Specification pages.

8. Record Specifications: Provide a clean, new copy of the Contract Specifications.

   a. Incorporate all addenda and changes. Indicate addenda numbers, change order numbers.

   b. Identify manufacturers, products, model numbers, and colors actually used on the Project.

   c. Indicate all substitutions.

   d. Indicate all deviations.

9. Maintenance and Owner's Manuals: Compile and provide maintenance and Owner's Manuals which include at least the following content:

   a. Equipment lists with serial numbers.

   b. Valve tagging schedules and flow diagrams.

   c. Schematic diagrams of systems and written description of system and each component.

   d. Schematic diagrams of equipment wiring.

e. Reflected ceiling plans showing accurate location of each valve and control device.

f. Copies of electrical panel board directories.

g. Emergency instructions for each item.

h. Complete parts listings and sources of replacement parts.

i. Recommended inspection schedules and procedures.

j. General and routine maintenance instructions.

k. Listing of original equipment installers, suppliers, and distributors.

l. Lubrication schedule and list of types of lubricants to be used for each item
.

m. Detailed information on maintaining, cleaning, and refinishing architectural finishes.

n. Detailed information on routine maintenance and inspection of roofing systems.

o. Final balancing reports for mechanical systems.

p. Mechanical system water treatment procedures and tests performed.

10. Warranties – see Section 017836 for specific Warranty Requirements.

11. Maintenance Agreements: Submit complete, signed, and legally binding agreements.

    a. Indicate expiration dates.

    b. Indicate inclusions and exclusions.

    c. Indicate Owner's responsibilities.

12. Test Reports and Inspections: Compile all test reports and inspections.

    a. Include complete information received during the Contract.

    b. Organize by Contract Specification number.

I. Additional Requirements for "Final Record Documents Mounted in the Building":

1. Content:

a. Electrical panel board directories.

b. Valve charts with valve numbers, purpose, and location tied to key plan.

2. Room Numbers: Use Owner's final room numbers.

a. Do not use Contract Document room numbers if different than Owner's final room numbers.

3. Locations: Wall mounted in mechanical and electrical rooms as preapproved by Owner and Architect.

J. Additional Requirements for "Record Submittals": Submit Acrobat PDF copies of all submittals required under Section 013300 Submittal Procedures.

1. See Section 013300 "Submittal Procedures," *Submittal Quantities* and *Additional Submittals Concurrent Directly To Owner*.

3.1 ROOM NUMBERS: Use Owner's final room numbers for:

A. Electrical panel board directories.

B. Fire alarm directories.

C. All other directories, signs, and labels.

D. Record documents of all types.

3.2 OWNER TRAINING REQUIREMENTS: Begin training after systems are fully commissioned, operational, and working well.

A. Instructors: All instructors are subject to the Owner's approval. Replace instructors and reschedule training upon Owner's request at no additional cost to Owner.

1. Instructors shall be competent and knowledgeable with excellent communication skills.

2. Instructors shall be prepared with a preplanned training program.

B. Hours of Owner Training: As specified in technical specification sections or, if not specified, at least one-half day, generally broken down as follows:

1. General overview of Record Documents: 5 percent of training time.

2. HVAC controls, systems, and equipment: 60 percent of training time.

3. Plumbing systems and equipment: 5 percent of training time.

4. Fire protection systems and equipment: 5 percent of training time.

5. Electrical systems and equipment: 15 percent of training time.

6. Other systems and equipment: 10 percent of training time.

C. Training Session Topics: Address at least the following topics:

1. Safety.

2. Proper operation including start up, shut down, and operation in all possible modes.

3. Seasonal change over requirements.

4. Emergency procedures.

5. Preventive and routine maintenance.

6. Special tools needed.

7. Spare parts inventory recommendations.

E. Training Completion: Obtain written acknowledgement from Owner that training was completed.

3.3 SITE WORK RECORD DRAWING REQUIREMENTS:

A. Measurement Accuracy: Provide measurements with the following accuracy:

1. Vertical: Within 0.1 foot.

2. Horizontal: Within 1 foot measured from permanent structures.

B. Required Site Work Record Drawing Information:

1. Sanitary manhole – rims/inverts

2. Sanitary cleanout – invert

3. Sanitary pipe – building invert

4. Storm manhole/CB – rims/inverts/sump

5. Storm cleanout – invert

6. Storm pipe – change slope/bend
7. Storm pipe – building invert
8. Water main – top pipe (every 36’ max.)
9. Water bends/tees/reducers/fittings – top pipe
10. Water valves/hydrants – top pipe
11. Electric – Secondary – change slope/bend
12. Electric – Secondary – top concrete (every 36’ max.)
13. Electric – Secondary – trench cross-section (number and type conduit, encasement detail)
14. Tel/Data – location, depth, and number of conduit
15. Gas – top pipe (every 36’ max.)
16. Gas – tees/valves – top pipe
17. Foundation and Footing Drains: Exempt from Record Drawing requirements, except required for all deviations from Contract locations and inverts.
18. Existing Utilities and Services: Locate, identify, measure, and record all existing utilities and services discovered or uncovered during the work of the Contract.

END SECTION 017800 VOH RECORD DOCUMENTS

017836 VOH WARRANTIES

1. SUMMARY
   This section includes administrative and procedural requirements for project warranties.

   Related Sections:
   This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS
   The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals	**X**	Warranty Submission

3. REQUIREMENTS

3.1 REQUIREMENTS FOR ALL WARRANTIES AND GUARANTEES.

A. Warranty Starting Dates: The Date of Substantial Completion of the entire project.

1. Exception for Incomplete Work: Warranty starting date for work not completed by the Date of Substantial Completion shall be the date of final completion and acceptance of the incomplete work.

B. Owner's Rights: Warranties required under the Contract are in addition to and not in lieu of any remedy or warranty to which the Owner is entitled under law. Warranties required under the Contract are not a waiver of any of the Owner's rights.

C. Warranty Forms: All warranty forms are subject to the Owner's pre-approval.

1. Submit warranty form and obtain approval prior to procuring work covered by the warranty.
2. The Contract Documents may require special warranty terms and conditions which are not normal or standard for the manufacturer.

D. Procurement: Do not procure materials, products, equipment, or work requiring warranties until confirmation that required warranties will be provided. Remove and replace materials, products, equipment, and work for which the required warranties are not available.

E. Warranties are Irrevocable: Warranties issued to the Owner are irrevocable.

1. Non Payment: If warrantor refuses to issue warranty or attempts to revoke warranty due to non payment by anyone other than the Owner, the Contractor shall correct the deficiency and cause the warranty to be issued or reinstated.
2. Improper Installation: If warrantor refuses to issue warranty or attempts to revoke warranty due to improper installation or other deficiency, the Contractor shall correct the deficiency and cause the warranty to be issued or reinstated.

F. Warranties are Transferable: All warranties shall permit the Owner to transfer or assign warranties to future owners or other assigns at no additional cost to the Owner.

G. Pro Rated Warranties: Are not acceptable. Each warranty shall cover the full cost of warranty related repair throughout the full term of the warranty.

H. Warranty Repairs Are Also Covered By Warranty: Work repaired or replaced under warranty shall be warranted for the full duration of the original warranty.

I. Warranty Submission: Furnish originals of each executed warranty to Owner.

1. All warranties shall be complete, signed, conformed, and legally binding. Each warranty shall be accompanied by a description of the product or installation, including the name of the product and the name, address and telephone number of the installer, if not clear in the warranty.
2. Submit a three-ring bound compilation of all warranties including the comprehensive total Contract warranty and each required long-term warranty.
3. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Organize warranty documents in and orderly sequence based on the sequence of the Project Manual and provide bookmarked table of contents at beginning of document.
4. Provide one additional copy of warranties to be included in the operations and Maintenance manual.

J. Warrantor's Failure To Perform: The Owner may perform or may hire another entity to perform the warrantor's obligations. The Owner may recover its costs and damages from the warrantor in any court of competent jurisdiction.

3.2 COMPREHENSIVE, TOTAL CONTRACT WARRANTY: See A201-2017, 3.5 and 12.2.2. In addition to specific long-term warranties which may be required in individual specification sections, provide a Comprehensive Total Contract Warranty covering all work, materials, equipment, and labor of the entire Contract.

A. Warranty Duration: As stated in the Conditions of the Contract for Construction or, if not stated, then **one year from Date of Substantial Completion.**

B. Consequential Damages and Work: The Comprehensive Total Contract Warranty shall include all consequential damages including, without limitation:

1. All work to uncover, repair, restore, and recover work repaired under warranty

2. All adjacent and related work to provide access to the warranted work

3. Repair, replacement, and restitution of property damaged by failure of warranted work.

C. Warranty Claims During Comprehensive Total Contract Warranty: The Owner will notify the Contractor in writing of each warranty claim. The Contractor shall make repairs within 30 days after receipt of Owner's claim, unless preapproved by the Owner.

D. Contractor's Obligation During the Comprehensive Total Contract Warranty: At no additional cost to the Owner, the Contractor shall:

1. Notify in writing each affected warrantor and original subcontractor, installer, supplier, if any.

2. Manage the warranty claim for the Owner's benefit.

3. Assist the Owner in obtaining warranty satisfaction.

4. Arrange and manage all warranty related work including work related to consequential damages.

E. Expiration of Comprehensive Total Contract Warranty: Approximately 30 days prior to expiration of the Comprehensive Total Contract Warranty, the Owner will create a "Warranty Repair List". The Contractor shall make all repairs within 30 days after receipt of Owner's list, unless preapproved by the Owner.

F. Contractor's Failure to Perform During Comprehensive Total Contract Warranty: If the Contractor fails to remedy work covered by the Comprehensive Total Contract Warranty, the Owner may perform or may hire another entity to perform the warrantor's obligations and the Contractor shall reimburse the Owner for the Owner's total costs including without limitation, management costs.

END SECTION 017836 VOH WARRANTIES

018120 VOH AIR QUALITY

1. SUMMARY

This section identifies the requirements and procedures for maintaining acceptable air quality during construction and at the beginning of building occupancy phase. Control of indoor air quality, and overall jobsite air quality, during construction, shall be the responsibility of the General Contractor.

Related Sections:
001540 Construction Waste Management

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		
Product Cut Sheets		
Product Samples		
Mock-ups		
Closeout submittals	**X**	Building Flush-out Plan

3. PRODUCTS

N/A

4. EXECUTION & QUALITY CONTROL

A. CONSTRUCTION SEQUENCE

i. Adjust the construction schedule where possible to install porous materials such as insulation, fireproofing, and drywall only after the building envelope is weathertight.
ii. Adjust the schedule to account for curing time and off-gassing of construction materials/activities. It is important to understand which materials will off-gas or release moisture as they cure and how long that curing will take.
iii. Install carpeting and furnishings after other interior finishes have cured. VOCs emitted from carpeting or furnishings can adsorb onto unfinished drywall and other porous materials. As a precaution, schedule the painting of walls before carpeting, furnishings, adhesives or other material that may off-gas significant levels of VOCs are installed.
iv. Provide adequate ventilation during curing period. To aid in curing of interior finishes and other products used during construction and to remove pollutants, proper filtration and adequate ventilation with 100% outside air will be provided. During humid periods or when very high moisture materials are present, significant dehumidification may be required during this curing period. Dedicated ventilation will be used for curing materials that release VOC's.

B. CONTROL AIR POLLUTANT SOURCES

i. Building materials shall be kept dry to avoid the introduction of moisture into the building interior. This is especially important with porous or absorptive materials, such as insulation, drywall, and wood.

ii. Porous materials that have been damaged by moisture shall be discarded or dried thoroughly before installation. Some materials, such as drywall, can be irreparably damaged by water exposure. Others, such as carpet, must be dried out very quickly to prevent risk of mold contamination.
iii. Identify, discuss and correct any construction detailing that could lead to moisture intrusion. During construction, be alert for deficiencies that could result in water entry into the building including leakage at roof intersections, poor rain screen details, inadequate drainage at exterior cladding, foundation details, and inadequate defenses against capillary moisture entry through floor and walls.
iv. Use low-emitting products to reduce emissions. When choices can be made, products that are low-emitting and odor-free shall be chosen. This applies to products specified by the Architect as well as products purchased on the job site during construction. Review Material Safety Data Sheets to ensure compliance with this requirement and make suggestions for substitutions where possible.
v. Avoid tracking pollutants into work area by controlling access to the job site. Material deliveries and construction waste removal, for example, shall be routed around the exterior of the building rather than through the space. Provide rough track-off grates or matting at the entryways to remove moisture and contaminants from workers' shoes. Smoking by construction workers is not allowed inside the building.
vi. Protect against construction generated moisture. Drywall taping and painting are significant sources of moisture. Adequate ventilation to eliminate moisture buildup and damage will be provided by the subcontractor, particularly during winter or humid weather.
vii. Minimize the transfer of pollutants from work areas into portions of a building nearing completion by maintaining negative pressure in the work area and positive pressure in the occupied space. This pressure differential should be approximately 0.03 inches water gauge (7 Pascal). This will keep the occupied space pressurized, minimizing the entry of contaminants and dust from the construction area.
viii. Use an air barrier or pressure differential to isolate areas at different stages of completion. If there is a significant source of dust or VOC emissions in one part of a building while another area is nearing completion, the more finished area shall be protected from contamination using air barriers or pressure differentials, as described above.

C. HOUSEKEEPING

i. Minimize accumulation of dust and other contaminants. Construction practices that minimize the production of dust and other contaminants from construction activities shall be used by subcontractors - e.g., use integral dust-collection systems for equipment including but not limited to drywall sanders, cut-off saws, and routers.
ii. Indoor cutting or other dust-generating activities should be centralized to areas where clean-up can be carried out easily and contaminants will not be tracked into other areas. Spray painting of water-based latex paints generates dust – temporary ventilation will be used during this time, with fans blowing directly out through window openings.
iii. Suppress dust by using environmentally safe wetting agents or sweeping compounds to keep dust from becoming airborne.
iv. Clean up dust. Wet rags, damp mops, and vacuum cleaners with high-efficiency particulate (HEPA) filters will be used to clean up dust generated by construction

activities. These practices are much more effective than sweeping and conventional vacuuming. Increase cleaning frequency when dust accumulation is noted.

v. Clean up spills. Spills and excess applications of solvent-containing products shall be cleaned up immediately. Water spills shall be mopped up as soon as practicable.

vi. Keep work area dry. The entire work area will be kept as dry as possible by fixing leaks that allow rainwater entry, mopping up water accumulation, and minimizing use of unvented combustion (e.g., propane or diesel "salamander" space heaters). Dehumidification shall be used when relative humidity exceeds manufacturer's recommendation for interior materials and finishes.

vii. Seal containers of volatile liquids. Containers of fuel, paint, finishes, and solvents shall be kept tightly sealed and stored outside the building when not is use. (Water-based materials storage inside is acceptable in tightly sealed containers.)

viii. Keep construction materials out of spaces nearing completion. Do not allow construction materials, demolition debris, supplies, or tools to be stored in, or transported through, completed or nearly completed portions of the building. Where moisture conditions exist, relative humidity should be monitored to limit the possibility of moisture damage.

D. HVAC SYSTEMS PROTECTION

i. Store HVAC equipment in a clean, dry location or covered with plastic to ensure that equipment is protected from moisture, dust or other contaminants.

ii. To prevent construction dust from contaminating ductwork, HVAC system should not be used during construction.

iii. Seal all HVAC inlets and outlets during construction. These include outside air inlets, grills, diffusers, supply ducts, return ducts, ceiling plenums, and VAV plenum intakes. Seal openings with plastic and tape that can be removed cleanly.

iv. Seal HVAC components during installation. For ducting runs that require several days to install, sections will be sealed off as they are completed, and seals removed prior to continuing the ducting run. The same requirement applies to other components of the HVAC system - do not wait until the system is completed to protect it from contamination.

v. Use a temporary ventilation system during construction when required that introduces outside air and ventilates contaminated air directly such as an indirect fired makeup air unit. Window-mounted fan units can serve this purpose in small projects. This will apply when material that releases volatile organic compounds (VOCs), odors, or dust is installed, used, or applied.

E. FLUSH OUT PERIOD

i. See Mechanical specifications for building flush out requirements. Recommended: two weeks - prior to occupancy.

ii. Flush out period prior to occupancy to be coordinated with owner, general contractor and mechanical contractor. Recommended flush out period = 2 weeks.

END SECTION 018120 VOH AIR QUALITY

018140 VOH SUBSURFACE CONDITIONS

1. SUMMARY

This section provides supplemental information about subsurface conditions and safe digging protocols.

Related Sections:
This section applies to all drawings and specifications included in the construction documentation, including General Requirements.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings		-
Product Cut Sheets		-
Product Samples		
Mock-ups		
Closeout submittals		

3. PROCEDURES

A. The Owner did not retain a Geotechnical Engineer to explore the subsurface conditions using soil borings. Exposed ledge and historical knowledge indicate ledge present at location of elevator addition. Removal of ledge is planned for the project.

1. See the structural drawings and specifications for project requirements related to foundations bearing on soil, structural fill, or ledge.

B. Dig Safely

1. Notify appropriate utility companies and municipal departments prior to excavation.

2. Any Contractor or subcontractor shall contact Dig Safe Vermont a minimum of 48 hours (excluding weekends and holidays) before any excavation or earth penetration activities have been scheduled. Failure to do this will make the Contractor liable for any and all costs associated with a utility disruption.

3. The Contractor shall follow all Dig Safe rules and is encouraged to photograph markings before digging to document the marked conditions.

END SECTION 018140 VOH SUBSURFACE CONDITIONS

019119 VOH EXTERIOR ENVELOPE COMMISSIONING

1. SUMMARY

This Section includes exterior enclosure commissioning procedures, including substructure, superstructure, exterior enclosure and roofing construction that protects climate-controlled spaces from unconditioned spaces and the exterior environment as follows:

1. Below-grade construction including foundations and slab-on- grade that functions as part of the exterior enclosure system.
2. Framed floor and roof construction that functions as part of the exterior enclosure system.
3. Exterior enclosure construction, above grade, including exterior opaque walls, windows and doors, including sheathing and framing, and interior finish materials attached to the exterior wall.
4. Roofing, including roofing system and roofing insulation.

Related Sections:
Divisions 00 and 01 Sections
061000 Rough Carpentry - Architectural
061010 Structural Rough Carpentry (on-drawings)
071113 Foundation Moisture Protection & Damproofing
072100 Thermal Insulation
072500 Envelope Control Layers
075423 TPO Roofing
077000 Roofing Accessories
078400 Fire-Resistive Joint Systems and Penetration Firestopping
079200 Joint Sealants
081400 Exterior Wood and Wood Clad Doors and Frames
085200 Windows
087100 Door Hardware
Division 21 through 28 Sections for required penetrations and specific to Work of each section and that require coordination with Envelope control layers and insulation for performance continuity.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	NA	-
Product Cut Sheets	NA	-
Compatibility Matrix	**X**	- Provide confirmation of control layer and adhesive product compatibility with adjacent products, see Section 072500 Envelope Control Layers and 072100 Thermal Insulation. - No enclosure submittals will be approved until this matrix is submitted. (An example for a previous project may be requested from the Architect if the contractor and subcontractors are unfamiliar with this practice.)
Product Samples	NA	-
Mock-ups	**X**	- Exterior wall mock-up with window opening, with all envelope control layers and sealants and demonstrating

		connections, terminations, and flashings is required by other sections of these specifications. On-structure mock-up is acceptable. Testing of this mock-up to be coordinated with Envl. Cx. agent and Architect.
Closeout submittals	**X**	- Reports for each of the various field tests including images and recommendations for remediation. - Final report with final tested outcomes/results.

3. COMMISSIONING TEAM

The following parties will be involved in the Envelope Commissioning process and their roles and responsibilities are further described below.

i. Owner and their Consultants (Clerk of the Works)
ii. General Contractor/Construction Manager
iii. Architect
iv. Commissioning Authority
v. Exterior enclosure sub-contractor and their sub-contractors
vi. Specialty sub-contractors

A. COMMISSIONING AUTHORITY

i. The Commissioning Authority shall be approved and engaged by the Owner.
ii. The Commissioning Authority shall have adequate experience in the practices that encompass exterior enclosure commissioning including understanding systems design intent, performing architectural and shop drawing peer reviews, evaluating submittal compliance, administering pre-construction meetings, performing/supervising field performance testing, fulfilling field construction administration responsibilities, evaluating component/assembly compliance and performing forensic evaluations as relating to Divisions 03 through 14 Sections for facility enclosure commissioning requirements specific to Work of each Section.
iii. The Commissioning Authority cannot be financially associated with any of the Division 01 through 14 contractors or vendors prior to engaging this contract.

B. CONTRACTOR'S RESPONSIBILITIES

i. Attend design, pre-construction and construction phase building enclosure coordination meetings
ii. Provide schedule and perform field quality control tests and inspections required by the Contract Documents to Commissioning Authority and Architect.
    a. Provide updated schedule throughout the construction period as soon as and every time the construction schedule is updated.
iii. Provide a repair and remediation protocol for any systemic failures identified by the BECxA, including a timeline for repair of all affected elements. Repaired elements shall not be covered up without review and documentation by the BECxA.
iv. Submit operation and maintenance data for systems, subsystems and components to the Commissioning Authority.
v. Provide cut sheets and shop drawing submittals of commissioned systems to the commissioning authority.
vi. Provide input for final commissioning documentation to the Commissioning Authority.

vii. Participate in testing/inspection procedures meetings.
viii. Provide access to work to be tested, including staging, lifts, ladders, temporary enclosures or other equipment required for BECx testing
ix. Permit Commissioning Authority to access locations of installed systems, subsystems and component for testing and inspection
x. Reimburse Owner for non-compliant tests and inspections as outlined in Division 01 through Division 14.
xi. Provide test data and certificates to Commissioning Authority.
xii. Participate in maintenance orientation and inspection.
xiii. Address current Owner and Architect punch list items.
xiv. Participate in final review at acceptance meeting.

C. ARCHITECT RESPONSIBILITIES
i. Provide paper and electronic copies of project drawings and specifications to the Commissioning Authority.
ii. Provide written responses to design review comments from the Commissioning Authority or other parties requested.
iii. Attend design, pre-construction and construction-phase coordination meetings.
iv. May participate in testing procedures meetings.
v. Provide resolution for items for which the Commissioning Authority and Contractor may be in disagreement

D. COMMISSIONING AUTHORITY'S RESPONSIBILITIES
i. Provide project-specific construction checklists and commissioning process test procedures.
ii. Test exterior enclosure systems and assemblies.
iii. Compile test data, inspection reports and certificates and include them in the systems manual and commissioning process report.
iv. Cooperate with the Architect and Contractor and provide qualified personnel when scheduled.
v. Promptly notify Architect and Contractor of irregularities or deficiencies in work that are observed during performance of services.
vi. Review project drawings and specifications for constructability, durability performance and exterior enclosure conformance
vii. Review coordination drawings.
viii. Attend pre-construction and construction phase meetings.
ix. Perform mock-up performance testing.
x. Review proposals and requests for substitutions and changes for compliance with Contract Documents, and for compatibility with Work of other sub- contractors.
xi. Review exterior enclosure work for compliance with Contract Documents.
xii. Maintain list of observed deficiencies and discrepancies.
xiii. Develop protocols for functional performance testing.
xiv. Perform functional performance testing.
xv. Issue letter of compliance, assuming all non-compliant items are addressed, or if at the end of the project all items are not complete, a letter so indicating.
xvi. BECxA is not authorized to:
    a. Release, revoke, alter or expand requirements of Contract Documents.

b. Approve or accept any portion of the work.
c. Perform any duties of the Contractor.

4. COMMISSIONING DOCUMENTATION
   A. Provide the following information to Commissioning Authority for inclusion in the Commissioning Plan
      i. Submittals, information for system manuals and other required documents and reports.
      ii. Certificate of completion, certifying that exterior enclosure assemblies, systems, equipment and associated controls are complete and ready for testing.
      iii. Test and inspection reports and certificates.
      iv. Corrective action documents.
   B. The Commissioning Authority will provide regular reports to the Owner and distribute to other parties as requested by the Owner, as construction and commissioning progresses.
   C. A final summary report (including backup documentation) and a letter of compliance will be provided by the Commissioning Authority to the Owner upon completion of exterior envelope construction and resolution of unaddressed non-compliant items. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc. will be compiled in appendices and provided with the summary report.

5. PRECONSTRUCTION TESTING
   A. Preconstruction Mockup Testing: No off-building BECx mockups are required. See first instance testing requirements which serve as an off-building mockup.

6. QUALITY ASSURANCE
   A. Quality Assurance and Control: Specific commissioning and control requirements for individual construction activities are specified in the Sections that specify those activities. Specified commissioning tests, inspections and related actions do not limit Contractor's other quality-assurance and quality- control procedures that facilitate compliance with the Contract Document requirements.
   B. Preconstruction Commissioning Conference: Commissioning Authority will schedule a pre-construction commissioning conference before construction of the exterior enclosure starts, at a time convenient to the Owner, Construction Manager and Architect. Allow for the conference to be held at the Project site or another convenient location. The Commissioning Authority will conduct the meeting to review commissioning responsibilities and personnel assignments.
      i. Attendees: Authorized representatives of Owner, Construction Manager, Commissioning Authority, Architect and consultants; Contractor and its superintendent; all subcontractors who will impact the exterior enclsoure in any way, including mechanical and electrical contractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to commissioning.
      ii. Agenda: Discuss items of significance that could affect progress including the following:
         a. Commissioning plan and related specifications

b. Tentative construction schedule per Contractor
c. Phasing
d. Critical work sequencing and long lead times per Contractor
e. Designation of key personnel and their duties
f. First instance locations and testing
g. Procedures for testing and inspecting
h. Submittal procedures
i. Preparation of record documents
j. Owner's occupancy requirements
k. Security

7. FUNCTIONAL PERFORMANCE TESTING

A. Objectives and Scope: The objective of functional performance testing is to demonstrate that each exterior enclosure assembly/system is functioning according to the documented design intent of the Contract Documents and in accordance with the OPR. During the testing process, areas of non-compliant performance are identified and corrected, improving the operation and functioning of the building envelope/assemblies.

B. Development of Test Procedures: Before specific test protocols and procedures are developed, the Commissioning Authority will request all documentation and a current list of change orders affecting the exterior enclosure/assemblies, including an updated points lists and parameters. The Commissioning Authority shall develop specific test protocols and procedures to verify and document proper operation of each piece of exterior enclosure/assemblies.

C. Functional Performance Testing: All functional performance testing of building envelope/assemblies shall be performed by the Commissioning Authority, unless otherwise specified by the Commissioning Authority or by the project specifications. Any subcontractor or vendor responsible to execute a test shall provide assistance to the Commissioning Authority in developing the procedures review (answering questions about assemblies and sequences, etc.). Prior to execution, the Commissioning Authority will provide a copy of the test procedures to the Construction Manager and subcontractor(s) who will review the tests for feasibility, building enclosure/assemblies and warranty protection.

D. Test Methods:
   i. First instance test(s) are included to verify component and assembly performance prior to commencing repetitive installation of similar assemblies,.
   ii. Functional performance testing and verification may be achieved by manual testing (persons manipulating equipment and observing performance). The Commissioning Authority may substitute specified methods or require additional methods to be executed other than what was specified. The Commissioning Authority will determine which method is most appropriate for tests that do not have a method specified.

E. Sampling: Multiple identical pieces of assemblies may be functionally tested using a sampling strategy. Significant application differences and significant sequence or functional differences in otherwise identical materials or assemblies invalidates their common identity. A small size or capacity difference alone does not constitute a difference. It is noted that no sampling by contractors and their subcontractors is allowed.

F. The Contractors and their subcontractors shall provide sufficient notice to the Commissioning Authority regarding their completion schedule for the assemblies or exterior

enclosure systems. The Commissioning Authority will schedule functional tests through the Construction Manager. A minimum of five working days are required as a minimum for scheduling testing.

G. The Commissioning Authority shall perform/administer and document the results of all functional performance tests.

H. The Commissioning Authority may recommend solutions to problems found; however, the burden of responsibility to solve, correct and re-test problems is with the Construction Manager, subcontractors and the Architect.

8. NON-CONFORMANCE

A. All deficiencies or non-conformance issues shall be noted and reported by the Commissioning Authority to the Construction Manager and Architect.

B. Corrections of minor deficiencies identified during functional performance testing or inspections are encouraged to be made, if practical, at the time of testing/inspection. In such cases, the deficiency and resolution will be documented.

C. Failure Due to Manufacturer Defect: If materials or assemblies fail to perform to the Contract Documents (physically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units must be considered unacceptable by the General Contractor, subcontractor, sub-subcontractor, Commissioning Authority, Designer or Owner.

D. If field tests cannot be completed because of a deficiency outside the scope of the Building Exterior Enclosure, the deficiency shall be documented and reported to the Owner and the Architect-of-Record. Deficiencies shall be resolved and corrected by appropriate parties and the test rescheduled.

9. EXECUTION & QUALITY CONTROL

A. Commissioning Authority shall issue a written report certifying that building exterior enclosure systems, subsystems and construction have been completed according to the Contract Documents and comply with BOD and OPR.

B. Commissioning Authority shall perform or facilitate and document field quality control tests and inspections.

C. Commissioning Authority shall confirm that field quality control testing of exterior enclosure has been completed and approved, that discrepancies have been corrected, and corrective work approved.

D. TESTING REPORTS:

i. Testing reports shall include measured data, data sheets, and a comprehensive summary describing the specific building exterior enclosure systems at the time of testing.

ii. Prepare a preliminary test report. Deficiencies will be evaluated by the Architect and the BECxA to determine corrective action. Deficiencies shall be corrected and test repeated. All repairs are to be documented by the BECxA.

iii. If it is determined that the system is constructed according to the Contract Documents, the Owner will decide whether modifications are required to bring the performance of the system to a level where the failure or deficiency is eliminated and shall be implemented or if the test results will be accepted as submitted. If corrective Work is performed, the Owner will decide if tests shall be repeated and a revised report is to be submitted.

E. Contractor's Role
   i. The Contractor shall provide all necessary staging, ladders and other support necessary for access to surfaces to be inspected or tested.
   ii. The Contractor shall provide their on-site staff-person responsible for building enclosure air and water leakage control to be present at all testing.
   iii. The Contractor shall provide temporary enclosures, if necessary, to partition off areas under pressure test.
   iv. The contractor shall provide water and power at the test locations

10. SYSTEMS TO BE COMMISSIONED
   A. Refer to Divisions 2 through 9 of the Specification Sections for specific requirements for commissioning each building exterior enclosure element and system. The systems and elements to be commissioned include, but are not limited to:
      i. Roofs air barrier and insulation systems, including all transitions, etc.
      ii. Exterior walls, including the air barrier system, and water management systems
      iii. Windows
      iv. Doors
      v. Sealants and expansion joints
      vi. Control joints
      vii. Flashings, including all transitions, end-dams, etc.
      viii. Below-grade construction, including waterproofing/damp proofing
      ix. Air barrier and insulation of floors, including slab-on-grade
      x. Interface conditions between each of the above listed elements
      xi. Other special building exterior enclosure systems.

END SECTION 019119 VOH EXTERIOR ENVELOPE COMMISSIONING

SECTION 022230 - SITE CLEARING AND GRUBBING

PART 1.00 - GENERAL

1.01 WORK INCLUDED

A. Site clearing and grubbing for construction sites by removal or destruction of the following:
   1. Trees, shrubs and vegetation which interfere with construction or landscaping.
   2. Underbrush.
   3. Logs.
   4. Stumps.
   5. Refuse and rubbish.
   6. Decayed or growing organic matter.
   7. Snow and ice.
   8. Water.

B. Stripping and stockpiling of topsoil.

C. Stripping and removal of unsuitable onsite soil materials.

D. Note – save stones and ledge from ledge removal to form the short piece of retaining wall at the north end of the plaza, as shown on civil drawings and Detail 2/A-4.1.

1.02 REFERENCE STANDARDS

A. (Not Used)

1.03 SUBMITTALS

A. (Not Used)

1.04 QUALITY ASSURANCE

A. All Federal and State Laws and Codes and local ordinances, regulations, and laws must be complied with. It shall be the responsibility of the Contractor to obtain all necessary permits and pay all fees for inspection, permits or disposal.

PART 2.00 - PRODUCTS

2.01 MATERIALS

A. (Not Used)

PART 3.00 - EXECUTION

3.01 PREPARATION

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A. Prior to clearing and grubbing, the following precautions shall be made:
   1. Required lines, levels, contours and datums shall be established and identified.
   2. Benchmarks, control points and reference points shall be maintained and preserved throughout construction. If disturbed or destroyed, they shall be reestablished by the Contractor, at no additional cost to the Owner.

B. The Contractor shall be fully responsible and shall take all necessary precautions to protect all adjacent structures, property, and personnel.

3.02 CLEARING AND GRUBBING

A. Remove vegetation, topsoil, debris, rocks, stumps, unsatisfactory soil materials, water, snow, ice, obstructions and deleterious materials from the ground surface.

B. Topsoil shall be segregated, stockpiled and protected for reuse, and provisions made for erosion control. Excess topsoil shall remain the property of the Owner and shall not be removed from the project site, unless directed by the Owner.

C. All stumps, roots and other unsuitable material shall be removed to a depth of twelve inches below final grade.

3.03 TREE REMOVAL

A. Immediately after felling trees designated to be removed, the Contractor shall remove the branches, cut trunk and limbs and clear the debris.

B. The Contractor shall cut all branches, roots and trunks larger than two inches in diameter into firewood in lengths from 16 to 18 inches.

C. The Contractor shall pile all wood in neat stacks not more than four feet high, on the Owner=s property, out of the work area.

D. Tree portions which are extremely difficult to cut into firewood may be removed as debris.

E. All firewood shall become the property of the landowner. Should the landowner choose not to make claim to the firewood, the Contractor shall dispose of it off-site.

F. All small branches, brush and leaves shall be chipped and removed from the site.

G. Trees and brush shall not be burned.

3.04 DEBRIS REMOVAL

A. All material, debris, rubble and spoils resulting from the work shall be disposed of at a suitable off-site location procured by the Contractor at his own expense. Only legal disposal sites may be used. The Contractor is responsible for locating an appropriate site and obtaining any necessary permits for disposal, and for loading, trucking, permit and disposal fees.

B. Debris shall not be burned.

3.05 REMOVAL AND DISPOSAL OF SURPLUS AND/OR UNSUITABLE ONSITE SOIL MATERIAL

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A. All surplus and/or unsuitable onsite soil material resulting from the work shall be disposed of at a suitable off-site location procured by the Contractor at his own expense. Only legal disposal sites may be used. The Contractor is responsible for locating an appropriate site and obtaining any necessary permits for disposal, and for loading, trucking, permit and disposal fees.

END OF SECTION 022230

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SECTION 024113 - SITE DEMOLITION

PART 1.00 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall demolish and/or modify all the existing structures, facilities and utilities as indicated on the drawings or specified herein. The Contractor shall furnish all materials, equipment and labor to perform the work as indicated.

B. Removal or abandonment of existing water system distribution piping and appurtenances.

C. Removal or abandonment of existing wastewater piping, tank(s), and pump station(s), as shown.

1.02 REFERENCE STANDARDS

A. (Not Used)

1.03 SUBMITTALS

A. The Contractor shall submit, for review by the Engineer, a complete demolition procedure including, but not limited to, the following details, schedules, and information concerning the modification and/or demolition of existing structures:

1. Step by step construction schedule including estimated demolition and construction time and dates.
2. Method of demolition, provisions for temporary utilities service and bypasses where necessary.
3. Equipment intended to be utilized.
4. Preparatory work prior to disruption of water flows or existing facility or utility operation.
5. Emergency backup equipment to be utilized in case of equipment failure.
6. Water and waste handling equipment.
7. Temporary electrical and utility systems if disruption is planned.
8. Equipment and material disposal site.
9. Other information as requested by the Engineer.

B. The Contractor shall submit for review details of the methods and materials proposed for use in making all connections/disconnections to existing structures, pipelines, etc.

1.04 QUALITY ASSURANCE

A. All work shall be accomplished by workers thoroughly experienced and skilled in such work.

B. Upon direction of the Engineer, the Contractor shall remove and/or replace all work that does not meet the requirements of this section. The Contractor shall perform all remedial measures at no additional cost to the Owner.

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C. All Federal and State Laws and Codes and local ordinances, regulations, and laws must be complied with. It shall be the responsibility of the Contractor to obtain all necessary permits and pay all fees for inspection or disposal.
D. The Contractor shall give the Owner and Engineer one week's notice prior to removing or dismantling any existing equipment or piping.

PART 2.00 - PRODUCTS

2.01 MATERIALS

A. All new work to be incorporated into the connections to existing structures or pipelines shall be made with new materials. No old or used materials will be permitted in making the connections.

PART 3.00 - EXECUTION

3.01 PREPARATION

A. All work shall be planned so as not to interfere with operation of existing facilities. The Contractor shall have no claim for additional compensation by reason of delay, inconvenience, or work outside of normal working hours for adapting his operations to the needs of the existing facilities.
B. Each step of the approved work procedure shall be completed in one continuous operation. No modification or demolition work shall be started until the Contractor has assembled all tools, materials and equipment necessary to complete the work in the shortest time. Once the demolition work is started, the Contractor shall work continuously on the connection so that the work is completed. No unfinished work shall be left for completion at a later time or date.

3.02 EXISTING UNDERGROUND UTILITIES

A. The drawings do not depict all utilities or exact positions of all utilities that may exist on the site.
B. The Contractor shall locate underground utilities in the work area by probing and/or other means as required. If utilities are to remain, the Contractor shall provide adequate means of protection during earthwork operations.
C. Should unmapped piping or other utilities be encountered during excavation, the Contractor shall consult with the utility owner immediately for directions. The Contractor shall cooperate with utility companies in keeping respective service and facilities to the satisfaction of the utility owner.
D. The Contractor shall demolish and completely remove from the site existing underground utilities required to be removed. The Contractor shall coordinate with utility owners for shutting off services, if lines are active.

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E. The Contractor shall not intentionally interrupt utilities unless permitted in writing by the utility owner, and then only after arranging to provide temporary utility service to necessary facilities or users.

3.03 CUTTING AND PATCHING

A. Wherever necessary to connect to existing structures or pipes, the Contractor shall remove the minimum amount of existing work for the installation of the necessary piping or new work.

3.04 REMOVAL AND DISPOSAL OF MATERIALS

A. All materials removed from modified, abandoned, removed or demolished structures shall be cleared from the immediate work area and disposed of in the following manner:
   1. All salvageable materials shall be removed from the site and stored at a location as directed by the Engineer. All salvageable materials shall be the property of the Owner.
   2. All materials which are considered non-salvageable shall be disposed of.

B. All material, debris, rubble and spoils resulting from the work shall be disposed of at a suitable off-site location procured by the Contractor at his own expense. Only legal disposal sites may be used. The Contractor is responsible for locating an appropriate site and obtaining any necessary permits for disposal, and for loading, trucking, permitting and disposal fees.

3.05 REMOVAL OF ITEMS

A. Where indicated on the Drawings, the item shall be completely removed from the site in the following manner, as appropriate.

B. Following removal of items, excavations shall be backfilled and compacted in accordance with Specification Section 02300.

3.06 ABANDONMENT OF ITEMS

A. Where indicated on the Drawings, the item shall be abandoned in the following manner, as appropriate:
   1. Pipes:
      a. Ends of all abandoned pipes shall be capped or plugged with caps or plugs suitable for the pipe type to insure a complete seal.
      b. Where indicated on the Drawings, abandoned pipes shall be completely filled with sand, flowable fill or concrete.
   2. Manholes, catch basins, tanks, vaults and other structures:
      a. Demolish and remove the frame and cover/grate, the top of the structure and the walls of the structure to a depth of three feet below finish grade.
      b. Break hole in the bottom of the structure to allow water to drain.

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c. Backfill and compact the inside of the structure with sand.

3. Valves, curb stops:
   a. Close the valve or curb stop.
   b. Install a stub piece of pipe into the valve or curb stop and a cap.
   c. Remove the valve or curb stop box, operating rod and cover.
4. Water service corporations:(MIDDLEBURY)
   a. Excavate to expose water service connection at water main.
   b. Remove corporation and replace with brass plug.

B. Following abandonment of items, excavations shall be backfilled and compacted in accordance with Specification Section 02300.

3.07 SEQUENCING OF NEW AND OLD FACILITIES

A. All existing facilities shall be kept operational until such time as the new facilities are fully tested and approved.

B. The Contractor shall provide temporary repairs, bypasses and/or temporary facilities as necessary at no additional cost.

C. Facilities shall not be switched over until the new systems are fully tested and operational.

END OF SECTION 024113

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024119 VOH SELECTIVE DEMOLITION

1. SUMMARY

This section includes information about demolition of the exterior MEP and FP systems and the exterior bridge structure, as well as selective demolition inside the new addition, in the dressing room, and at the new interior loft.

The Vergennes Opera House building is a highly important historic structure. Special care must be taken in the demolition on any portion of this building.

Related Sections:
011000 Summary and General Conditions
015240 Construction Waste Management

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Demolition sequencing schedule for Owner coordination.
Product Cut Sheets	NA	-
Product Samples	NA	
Mock-ups	NA	
Closeout submittals	**X**	- Warranty Information

3. PROJECT CONDITIONS

A. OCCUPATION OF BUILDING
   i. The City Hall level of the building will be occupied during the project. The Auditorium and related spaces will not be occupied during the project.
   ii. Separation of the demolition work associated with the new entrance will be required, to protect and allow ongoing work in the City Hall.
   iii. The Construction Manager shall work with the Owner to incorporate maintain Owner access to the City Hall portions of the building, including identifying periods on the Project Schedule where the building may not be Universally Accessible to the public.

B. HAZARDOUS MATERIALS
   i. See associated Environmental Surveys, provided by the Owner. NOTE – THIS REPORT HAS NOT YET BEEN ISSUED.
   ii. Remediation of Hazardous Materials will be by Owner, with the exception of the handling of existing lead paint by contractor.

C. PHOTO DOCUMENTATION:
   i. Completely photograph all spaces prior to demolition. Provide digital photo files to Owner for record.

4. EXECUTION & QUALITY CONTROL
   A. SELECTIVE DEMOLITION SCHEDULE:
      i. See Demolition plans and elevations for notes on preservation of contents.
      ii. See MEP drawings for a schematic illustration of the demolition of building systems. A detailed definition of the MEP FP systems demolition is the responsibility of the CM and their design-build MEP FP subcontractors.
      iii. See structural drawings for extent of structural demolition.
      iv. Prior to start of demolition, the general contractor will present the owner and architect with a proposed schedule for demolition. The schedule shall be presented at least one week prior to demolition.

   B. DISPOSAL:
      i. See Construction Waste Management Plan for requirements around waste disposal.
      ii. Contractor to provide dumpster for disposal of all materials.
         a. Location of dumpster to be approved by owner.
      iii. Provide legal disposal of all demolition materials.
         a. Provide landfill records for disposal of any hazardous material.

END SECTION 024119 VOH SELECTIVE DEMOLITION

040100 VOH MASONRY CLEANING AND REPAIR

1. SUMMARY

The existing brick veneer masonry under the bridge on the west façade of the Vergennes Opera House is in poor shape, primarily due to the use of salt for de-icing on the bridge above. Many mortar joints have been compromised, and in some cases the brick itself is damaged.

Masonry repair is limited to areas that will be covered by either the addition itself or backfill to the north of the additions. Most of this area is brick veneer, but some of it is ashlar marble (close to grade to the north). Some infill work is required as well. The brick masonry above the bridge is in good shape and not included in this scope. See drawing A-2.0.2 for the area of work.

This section identifies the products and processes for cleaning, repairing, and infilling the exterior brick and masonry. Best practices, acceptable products, and expected results are also described. This work should be conducted after the old bridge has been removed and the components related to the electrical service have been relocated.

Related Sections:

064013	Exterior Architectural Woodwork
071113	Foundation Moisture Protection & Damproofing
079200	Joint Sealants

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	**Req.**	**Specifics**
Shop Drawings		
Product Cut Sheets	**X**	- All cleaners, detergents, mortars, elastomeric sealants and miscellaneous masonry accessories - Environmental Product Declaration (EPD) - Health Product Declaration (HPD)
Product Samples	**X**	- -Material samples of proposed replacement bricks. - -Mortar samples of each type to be used (in a form of 6" long by appropriate width of existing mortar joint, and sample strips of mortar set in aluminum or plastic channels)
Mock-ups	**X**	- Prepare cleaning mock-up of roughly 5' x 5' of brick at location agreed upon by the architect. - Prepare mock-up of approximately 2 sq. ft. of repointing at location agreed upon by architect. - Prepare mock-up of approx. 2 sq. ft. of repair w/ new brick installed and mortar.
Closeout submittals	**X**	Warranty Information

3. PRODUCTS AND EXECUTION

Install or use all products according to manufacturer's written instructions unless specifically noted otherwise.

A. MASONRY RESTORATION CLEANER
   i. Scope – Chemical Cleaning of the masonry is not necessary unless it is required to perform the other masonry repairs. After the removal of all exterior building components (bridge and electrical devices), clean the area to be repaired with low-pressure water and a scrub-brush, to remove masonry dust and any loose mortar.
   ii. If Chemical Cleaning is deemed necessary, follow the steps below.
   iii. Use Diedrich 101 Restoration Cleaner, Eaco Chem One Restore, or approved equal. Follow directions precisely per manufacturer's requirement.
   iv. Protection:
      a. Protect all surrounding surfaces, including soil, to prevent unintentional staining and damage. Protect per manufacturer's suggestions. Do not apply chemical solutions when conditions provide potential hazard.
      b. Neutralize any alkaline and acid wastes prior to disposal per all local, state, federal and campus codes and best practices.
   v. Testing:
      a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not test cleaners and methods known to have deleterious effect.
      b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.
   vi. Perform cleaning in a manner that results in a uniform coverage of all surfaces, including corners, moldings and interstices.
   vii. Perform restoration cleaning to entirety of existing exterior masonry prior to assessment of damaged areas or failed joints.
   viii. Rinsing:
      a. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting.
      b. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

B. BRICKS
   i. Scope: Most visible bricks are in good shape and do not need repair or replacement. The condition of bricks behind the bridge ledger and behind surface-mounted electrical components is unknown. Some may have been damaged by the addition of these later elements and need repair.
   ii. Use salvaged local Drury or Densmore sand-molded standard size brick to match existing bricks as closely as possible. All bricks to be clean and undamaged.

iii. Brick replacement to occur after cleaning of repair area.

iv. Replace failed bricks or bricks that have been damaged by previous installation of the bridge or various electical service components. A failed brick is one that is missing, crumbling, cracked, or loose. A damaged brick is one that has a deficiency of more than ¾" on the surface. For deficiencies smaller than ¾" but larger than 1/8" repair with colored mortar to match brick exactly. Architect shall have final determination if a brick is failed.

v. Any new bricks to be laid to match existing bond pattern and coursing heights. At openings (like windows and doors) requiring repair, match typical strategies employed by original masons with regards to cut bricks, returns, and coursing.

C. STONE

i. No stone is expected to need replacement.

D. MORTAR

i. Scope: Much of the mortar in the brick portions of the wall beneath the bridge has been eroded by the use of salt.

ii. Existing mortar composition to be tested and documented.

iii. Mortar for repointing brick to be type "O" mortar (per ASTM C270) or other should testing show different results, to match existing color, composition, and tooling exactly - some white cement may be required to match color.

a. Repoint all failed or deteriorated mortar joints, as well as areas described in the drawings, after the restoration cleaning and brick repair has been completed.

b. A failed mortar joint is a joint where mortar is not within 3/8" of the surface of the adjoining brick.

c. Basis of bid should be 100% repointing in areas indicated on drawings. For the remainder of the building assume 10% repointing.

d. Follow recommendations and procedures in Brick Industry Association technical note 46 (Maintenance of Brick Masonry). Any deviations from these recommendations require the written consent of the architect.

e. Architect to have final determination of joints to be repointed.

iv. Mortar for repairing minor deficiencies as described above to be type "O" mortar mixed to exactly match the particular brick being repaired.

v. All mortar to be applied per temperature requirements indicated by manufacturer in accordance to manufacturer's best practices and recommendations.

E. INFILL AT STEEL TUBES

i. Scope: Three 5" x 12" rectangular steel tubes beams were inserted through the brick veneer to support the current bridge. These will be removed as part of this project. Each instance requires a different treatment.

ii. The northernmost steel beam is supported on the brick veneer. Remove the beam and tooth in replacement bricks to repair the hole. This location will be below grade.

iii. The center beam is a cantilever from inside the building. The steel beam will be cut off flush with the face of the brick veneer. Fill the void left in the wall with mortar. This location will be covered by the new addition.

iv. The southern beam is a cantilever from inside the building. The steel beam will be cut off flush with the face of the brick veneer or slightly inside the face of the veneer if possible. This location will be partially covered by the new addition. Fill the void in the beam (approx. 4" x 11") with new brick flush with the face of the veneer. If possible, apply sealant to cover the recessed edge of the steel tube.

F. INFILL AT WINDOW

i. Scope: An old window outside the electrical room will be partially covered by the new addition. This window needs to be infilled with brick to create a solid wall surface to build against and to waterproof.

ii. Brick for this infill does not need to be salvaged brick to match the original brick, but it should be a brick of similar density.

iii. Mortar for this infill panel should be the same mortar used for other masonry repairs – see section above.

iv. Do not provide weeps in the infill portion that is outside the new addition.

G. SEALANT AND BACKER ROD

i. Product: Tremco Dymeric 240 FC Multi-component Polyurethane Sealant or approved alternate

a. Line/Color: Architect to select from full selection of available colors. Multiple colors as required to make best match in separate locations.

ii. Backer Rod: Closed cell polyethylene backer rod in sizes as required for each situation. Fit to be as described by manufacturer's best practice.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions, ASTM standards, and National Parks briefs unless specifically noted otherwise.

A. QUALITY ASSURANCE

i. Restoration Specialist Qualifications: Work must be performed by a firm having not less than 5 years successful experience in comparable masonry restoration projects and employing personnel skilled in the restoration processes and operations indicated.

ii. Source of Materials: Obtain materials for masonry restoration from a single source for each type of material required to ensure match of quality, color, pattern and texture.

iii. Preinstallation Conference:

a. Meet with General Contractor, Owner Representative, and Architect. Review and finalize construction schedule; availability of materials, methods and

procedures; flashing, details and masonry cutting; temporary protection requirements during and after performed work.

B. DELIVERY, STORAGE AND HANDLING

i. Protect masonry restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other type materials.

ii. Protect grout, mortar, and other materials from deterioration by moisture and temperature. Store in a dry location or on waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

C. EXAMINATION AND PREPARATION

i. Examine existing conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

D. PROJECT / SITE CONDITIONS

i. Environmental Requirements: Perform work only in dry and otherwise favorable weather conditions. Protect repaired masonry against freezing or excessively rapid drying for at least 48 hours after being laid; no masonry shall be laid when temperature is below 32 F on a rising thermometer or below 40 F on a falling thermometer or when stone surface temperature is 40 degrees F or below.

E. ADJUSTING/CLEANING

i. Clean off excess materials, sealants and substances for all repaired and finished work surfaces.

ii. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.

iii. Use only tools and equipment which are clean and free of hardened or partially hardened material. Use of metal scrapers or brushes will not be permitted.

END SECTION 040100 VOH MASONRY CLEANING AND REPAIR

055000 VOH METAL FABRICATIONS

1. SUMMARY

This section identifies the metal fabrication for exterior painted steel handrails and guard rails and interior guards and stair handrails, modifications to the existing railing at the plaza, and miscellaneous metal work. In addition, this section addresses the fabrication, fasteners, finishes and best practices for installation.

Related Sections:
061000 Rough Carpentry (Architectural)
062023 Interior Finish Carpentry
099113 Exterior Painting
099123 Interior Painting
See Structural Drawings and Specifications for structural steel canopy columns.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	**Req.**	**Specifics**
Shop Drawings	**X**	- Shop drawing plans, sections, and details for fabrication of metalwork, metal brackets, column bases and caps, and railings including installation details. - Brake metal profiles
Product Cut Sheets	**X**	- For each listed product.
Product Samples	**X**	- Railing bracket
Mock-ups	NA	
Closeout submittals	**X**	- Warranty Information, - Maintenance information.

3. PRODUCTS

A. STAIR RAILING BRACKETS
   i. Manufacturer: Wagner Companies or approved equal.
   ii. Product: 1980ST Universal Weld steel handrail bracket or approved equal.
   iii. Location: At stud locations or on blocking as shown on the Drawings. Max spacing 4’-0”.

B. RAIL CAPS
   i. Manufacturer: Wagner Companies or approved equal.
   ii. Product: H1248 Hand Rail
   iii. Location: As noted on architectural drawings.

C. STEEL RAILING COMPONENTS
   i. Manufacturer: N/A

ii. Product: Steel tubes, bar stock, angles, plate and other shapes as necessary to fabricate railings and guards.
iii. Embeds: Components of steel to be embedded in concrete or below grade shall be stainless steel.
iv. Finishes:
   a. East Landing and Walkway Guard Rail and Hand Rail: All components of the east railing and guard rail shall be galvanized, not painted.
   b. All other locations – provide primed for finish painting.
v. Location: As noted on architectural drawings.

D. MISCELLANEOUS MATERIALS
   i. Product: Grout, fasteners, and washers, compatible with adjacent materials. All exterior fasteners to be galvanized.
   ii. Cleaner: As recommended by manufacturer.

4. EXECUTION & QUALITY CONTROL
Install according to manufacturer's written instructions unless specifically noted otherwise.
Install square and level.

END SECTION 055000 VOH METAL FABRICATIONS

061000 VOH ROUGH CARPENTRY (ARCHITECTURAL)

1. SUMMARY

This section includes all miscellaneous wood plates and bucks, non-bearing partitions, wood strapping at exterior walls, and wood blocking and nailers. This section also specifies the type of wood sheathing to be used as exterior wall sheathing. The section also includes the wood blocking under exterior brake metal trim profiles. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Related Sections:

061000 Rough Carpentry (Structural)
062013 Exterior Finish Carpentry
062023 Interior Finish Carpentry
064023 Interior Architectural Woodwork
072500 Envelope Control Layers
075423 TPO roofing
100000 All of Division 10- Specialties

See Structural Drawings and Specifications for structural rough carpentry.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Showing blocking location provided by each specialty.
Product Cut Sheets	**X**	- Wood-preservative treatment and fire-retardant treatment data from manufacturer. - Environmental Product Declarations (EPDs) - Health Product Declarations (HPDs)
Product Samples	NA	
Mock-ups	**X**	- Window bucks as part of window mock-up assembly. On-structure mock-up is acceptable.
Closeout submittals	**X**	- Warranty Information, O & M Information

3. PRODUCTS

A. PRESSURE TREATED LUMBER

i. Product: Pressure Treated 2x lumber in sizes and locations as shown on the Drawings.
ii. Type of Treatment: ACQ (alkaline copper quaternary)
iii. Dimension: 1 ½" x 3 ½", 5 ½", 7 ¼", 9 ¼ " or 11 ¼ " as required.
iv. Locations: Window bucks, plates, any wood in damp locations or in direct contact with concrete or masonry, blocking at roof perimeter, miscellaneous locations.
v. Protection: Flashing membrane installed between PT lumber and metal framing.
vi. Fasteners: Stainless steel or proven compatible with pressure treated lumber.

B. GLUE AND CROSS LAMINATED TIMBER

i. See Structural Specifications

C. WOOD STAIR LANDINGS
- i. Quality, Species, and Grade: Select Grade 2x8 Pressure Treate structural decking.
- ii. See structural drawings and specifications for structural requirements and sourcing requirements.
- iii. Installation: See structural and architectural drawings for connection and detailing information.
- iv. Finish: See Interior Painting and Staining

D. EXTERIOR WALL SHEATHING
- i. Product: ½" CDX – See Structural.
- ii. Locations: All exterior walls (see details for location of sheathing in wall sections)
- iii. Installation: Per Structural and manufacturer's instructions

E. ROOF SHEATHING- (See Structural)
- i. Product: 3/4" Advantech sheathing (thickness increased for snow load impact from roof above).
- ii. Locations: As indicated on drawings. All roof decks, to provide weather protection prior to insulation and membrane.

F. EXTERIOR STRAPPING
- i. Product: 1x3, 5/4"x3, and 2x4 wood strapping and as shown on drawings. Corner details will require a pre-built 'ladder' of strapping to support the siding corners.
- ii. Locations: Provide strapping as shown on the drawings and at the following:
  - a. At stud locations over rigid insulation at siding, 16" oc typical unless otherwise noted.

G. EXTERIOR BLOCKING FOR METAL FLASHINGS
- i. Product: 2x4, 2x6 and ripped 2x SPF #2 wood as shown on drawings
- ii. Locations: Provide solid blocking under custom-bent metal trim profiles, as shown on the drawings and details.

H. NON-BEARING WALL PARTITIONS
- i. Product: 2x4 and 2x6 SPF #2 wood studs and plates.
- ii. Bottom plates in contact with concrete to be pressure-treated.
- iii. Locations: at locations shown on plans and denoted by wall section types.

I. PLYWOOD AND DIMENSIONAL LUMBER BLOCKING AND WINDOW BUCKS
- i. Product: ¾" exterior grade CDX plywood or 2x #2 lumber as indicated.
- ii. Locations: Provide blocking as shown on the drawings and at the following:
  - a. Miscellaneous trim backer at roof and cornices.
  - b. Plumbing Fixtures including wall hung toilets and sinks, drinking fountains, grab bars, and all other toilet accessories: Plywood to extend 8" beyond fixture dimensions in all directions.
  - c. Base, Wall Cabinet, and shelving attachment points: Centered at 35 inches for base cabinets, at top and bottom of wall cabinets as shown on the Drawings.

d. Shelving and worksurface attachment as shown on the Drawings.
e. Handrail wall bracket locations: Plywood extending 8" beyond fixture dimensions in all directions.
f. Door stops: Plywood extending 8" beyond fixture dimensions in all directions.
g. Fire extinguisher hangers and cabinets: Plywood extending 8" beyond fixture dimensions in all directions.

J. INTERIOR WOOD FURRING
i. Product: 1x3 wood strapping as shown on drawings
ii. Locations: see wall types and details.

K. PLYWOOD BACKING PANELS
i. Product: Exterior grade AC plywood, fire-retardant treated, ¾" thickness and where indicated on the drawings.
ii. Locations:
a. Elevator Machine Room
b. Electrical and Mechanical rooms
c. At Water Entrance

L. FASTENERS
i. All Fasteners in rough carpentry to be galvanized or coated steel.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. EXTERIOR SHEATHING AND ROOF DECK:
i. Exterior Sheathing and decking serves as the primary air barrier.
ii. See Section 073500 Envelope Control Layers for tapes and air-sealing details.

B. BLOCKING:
i. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
ii. 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.
iii. Attach items to substrates to support applied loading. Recess fasteners flush with surfaces unless otherwise indicated.
iv. Where wood-preservative-treated lumber is installed adjacent to metal framing or decking, install continuous flexible flashing separator between wood and metal.

C. FRAMING REPAIR:
i. Examine structure of roof and opened up existing areas of work for rot.
ii. Remove and/or repair rotted material with P.T. framing/sheathing after consultation with architect and structural engineer.

END SECTION 061000 VOH ROUGH CARPENTRY (ARCHITECTURAL)

062023 VOH INTERIOR FINISH CARPENTRY

1. SUMMARY

This Section includes the interior site built trim. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Schedule:
Interior Trim:

1. Painted wood base to match existing base at Hall 311.
2. Clear finished wood window sills at new addition windows (typical).
3. Clear finish wood casings, jamb extensions, aprons at new windows and doors in addition.
4. Painted finish wood window sills at existing windows for restoration.
5. Clear finished wood slat ceiling at Canopy Entrance.
6. Hardwood rail cap and base trim at guard rail in Entry 117.
7. Hardwood sill/threshold at door 121.
8. Wood floor patches in Hall 311.
9. Miscellaneous interior wood trim as shown on the Drawings and per finish schedule.

Related Sections:

061000	Rough Carpentry (Architectural)
081100	Wood Doors and Frames
081113	Hollow Metal Doors and Frames
081416	Flush Wood Doors
085000	Windows
092900	Gypsum Board
099123	Interior Painting and Staining

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Show locations of each item, dimensioned plans and elevations, large scale details, furring and blocking locations, size and location of cutouts and holes for plumbing fixtures and other items installed in architectural woodwork.
Product Cut Sheets	**X**	- For plastic laminate, panel and solid-surfacing materials, cabinet hardware and accessories, finishing materials.
Product Samples	**X**	Lumber with transparent finish for each type of wood proposed, plastic laminate and solid surfacing materials, cabinet door panel, cabinet hardware and accessories.
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information, O & M Information

3. PRODUCTS

NOTE: WOOD PRODUCTS AND ADHESIVES SHALL NOT CONTAIN UREA FORMALDEHYDE.

A. WOOD FOR PAINTED FINISH
   i. Product: Poplar or Eastern White Pine (clear of knots), no finger jointed.
   ii. Sizes: 4/4 and 5/4 as noted on drawings.
   iii. Painting: Sherwin Williams or approved Equal – See Interior Painting Section 099110.
   iv. Priming: BIN prime any visible knots or blemishes. Prime all material prior to installation.
   v. Sheen: Semi-gloss
   vi. Fabrication: Fabricate and finish in shop where possible.

B. WOOD FOR WINDOW AND DOOR TRIM
   i. Product: Clear Eastern White Pine (clear of knots), no finger-jointing.
      a. Sizes: 3/4, 4/4, and 5/4 as noted on drawings. Typical nosings to be 3/8" roundover, where applicable.
      b. Other Profiles: As noted or drawn on drawings
   ii. Stained Finish: Sherwin Williams, Minwax, Cabot or approved Equal – See Interior Painting Section 099110.
   iii. Fabrication: Fabricate and finish in shop where possible.
   iv. Location: Guardrail caps, half wall caps, and at locations noted on drawings.
   v.

C. WOOD FOR WINDOW SILLS AND INTERIOR ELEMENTS
   i. Product: Clear Maple.
      a. Sizes: 4/4, 5/4 or as noted on drawings. Typical nosings to be 3/8" roundover, where applicable.
   ii. Clear Finish: Sherwin Williams, Minwax, Cabot or approved Equal – See Interior Painting Section 099110.
   iii. Fabrication: Fabricate and finish in shop where possible.

D. WOOD FOR CANOPY ENTRANCE
   i. Product: Clear finish, CVG Douglas Fir
      a. Sizes: 1x4 Tongue and Groove V-groove boards.
   ii. Stain/Finish: See Interior Painting and Staining Section 099110.
   iii. Fabrication: Fabricate and finish in shop where possible.

E. WOOD FOR FLOOR PATCHING
   i. Product: maple hardwood strip flooring
      a. Sizes: 1x, match size of existing flooring.
   ii. Stain/Finish: See Interior Painting and Staining Section 099110.
   iii. Fabrication: Tooth in patched where possible.

F. WOOD FOR HISTORIC WINDOW SILLS AND/OR REPAIRS
   i. Product: Lifespan treated trim wood, or historic tight-grained pine.
   ii. Sizes: per drawings, or as required.

iii. Stain/Finish: Prime with oil-based primer.
iv. Fabrication: Fabricate and finish in shop where possible.

G. ADHESIVES AND SEALANTS
i. General: Adhesives shall not contain urea formaldehyde.
ii. VOC limits:
a. Wood Glues: 30 g/L.
b. Multi-purpose Construction Adhesives: 70 g/L.
c. Sealants and caulks: 70 g/L.

4. EXECUTION & QUALITY CONTROL
Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

A. FABRICATION, GENERAL
i. Interior Woodwork Grade: Provide Custom-grade interior woodwork complying with referenced quality standard.
ii. Ease edges to radius indicated for the following:
a. Corners and edges of solid members and rails: 1/16”unless noted otherwise.
iii. Verify all dimensions in filed prior to fabrication and installation.

B. PREPARATION
i. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
ii. Examine shop-fabricated work for completion and quality. Complete work as required including back-priming.
iii. Examine site for appropriate blocking as necessary.

C. INSTALLATION
i. Install woodwork 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.
ii. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
iii. Anchor woodwork to built-in blocking.

D. ADJUSTING AND CLEANING
i. Repair damaged and defective woodwork and/or other finishes listed, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork and/or other finishes listed. Adjust joinery for uniform appearance.
ii. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.
iii. Protect finished woodwork from other construction as necessary to preserve integrity for final inspection and occupancy.

END SECTION 062023 VOH INTERIOR FINISH CARPENTRY

064013 VOH EXTERIOR ARCHITECTURAL WOODWORK

1. SUMMARY

This Section includes the following:

1. Exterior wood trim to be painted or metal clad. This occurs primarily at the edge/face of bridge framing, and the new sill for the window above the upper vestibule roof.

Related Sections:

012300 Alternates and Allowances
062023 Interior Finish Carpentry (includes bridge canopy ceiling material)
099113 Exterior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	For whole frieze panel replacement only.
Product Cut Sheets	**X**	For any pre-manufactured/treated products, wood filler.
Product Samples	**X**	Each type of wood – min 12" board length
Mock-ups	**X**	As necessary for any replacement frieze panels.
Closeout submittals		

3. PRODUCTS

A. LUMBER TRIM FOR PAINTED FINISH
   i. Species and Grade for new material as necessary: Pre-primed Lifespan Solid Select treated lumber.
   ii. Maximum Moisture Content: 10-15%
   iii. Finger Jointing: Not Allowed
   iv. Face Surface: Smooth
   v. Clear – No knots.
   vi. Primer: two coats alkyd-based primer.
   vii. Dimensions: 1x and 5/4 thicknesses as required by details.

B. MISCELLANEOUS MATERIALS
   i. Fasteners: Provide stainless steel nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.
   ii. Wood Glue: Waterproof resorcinol glue recommended by manufacturer for exterior carpentry.
   iii. Sealants: Tremco Latex or silicone as appropriate for painted finish and water resistance.

iv. Drip edges and flashing. Copper drip edge and/or Z-flashing at top surface of all horizontal trim (currently with flashing) with water shedding elements above.
v. Wood Filler/Patch: Abatron Liquid Wood or approved equal.
   a. 2 part penetrating wood consolidant, Greenguard Certified, zero VOC.
   b. 2 part wood replacement putty, Greenguard Certified, zero VOC.

4. EXECUTION & QUALITY CONTROL

A. PREPARATION
   i. Store and install all lumber, sheet goods, and other material so it is flat and protected from weather and other sources of moisture.
   ii. Stack lumber, sheet goods, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
   iii. Do not install materials that are wet, moisture damaged or mold damaged.
   iv. Clean and examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance.
   v. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged. Do not install material that has knots or other disfigurements that may bleed through to surface after painting.
   vi. Proceed with installation only after unsatisfactory conditions have been corrected.

B. INSTALLATION, GENERAL
   i. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
   ii. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
   iii. Scribe and cut exterior finish carpentry to fit adjoining work. Seal cuts and ends with same finish as material.
   iv. Install to tolerance of 1/8 inch in 96 inches for level and plumb.
   v. Use scarf joints for end-to-end trim joints.
   vi. Stagger end joints in adjacent and related members.
   vii. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long except where necessary.
   viii. Coordinate exterior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.
   ix. Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.

x. Unless otherwise indicated, countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
xi. Backprime all trim lumber and add primer & paint at all cuts made during installation. 6- sided priming prior to installation is required.
xii. Sealant Use: Caulk all butt joints.
xiii. LifeSpan products to be installed per manufacturer's specific instructions for cutting, fastening, spacing, painting, etc.

C. REPAIRS AND PROTECTIONS
i. Replace exterior finish carpentry that is damaged or does not comply with requirements. Repair if work complies with requirements and shows no evidence of repair or refinishing.
ii. Protect installed products from damage from weather and other causes during construction, prior to painting.

END SECTION 064013 VOH EXTERIOR ARCHITECTURAL WOODWORK

071113 VOH FOUNDATION MOISTURE PROTECTION & DAMPROOFING

1. SUMMARY

The new hoistway location creates a water intrusion risk into the original building wall below grade to the north of the hoistway, as well as into the hoistway and LULA pit. Robust waterproofing of this portion of the existing masonry wall and of the new foundation is critical to project success. This section identifies foundation waterproofing required at the exterior surfaces of the existing masonry and the new concrete foundation walls. It also includes drainage board to be applied over the above-referenced waterproofing.

Related Sections:

072100	Thermal Insulation
072500	Envelope Control Layers

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	**Req.**	**Specifics**
Shop Drawings	NA	-
Product Cut Sheets	**X**	- All listed products - Environmental Product Declaration (EPD) - Health Product Declaration (HPD)
Compatibility	**X**	- Provide confirmation of control layer and adhesive product compatibility with adjacent products.
Product Samples	**X**	All listed products
Mock-ups		
Closeout submittals	**X**	Warranty Information

3. PRODUCTS

A. ADDITION - SUB-SLAB

i. Manufacturer: W. R. Grace and Co./GCP Applied Technologies or approved equal.

ii. Product: PrePrufe 160R Plus pre-applied waterproofing membrane sheet.

iii. Location: Install PrePrufe system as shown on details to create a continuous waterproof membrane under the slab of the addition, including turning up or down perimeter foundation walls. PrePrufe that turns up the wall shall be cover wall-footing joint by at least 12” and shall be overlapped by fluid-applied Procore on foundation walls. A single roll of PrePrufe 160R covers 460 SF – the addition is only 70 SF, so the excess PrePrufe could be used on the foundation walls in lieu of the Procore spray-applied and/or as the membrane flashing that spans the vertical concrete wall to brick wall joint.

iv. Accessories:

a. PrePrufe Tape 4” – for covering cut edges, roll ends, joints, penetrations, and detailing.

b. Bituthene Liquid Membrane - manufacturer's recommended product for foundation slab and wall penetrations, including at pipes penetrations.

v. See manufacturer's installation requirements.

B. EXISTING BRICK WALL

i. Manufacturer: W. R. Grace and Co./GCP Applied Technologies or approved equal.

ii. Product: Procor 75 Spray Grade, 2-part fluid-applied waterproofing membrane for below-grade applications.

iii. Location: Existing brick masonry walls north of the new hoistway that will be below grade.

iv. Accessories:

a. PrePrufe Tape 4" – for covering larger joints, penetrations, and detailing.

b. Bituthene Liquid Membrane - manufacturer's recommended product for foundation slab and wall penetrations, including at pipes penetrations.

v. See manufacturer's installation requirements.

C. DRAINAGE BOARD

i. Manufacturer: Grace

ii. Product: Hydroduct 220, Drainage Board with Filter Fabric

iii. When adhering Hydroduct 220 directly to Bituthene waterproofing membranes, Preprufe Detail Tape should be used. When using Preprufe Detail Tape, press firmly to ensure good adhesion. Substrate and job site conditions will determine the attachment pattern. Additional consideration should be given in high wind exposures. Abut adjacent rolls with excess fabric overlapping in shingle fashion.

iv. See manufacturer's installation requirements.

D. PERIMETER DRAINAGE

i. Provide continuous perimeter foundation drainage with filter fabric protection, typical, as indicated on structural drawings and with connection to existing perimeter drainage system.

ii. See civil/structural drawings and specifications for back-fill requirements.

E. WATERSTOP

i. Manufacturer: Sika, or equivilent

ii. Product: Greenstreak Flexible PVC Waterstop Dumbell 6" wideand 3/8" thick.

iii. Locations: See structural drawings.

iv. See manufacturer's installation requirements.

4. EXECUTION & QUALITY CONTROL

A. PREPARATION

i. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

a. Substrate will need to be cleansed prior to installation.

b. Verify that substrates are free of oil, grease, dirt and other contaminants.
c. Verify that concrete is visibly dry and free of moisture as recommended by waterproofing manufacturer.

B. FOUNDATION WATERPROOFING
i. Note that Sub slab waterproofing is intended to have the reinforcing installed on it and the concrete poured directly on it. Protect the substrate during installation of reinforcing and pouring of concrete.
ii. Apply from the top of the walls down to the top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
iii. Architect shall inspect and approve water-proofing before backfilling.

C. PROTECTION
i. Keep all materials dry, clean, and protected from the weather prior to installation.
ii. Clean construction spills and remove masking materials after installation.
iii. Water proofing shall not be visible on the foundation wall above grade. Any splashes or spills that are visible will need to be removed by the contractor.

END SECTION 071113 VOH FOUNDATION MOISTURE PROTECTION & DAMPROOFING

071900 VOH CONCRETE SEALER

1. SUMMARY
   This section describes the concrete floor sealer for new concrete slabs-on-grade.

   Related Sections:
   Structural specifications (on drawings).

2. SUBMITTAL PROCESS
   The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	NA	-
Product Cut Sheets	**X**	- Sealing and Curing products (show VOC content) and any accessory materials. - Maintenance Requirements/Manual
Product Samples	**N/A**	
Mock-ups		- Provide an in-situ mock-up in an inconspicuous area in the building for Architect and Owner review
Closeout submittals	**X**	Warranty Information

3. PRODUCTS
   A. SEALED CONCRETE (CURE AND SEAL)
      i. Manufacturer: Butterfield, OAE
      ii. Basis of Design Product: Clear Guard H2 Water-Based Cure and Seal, Acrylic Sealer, or approved equal.
      iii. Material: Emulsified Acrylic
         a. Non-yellowing
         b. Protects surface from dirt and staining
         c. Chemical Resistance: 24-hr spot resistance to antifreeze, deicing salts, foods, oil, calcium and sodium chlorides.
            1. Minimizes affects of de-icing salts and exposure to gas or oil, greases, acids, solvents and other chemicals.
         d. Application: Can be applied to new or existing/old concrete surfaces.
         e. Finish: high-gloss
         f. UV-resistant
         g. VOCs: <100g/L
      iv. Location: See finish plan.

4. EXECUTION & QUALITY CONTROL
   Store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. QUALIFICATIONS
   i. Experience: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce specified work.
   ii. Supervision: Maintain competent supervisor who is at Project during times specified work.
   iii. Manufacturer Qualification: Approved by manufacturer to apply products.

B. STORAGE AND ENVIRONMENTAL LIMITATIONS: Comply with manufacturer's written instructions for storage of material, substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting product application.

C. PREPARATION
   i. Prepare substrates to be free of coatings, sealers or hardeners. Fill cracks, holes and depressions as per manufacturer’s recommendations.

D. INSTALLATION AND APPLICATION
   i. Comply with manufacturer's written instructions for installation and application practices and using appropriate coverage rates.

E. CLEANING AND PROTECTION
   i. Comply with manufacturer's written instructions for cleaning and protection after installation.
   ii. Protect from oily or greasy construction activities or equipment.

END SECTION 071900 VOH CONCRETE SEALER

072100 VOH THERMAL INSULATION

1. SUMMARY

This section identifies the exterior insulation to be used at the walls, roof, foundation, and subslab. In addition, this section addresses the fasteners, finishes, and best practices for installation.

See wall sections for required insulation values/thicknesses, required installation requirements (i.e. min layers and/or sealing/taping), and location/application of materials listed below.

Note that this project will be subject to the Vermont 2020 Commercial Building Energy Standards (CBES). These regulations mandate thermal energy performance, as well as air tightness, including the requirement to test the building envelope or provide building envelope commissioning. The Thermal Insulation, Envelope Control Layers, Joint Sealant, Door, and Window specifications, in concert with the architectural drawings, provide the structure for satisfying the air sealing requirements for the building. The Air Tightness Compliance Testing is noted in the Envelope Control Layer specification, providing guidance for the testing process.

Related Sections:

061000	Rough Carpentry (see on-drawing structural specifications)
062023	Interior Finish Carpentry
071113	Foundation Moisture Protection & Damproofing
072500	Envelope Control Layers
075423	TPO Roofing

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	**Req.**	**Specifics**
Shop Drawings	**X**	- Details for board insulation attachment
Product Cut Sheets	**X**	- For each listed product - Environmental Product Declaration (EPD) - Health Product Declaration (HPD)
Compatibility Matrix	**X**	- Provide confirmation of control layer and adhesive product compatibility with adjacent products, see Section 072500 Envelope Control Layers. - No enclosure submittals will be approved until this matrix is submitted. (An example for a previous project may be requested from the Architect if the contractor and subcontractors are unfamiliar with this practice.)
Product Samples	NA	
Mock-ups	**X**	- Exterior wall mock-up with window opening, with all envelope control layers and sealants and demonstrating connections, terminations, and flashings.
Closeout submittals	**X**	- Warranty Information

3. PRODUCTS

EXTRUDED POLYSTYRENE BOARD (XPS) IS NOT ACCEPTABLE FOR USE ON THIS PROJECT WITHOUT EXPRESS PERMISSION FROM THE ARCHITECT.

A. SUB-SLAB RIGID BOARD INSULATION - EXPANDED POLYSTYRENE BOARD (EPS)
   i. Manufacturer: Dow Chemical Company, Branch River, Atlas or approved equal.
   ii. BOD Product: Expanded Polystyrene Board (EPS) Insulation, Type II, 15 psi.
   iii. Thermal Performance: min R-4/inch
   iv. Thickness: As indicated on drawings
   v. Gaps: 1/8" gaps or less to be filled with sealant, gaps larger than 1/8" to be fill with one-part high expansion foam.
   vi. Locations/Installation:
      a. Sub-slab, (2) layers continuous at sub-slab, stagger seams. Maximum gap between panels of one-quarter inch - fill all gaps.
      b. Foundation wall.
      c. In other locations as indicated on drawings

B. RIGID BOARD INSULATION – ROOF INSULATION
   i. Manufacturer: Dow Chemical Company, Owen's Corning, DuPont, ACH, Atlas, or approved equal.
   ii. BOD Product: Polyisocyanurate board Insulation, fiberglass, or foil faced.
   iii. Thermal Performance: min R-5.6/inch (aged, measured at 75^{O}F, ASTM C518)
   iv. Thickness: As indicated on drawings
   v. Gaps: Maximum gap between panels of one-quarter inch - fill all gaps. 1/8" gaps or less to be filled with sealant, gaps larger than 1/8" to be fill with one-part high expansion foam.
   vi. Covering: In locations with exposed interior foam, glass-fiber-infused polyisocyanurate foam core laminated between 1.0 mil smooth, reflective aluminum facers on both sides is required (i.e. Thermax, OAE)
   vii. Locations/Installation:
      a. Roof Insulation: (2) layers of with seams staggered, typ. (+ tapered insulation, see Section 075423 TPO Roofing and Section details)
      b. As indicated on drawings

C. POLYISOCYANURATE BOARD INSULATION – EXTERIOR WALL INSULATION
   i. Manufacturer: Dow Chemical Company, Owen's Corning, DuPont, ACH, Atlas, or approved equal.
   ii. Product: Polyisocyanurate board Insulation, fiberglass, or foil faced.
   iii. Installation: 1 layer of full thickness (noted above) or (2) layers of half thickness (noted above) with seams staggered, typ.
   iv. Gaps: Maximum gap between panels of one-quarter inch - fill all gaps. 1/8" gaps or less to be filled with sealant, gaps larger than 1/8" to be fill with one-part high expansion foam.
   v. Covering: In locations with exposed interior foam, glass-fiber-infused polyisocyanurate foam core laminated between 1.0 mil smooth, reflective aluminum facers on both sides is required (i.e. Thermax, OAE)

D. MINERAL-WOOL BATT INSULATION– WALL/CEILING INSULATION
   i. Manufacturer: Rockwool, Thermafiber or approved equal.
   ii. Bod Product: “Comfortbatt”
   iii. Thermal Performance: min as noted below for wood frame construction (aged, measured at 75^{O}F, ASTM C518)
      a. R13 (2.29) - 3.5” thick (89 mm)
      b. R15 (RSI 2.64) – 3.5” thick (89 mm)
      c. R21 (3.70) - 5.5” thick (140 mm)
      d. R23 (RSI 4.05) – 5.5” thick (140 mm)
      e. R30 (RSI 5.28) – 7.25” thick (184 mm)
      f. R38 (6.69) - 9.5” thick (241 mm)
   iv. Thickness: As indicated on drawings
   v. Gaps: Maximum gap between panels of one-quarter inch - fill all gaps. 1/8” gaps or less to be filled with sealant, gaps larger than 1/8” to be fill with one-part high expansion foam.
   vi. Locations/Installation:
      a. Comfortbatt to be used at the interior expansion joint locations between new and existing buildings, and where some compression is required
      b. As shown on the Drawings.

E. CELLULOSE INSULATION –Dense Pack Cellulose for Walls and roof assemblies
   i. Manufacturer: National Fiber, or approved equal.
   ii. Product: Cellulosic-Fiber Insulation: chemically treated for flame resistance, processing, and handling characteristics.
   iii. Moisture Content per manufacturer’s installation requirements.
   iv. Fill and Density per manufacturer’s installation requirements.
   v. Formaldehyde free formula with borate flame and insect resistance treatment.
   vi. Thermal Performance: min as noted below for wood frame construction (aged, measured at 75^{O}F, ASTM C518)
      a. Walls:
         1. 2x4=R-13 (3.4 pcf installed density)
         2. 2x6 = R-20 (3.4 pcf installed density)
         3. 2x8 = R-27 (3.5 pcf installed density)
         4. 2x10 = R-35 (3.6 pcf installed density)
         5. 2x12 = R-42 (3.7 pcf installed density)
      b. Roof Assemblies: See drawings for dimensioned depths of dense pack cellulose
   vii. Locations/Installation:
      a. As shown on the Drawings.

F. CLOSED-CELL SPRAY POLYURETHANE FOAM (LOW-GWP)
   i. Manufacturer: Lapolla Industries or Demilec Heatlok HFO, with Solstice-LBA blowing agent by Honeywell, or approved equal.
   ii. BOD Product: Low-GWP-blown closed-cell spray foam. Foam-Lok 2000-4G, or approved equal.
   iii. maximum flame-spread = 25
   iv. smoke-developed indexes = 450

v. minimum density of 2.0 lb/cu. ft.,
vi. Zero ozone depletion: 0
vii. Blowing agent Global Warming Potential: GWP100 < 25, which can be met with either of the following:
  a. Use of a natural refrigerant (i.e. pentane and cyclopentane), or
  b. a synthetic refrigerant with a GWP100<5
viii. Thermal Performance: min R-6.6/inch (aged, measured at 75^{O}F, ASTM C518)
ix. Covering: In locations with exposed foam, provide 15 minute rated intumescent coating per life safety code.
x. Installer: Certified installer with minimum 6 months experience.
xi. Thickness: As indicated on drawings
  a. In lifts as recommended by manufacturer's instructions.
  b. As shown on details for air sealing or where main insulation thickness is compromised.
xii. Locations/Installation:
  a. As shown on the Drawings and around envelope penetrations.

G. BATT- ACOUSTIC INSULATION
i. Manufacturer: Rockwool, Thermafiber, Owens Corning, Certainteed or approved equal.
ii. BOD Product: Formaldehyde-free Fiberglass or mineral wool "SafenSound" or SAFB acoustical batt insulation or approved equal.
  a. Note: Mineral wool may be required per life safety code at areas requiring non-combustible insulation. See drawings.
iii. Dimension: 3.5" or 6" x 16.25" or 24.25" x 96" batts where indicated.
iv. Locations:
  a. Provide 3.5 and 5.5" batts in partitions around all toilet rooms and around lift hoistway, and in ceiling of lift.

H. MINERAL-WOOL BATT- FIRE INSULATION
i. Manufacturer: Rockwool, Thermafiber or approved equal.
ii. Product: "SafenSound" or SAFB acoustical insulation or approved equal.
iii. Dimension: Strips as specified by UL Label fire closure system.
iv. Locations: Where indicated and at all door frames.

I. JOINT-AND-PENETRATION TREATMENT MATERIALS
i. Manufacturer: Todol Products or approved equal.
ii. Product: Pur-Fill 1G, non-CFC, Spray foam- low and high expanding as appropriate or approved equal. Low-expanding for use at window and doors and high expansion in all other locations.
iii. At window rough openings: Use only low expanding spray foam to fill cavity.
iv. At other penetrations through envelope and gaps in rigid insulation: Use Pur-Fill as necessary to supplement Spray Polyurethane Foam, but do not depend on Pur-Fill as air/weather barrier.

J. MISCELLANEOUS MATERIALS

i. Product: Use insulation manufacturer's recommended adhesive, tapes, and fastener attachment spacing for each type of insulation and/or listed product.
ii. Product: Acoustical Sealant- joint sealant for interior gaps under ¼". Low-VOC products for any/all interior applications is preferred.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. GENERAL
i. Install only insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
ii. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
iii. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise indicated. Stagger insulation joints if multiple layers.

B. INSTALLATION OF SUB-SLAB INSULATION
i. Vertical surfaces: If not otherwise indicated extend to top of footing unless otherwise indicated.
ii. Horizontal surfaces: Loose lay and tightly abut horizontal insulation units to minimize gaps. Seal gaps as noted. Extend insulation over the entire horizontal sub-slab surface unless otherwise indicated.

C. INSTALLATION OF EXTERIOR WALL RIGID INSULATION
i. Fill voids in completed installation with spray foam, or sealant as recommended by insulation manufacturer.

D. INSTALLATION OF ROOF INSULATION
i. Per roofing manufacturer's requirements- see Roofing Specifications.
ii. Stagger joints between layers.

E. INSTALLATION OF LOOSE FILL/DENSE PACKED CELLULOSE
i. Install per manufacturer's recommendations.
ii. Air seal all penetrations, base and top plates prior to installation of cellulose.
iii. Install dense packed cellulose to minimum density of 3.5 PCF.

F. INSTALLATION OF INTERIOR SOUND INSULATION BATTS
i. For framed wall cavities where cavity insulation heights exceed 96 inches, support un-faced blankets mechanically.
ii. Where batts are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated, with mechanical support. Extend wall insulation to deck (or plate) with acoustical sealant as shown on partition schedule.

G. INSTALLATION OF SPRAY FOAM INSULATION

i. Apply as specified by manufacturer for weather conditions.
ii. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets penetrating walls is completed, and windows, electrical boxes, and other items not indicated to receive insulation are masked.

END SECTION 072100 VOH THERMAL INSULATION

072500 VOH ENVELOPE CONTROL LAYERS

1. SUMMARY

This section identifies the vapor, air and weather control layers at the new exterior walls; and associated tapes, fasteners, sealants, and best practices for installation.

Related Sections:

033000 Cast-in-Place Concrete (see on-drawing structural specs)
061000 Rough Carpentry (see on-drawing structural specs)
062023 Interior Finish Carpentry
071113 Foundation Moisture Protection & Damp-proofing
072500 Envelope Control Layers
075423 TPO Roofing
079200 Joint Sealants

The Thermal Insulation, Envelope Control Layers, Joint Sealants, Door, and Window specifications, in concert with the architectural drawings, provide the structure for satisfying air sealing requirements for the building. See Section 014517 Field Testing of Exterior Assemblies for Air Leakage testing.

Minimum air tightness performance metrics:

New Addition
Air/Vapor-Barrier Assembly Air Leakage Requirement: Maximum 0.15 cfm per sq. ft. of five-sided (i.e. above grade) exterior shell at 50 Pa pressure.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	NA	-
Product Cut Sheets	**X**	- All listed products
Compatibility Matrix	**X**	- Provide confirmation of control layer and adhesive product compatibility with adjacent products (matrix format). - No enclosure submittals will be approved until this matrix is submitted.
Product Samples	**X**	All listed products
Mock-ups	**X**	Exterior wall mock-up with window opening, with all envelope control layers and sealants. Mock up can be part of permanent work.
Closeout submittals	**X**	Warranty Information

3. PRODUCTS

A. UNDERSLAB VAPOR CONTROL LAYER - SHEET MEMBRANE: SUB-SLAB
   i. Manufacturer: Stego Industries, LLC, Husky, OAE
   ii. BOD Product: Stego Wrap Vapor Barrier, Husky Yellow Guard, OAE
   iii. Thickness: 15 mil.

iv. Permeance Rating: maximum permeance rating of 0.0086 perms.
v. Dimension: 14 ft x 140 ft roll.
vi. Installation: Provide under all new slabs, extending out and taped to wall vapor control layers. See details.

B. UNDERSLAB VAPOR CONTROL LAYER JOINT-AND-PENETRATION TREATMENT MATERIALS
i. Manufacturer: Stego Industries, LLC, Husky, OAE
ii. BOD Products:
a. Stego Tape- 3.75" x 180' roll polyethylene tape w/ acrylic adhesive. 6mil, 0.03perms, OAE
b. Stego Mastic- 2 gallon and 5 gallon buckets. 0.17 perms, OAE
c. Stego Crete Claw, 6”. 26mil, 0.03 perms, OAE
d. Stego Tack Tape, 2”. 30mil, 0.03 perms, OAE

C. INTERIOR VAPOR CONTROL LAYER
i. Manufacturer: Pro Clima/ Moll bauökologische Produkte, Imported by 475 High Performance Building Supply, 131 Union Street, Brooklyn NY, 11231 Tel: 718-622-1600; Email: info@foursevenfive.com; Web: www.foursevenfive.com
ii. Product: Reinforced Polyethylene Copolymer Vapor Retarder membrane ‘Intello +’ Class A, B & C, 15 mils thick, or approved equal “smart” vapor retarder.
iii. Air Permeance: 0.00005cfm/ft2 per ASTM E2178
iv. Vapor Perm Rating: Variable from 13.2 to <.13 perms.
v. Vapor-Retarder Tape and Fasteners: Pressure-sensitive tape and fasteners of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder. Tape all seams and tape material to adjacent barriers for full barrier. Installation strips- see E. below.
vi. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor retarders securely to substrates indicated.
vii. Pipe, duct and cable sealing in Reinforced Polyethylene Copolymer Vapor Retarder: ROFLEX and KAGLEX gaskets.
viii. Substitutions: If Certainteed “Membrain” vapor variable membrane is proposed as a substitution, it will require Insulweb netting behind.

D. EXTERIOR AIR CONTROL LAYER AND WEATHER BARRIER
i. Manufacturer: Pro Clima/Moll.
ii. Substrate: Taped Plywood sheathing - See 061000 Rough Carpentry
iii. Product: "Mento 1000" air-tight, vapor open membrane
iv. Tapes and Fasteners: Pro Clima Vana, tape all seams and tape material to adjacent barriers for full air barrier.
v. Sill Pan: Extoseal Encors- Pro Clima Acrylic modified butyl adhesive sill tape.
vi. Pipe, duct and cable sealing in Reinforced Polyethylene Copolymer Vapor Retarder: ROFLEX and KAGLEX gaskets.

E. SILL SEAL
i. Manufacturer: Dow

ii. Product: 5.5" Styrofoam unfaced polystyrene roll insulation.

F. WEATHER BARRIER TAPE
   i. Manufacturer: 3M, Siga, Huber, Venture, OAE.
   ii. Product: Huber ZIP System Tape (if ZIP), or Siga Wigluv, 3M All weather flashing tape 8067, Huber ZIP System Tape (if plywood) with solid acrylic adhesive, Venture 1585CW-P2 (if plywood, or approved equal.
   iii. Location: At all joints in plywood sheathing, and between plywood sheathing and connecting materials. Window jamb and head flashing.

G. WINDOW SILL FLASHING TAPE
   i. Manufacturer: Dupont, Proclima, or approved equal.
   ii. Product: Tyvek Flexwrap, ProClima Extoseal Encors, or similar flexible tape with butyl adhesive. (Rubberized Asphalt tapes are not acceptable)
   iii. Location: Window, storefront and curtain wall sill pans.

H. WINDOW/DOOR HEAD AND JAMB FLASHING TAPE
   i. Manufacturer: Huber, Proclima, SIGA or approved equal.
   ii. BOD Products: ZIP tape, ProClima Vana, SIGA Wigluv, or similar flexible tape for exterior applications.
   iii. Location: Window and door rough openings

I. AIR SEALING SYSTEMS/CONNECTIONS
   i. Location: A continuously air-seal enclosure, to meet the minimum air-leakage target is required. Locations therefore include but are not limited to all fenestration, MEP openings, sub-slab and sub-slab to walls, walls to roof, roof to all roof penetrations and any other exterior assemblies in and of themselves and to all adjacent assemblies.

J. MISCELLANEOUS MATERIALS
   i. Product: Adhesives and/or tapes as specified by manufacturer for listed products.
   ii. Product: Neoprene boots (and associated tape) as required to accommodate stack expansion and contraction. Note this will require close coordination with plumbing subcontractors to ensure appropriate sequencing for inclusion.
   iii. Product: Acoustical Sealant- joint sealant for interior gaps under ¼". Low-VOC products for any/all interior applications is preferred.
   iv. Product: Fiberglass mesh Insect screen. Install as shown on details at the top and bottom of all rain-screen vent cavities. For bottom of cavities, install continuous along cavity by pinching back of screen between strapping and wall insulation, wrapping around the bottom of the strapping, and stapling to the face of the strapping. For top of cavities, staple continuous strip over strapping across area intended to be open for venting.

4. EXECUTION & QUALITY CONTROL

Careful attention to sealing seams and penetrations in air and vapor control layers is important for preventing air leakage and vapor transmission across the building envelope. Store and install according to manufacturer's written instructions unless indicated otherwise.

A. GENERAL
   i. See Sequence of Operations noted on the Drawings for installation procedures for each air/vapor barrier system. Install joint sealants and treatments and transition strips per manufacturer's written instructions.

B. LOOK-AHEAD SCHEDULING AND PREINSTALLATION CONFERENCE
   i. Contractor to include key milestones for control layer and insulation work on the project schedule and to provide ample notice to the architect, envelope commissioning agent, relevant contractors and other appropriate parties. Such milestones shall include as a minimum:
      a. Pre-installation conference
      b. Submittal and compatibility matrix schedule and review
      c. Mock-ups required and timing for review and follow-up
      d. Initial testing, progress testing and final testing milestones for insulation and control layer inspection (see also Section 4.E.i. below)
   ii. Superintendent to facilitate pre-installation conference with architect, Clerk of the Works, envelope commissioning agent, relevant contractors including representation from MEP trades, and other parties as appropriate prior to work beginning. Pre-installation conference shall include review of building envelope drawings and discussion of the required mock-ups.
   iii. Perform pre-installation conference with all installers associated with the building envelope and before constructing wall mockups.

C. PREPARATION
   i. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
      a. Verify that substrates are free of oil, grease, dirt and other contaminants.
      b. Verify that concrete is visibly dry and free of moisture and has cured for minimum time period recommended by air-barrier manufacturer.

D. PERFORMANCE REQUIREMENTS
   i. General: Exterior air/vapor barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration.
   ii. Air/vapor-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
   iii. Air/Vapor-Barrier Assembly Air Leakage at new construction: See target noted at the beginning of this spec section for project specific requirement.

E. FIELD QUALITY CONTROL
   i. Inspections:
      a. Air/vapor-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Notify architect before starting critical air sealing steps and as specified below.
      b. Inspections will include the following:

1. Continuity of air/vapor-barrier system has been achieved throughout the applicable areas of building envelope with no gaps or holes.
2. Continuous structural support of air/vapor-barrier system has been provided.
3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
4. Site conditions for application temperature and dryness of substrates have been maintained.
5. Maximum exposure time of materials to UV deterioration has not been exceeded.
6. Surfaces have been primed, if applicable.
7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
8. Termination mastic or tape has been applied on cut edge per manufacturers' requirements.
9. Strips and transition strips have been firmly adhered to substrate with appropriate application pressure.
10. Compatible materials have been used. (Compatibility matrix is required for inclusion with submittal.)
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
13. All penetrations have been sealed.

c. Testing: The Contractor shall schedule first instance testing with the Owner's testing agency. Depending on schedule, full compliance testing may not be possible to achieve when the building is totally enclosed, fully insulated, air barrier is installed and completed, window and doors are installed, and all items penetrating the building envelope are installed, but before any interior trim work or interior floor and ceiling finishes have been installed, therefore first instance testing and progress testing are more likely the path to compliance. Coordination and timing of testing to be coordinated and confirmed with the architect. The Architect and Owner shall be informed of the testing date two weeks in advance.
    1. Qualitative Air-Leakage Testing: Air-barrier assemblies will be tested for evidence of air leakage with smoke pencil and/or infrared camera with pressurization or depressurization.
    2. Quantitative Air-Leakage Testing: Blower Door Test to comply with performance requirements.
    3. Repair or remove and replace deficient air-barrier components for retesting as specified above.
    4. Final Testing upon completion of the project to confirm that the project is in compliance with the CBES.

F. INSTALLATION OF AIR/VAPOR CONTROL LAYERS

i. Extend air/vapor control layers to extremities of areas to be protected from air/vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend air/vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation. (See drawings.)
ii. Seal vertical joints in air/vapor control layers over framing by lapping not less than two wall studs. Fasten air/vapor control layers to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c. Tape all overlaps. Locate all joints on top of solid substrate. Use a PRESSFIX tape pressurization tool to ensure there is sufficient back-pressure when applying the pressure sensitive Pro Clima tapes. Make sure that tape joints are not permanently under stress, i.e. are supported by a batten or by cross taping the taped joint with 12" long pieces of tape every 12"
iv. Firmly attach air/vapor control layers to solid substrates with appropriate fasteners as recommended by air/vapor control layers manufacturer.
v. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating air and vapor control layers as required by air/vapor control layers manufacture's specifications, to meet testing targets and as described in this section.
vi. Repair tears or punctures in vapor retarders immediately before concealment by other work. Seal with appropriate tape or another layer of air/vapor control.

G. SUB-SLAB VAPOR BARRIER
i. Overlap seams a minimum of 6" and tape using Stego tape.
ii. Allow at least 24" overhang at edge of slab to allow wrapping from perimeter of slab up to wall sheathing and fastening with wall air/vapor control layers.
iii. Use cut pieces of Stego Wrap, Stego tape and Stego mastic to fully seal around column openings and other openings or punctures through vapor barrier.
iv. Provide continuous waterproofing at elevator pit. See drawings and associated spec section.
v. Architect shall review vapor barrier installation before slab pour.
vi. Sub-slab barrier shall be taped to wall control layers as shown on the drawings.

H. CONNECTIONS
i. As per drawings and manufacturers' specifications and installation instructions. Any discrepancy between drawings and manufacturers' specifications and installation instructions shall be brought to the attention of the Architect prior to installation.
ii. Provide compatibility matrix showing compatibility of all materials in contact.

I. ROOF AIR-SEALING
i. Where plumbing, HVAC, or other items penetrate the air barrier, use a taped neoprene boot or appropriate tape method to seal the gap around the stack while permitting movement due to stack expansion or contraction.
ii. Seal wall air/vapor membrane to roofing membrane at parapets and coping to complete air/vapor barrier envelope. Note air/vapor control layer continuity as per drawings.

J. PROTECTION

i. Protect air/vapor control layers: If exposed to UV light and harmful weather exposure for more than the maximum allowed by manufacturer, remove and replace air/vapor control layer or install additional, full-thickness, air/vapor barrier application after repairing and preparing the overexposed membrane according to manufacturer's written instructions.
ii. Clean construction spills and remove masking materials after installation.
iii. Protect air/vapor barrier from contact with incompatible materials and sealants not approved by air/vapor control manufacturer.

END SECTION 072500 VOH ENVELOPE CONTROL LAYERS

074600 VOH EXTERIOR SIDING

1. SUMMARY

This section specifies the fiber cement panels cladding the addition, ~~as well as the composite slate accent siding at the top of the addition, as shown on the building elevations.~~ In addition, this section addresses the fasteners, finishes, associated sealants, and best practices for installation. Note – required mock-ups could be reviewed along with the window mock-up.

Related Sections:

061000 Rough Carpentry (Architectural)
062013 Exterior Finish Carpentry
072500 Envelope Control Layers
099113 Exterior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	-
Product Cut Sheets	**X**	- For each listed product including individual components and finishes. - siding contractor installation authorization
Product Samples	**X**	- Full set of factory color samples
Mock-ups	**X**	- In situ mock up of panel joints (top, bottom, side, corner)
Closeout submittals	**X**	Warranty Information and maintenance information

3. PRODUCTS

A. CEMENT BOARD PANEL SIDING

i. Locations: Elevator addition walls from base up to roof parapet.
ii. Manufacturer: James Hardie or approved equal
iii. Product: Architectural Collection panel siding.
iv. Thickness: .0312”
v. Size: 4’ x 8’ or 4’x10’ panels ripped into 10” high final panels (to match 4 brick courses in height).
vi. Finish: Factory-applied finish- standard color, “Fine Sand” texture.
   a. Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping
vii. Underlayment: 2x4 vertical strapping at 16” oc. (see Section 061000)
viii. Fasteners: Corrosion resistant siding nails or screws, in concert with manufacturers installation instructions. Fastening at no greater than 16” O.C. per manufacturer’s standard installation requirements. Note: exposed fasteners will require finished cover painting.
ix. Trim: EZ-Trim in prefinished color to match siding as required for a clean application on large panel areas.

x. Warranty: Provide twenty (20) year Warranty on materials and workmanship from date of Substantial Completion. Provide fifteen (15) year warranty on finish (peeling, cracking, chipping) from date of material purchase.

B. SHEET METAL FLASHINGS AND TRIM
- i. Manufacturer: n/a
- ii. Product: Provide metal z-flashing at all horizontal panel joints.
- iii. Product: Provide drip flashing at all panel bottoms.
- iv. Product: Provide metal J-trim at all vertical panel joints with adjacent materials.
- v. Product: Provide custom surround at all window and door jamb/head trim – see detail drawings.
- vi. Product: Provide custom inset corner trim – see detail drawings.
- vii. Product: Provide custom metal flashings at trim locations – see detail drawings.
- viii. Color: Choose from standard prefinished colors.

C. GENERAL MISCELLANEOUS MATERIALS
- i. Product: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items as required for a complete siding system and as recommended by siding manufacturer.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. QUALITY ASSURANCE
- i. Conduct a pre-installation conference with General Contractor, Owner Representative, Architect, and siding installer. Review and finalize construction schedule; availability of materials, methods and procedures; flashing, details and penetrations; temporary protection requirements during and after siding installation.

B. EXAMINATION AND PREPARATION
- i. Examine substrates, areas, and conditions, for compliance with requirements for installation tolerances, siding panel supports, and other conditions affecting performance of the Work.
- ii. Clean substrates of substances harmful to installation, including removing projections capable of interfering with panel attachment.

C. INSTALLATION
- i. General: Comply with all of siding manufacturer’s written installation instructions.
- ii. Paint/Prime all cut ends prior to installation – this will require installer to have paint available during installation.
- iii. Paint over all exposed fasteners.
- iv. Touch up with touch up paint provided by siding manufacturer.

D. CLEANING

i. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END SECTION 074600 VOH EXTERIOR SIDING

075423 VOH TPO ROOFING

1. SUMMARY

This section identifies the membrane roofing for the new elevator and entrance addition. The project consists of installing TPO mechanically-fastened roofing system with RhinoBond TPO welding plate and insulation. In addition, this section addresses the associated fasteners, finishes, and best practices for installation.

Related Sections:

061000	Rough Carpentry- wood blocking, nailers, and curbs
072100	Thermal Insulation
072500	Envelope Control Layers
079200	Joint Sealants

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Engineering of Mechanical Fasteners, Fabrication and installation layouts of flashing and trim, including plans, elevations, expansion joint locations, details distinguishing shop and field-assembled work - Plan of roof sloping/ insulation layout
Product Cut Sheets	**X**	- For each listed product - Roofing contractor installation authorization - Environmental Product Declaration (EPD) - Health Product Declaration (HPD)
Compatibility Matrix	**X**	- Provide confirmation of control layer and adhesive product compatibility with adjacent products, see Section 072500 Envelope Control Layers. - No enclosure submittals will be approved until this matrix is submitted.
Product Samples	**X**	- TPO membrane
Mock-ups		-
Closeout submittals	**X**	- Warranty Information - Manufacturer's final inspection report

3. PRODUCTS

A. THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

i. Manufacturer: Carlisle Syntec Systems Inc., Firestone Inc., or approved equal

ii. Product: .060 mil thick, reinforced TPO RhinoBond mechanically fastened roofing membrane. Thickness over reinforcing scrim shall be .015 mil or thicker.

iii. Color: White (choose from range of manufacturer's colors. Consider heat island reduction and reflectivity.

iv. Size: Membrane rolls of 8', 10' or 12' wide by 100' long.

v. Standards: UL Class 1A-90,

vi. Wind speed rating of 90 mph,
vii. initial solar reflectance of 0.79, and 3 year aged reflectance of 0.70,
viii. emittance of 0.90 and 3-year aged emittance of 0.96,
ix. SRI of 110.
x. Warranty: 20 year Warranty

B. PROTECTION BOARD
i. Manufacturer: Certainteed, USG, CGC, Carlisle SynTec, Atlas roofing
ii. Product: GlasRoc Glass Mat Gypsum, Securock Roof Board or appr. equal.
iii. Dimension: 5/8" thick x 4' x 8' (use ½" at vertical applications for membrane terminations)

C. INSULATION/UNDERLAYMENT
i. Manufacturer: Dow Chemical Company, Firestone, Carlisle SynTec, Atlas roofing.
ii. Product: Polyisocyanurate foam core, Type 1, Grade 2, maximum flame-spread and smoke-developed indexes of 75 and 450, respectively.
iii. Dimension: Flat insulation- as indicated in drawings.
iv. Dimension: Tapered insulation, ¼" per foot, where shown on roof plan.

D. ADHESIVES, PRIMERS, SEALANTS, AND CLEANERS
i. Manufacturer: As furnished by membrane roofing manufacturer.
ii. Product: Low VOC Bonding Adhesive for TPO
iii. Product: Cut-Edge Sealant
iv. Product: Primer
v. Product: Water-block seal

E. PIPE BOOT AT PENETRATIONS
i. Product: Premolded, EPDM or rubber pipe collar with flexible aluminum ring bonded to base.

F. METAL EDGING, METAL DRIP EDGE AND MEMBRANE TERMINATION
i. Manufacturer: As furnished by membrane roofing manufacturer.
ii. Product: TPO lap over roof edge and 20 ga. Continuous edge cleat.

G. METAL COPING/FASCIA COVER
i. Manufacturer: Custom Fabricated. Use sheet metal to match roofing/brake metal.
ii. Material: 24 gauge, brake metal, Pre-painted Galvanized Steel Sheet.
iii. Size and Configuration: As per architectural drawings and details.
IV. Fabrication: Shop fabricated. Coordinate with architectural design.
v. Finish: Powder coated finish – Perspectra PLUS Series/Weather XL, color by each location by architect.

H. FASTENERS AND PLATES
i. Manufacturer: As furnished by membrane roofing manufacturer.
ii. Product: Engineer fastening system to provide twice as many fastening points as required by code design.

a. RhinoBond TPO Welding Plate: A 3" diameter, 0.028" thick, corrosion-resistant steel plate with high solids coating on the top surface. The plate is secured with Carlisle's HP-X Fastener or Purlin Fastener and the membrane is welded to the top surface using the RhinoBond Induction Welding Tool.
b. HP-X Fasteners: A heavy duty #15 threaded fastener with a #3 phillips drive used for membrane or insulation securement into steel, wood plank or minimum 15/32 inch thick plywood.
c. HP Term Bar Nail-Ins: A 1-1/4" long expansion anchor with a zinc plated steel drive pin used for fastening the Carlisle Termination Bar or Seam Fastening Plates to concrete, brick, or block walls.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. INSTALLATION, GENERAL

i. Hot air weld the Sure-Weld membrane using an Automatic Hot Air Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's specifications. When using .060-mil thick or thicker membrane, all splice intersections shall be overlaid with Sure-Weld non-reinforced flashing or TPO T-Joint covers.
ii. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes). Repair all seam deficiencies the same day they are discovered. Apply Cut Edge Sealant on all cut edges of reinforced membrane (where the scrim reinforcement is exposed) after seam probing is complete.
iii. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.
iv. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.

END SECTION 075423 VOH TPO ROOFING

076200 VOH SHEET METAL FLASHING AND TRIM

1. SUMMARY

This section includes metal insulation cover at foundation, sheet metal trim wraps, reveal joint between existing building and addition, copings, drip edges, and other sheet metal flashings not identified elsewhere in the project manual.

Related Sections:

061600	Sheathing
064013	Exterior Architectural Woodwork
072500	Envelope Control Layers
075423	TPO Roofing

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Highlight locations and different profiles to be used.
Product Cut Sheets	**X**	- For each listed product including individual components and finishes. - Roofing contractor installation authorization
Product Samples	**X**	Metal with Kynar Finish Color Options
Mock-ups	NA	
Closeout submittals	**NA**	

3. PRODUCTS

A. METALLIC-COATED METAL SHEET

i. Manufacturer: Englert or approved equal.

ii. Product: 24 gauge aluminum-Zinc Alloy-Coated Steel Sheet.

iii. Finish: Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

a. Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping

iv. Color: As selected from the manufacturer’s full range.

v. Warranty: Provide twenty (10) year Warranty on finish, two (2) year labor and materials from date of Substantial Completion.

vi. Locations: All exposed sheet metal trim and flashings, except for insulation cover.

B. COATED COPPER

i. Manufacturer: Revere, or equivalent

ii. Product: 20 oz. coated copper sheet

iii. Finish: Tin-zinc alloy coating on both sides.
   a. Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping
iv. Color: NA
v. Warranty: Standard manufacturer's
vi. Locations: Exposed insulation cover sheet metal at the base of the addition.

C. GENERAL MISCELLANEOUS MATERIALS
   i. Product: Provide materials and types of fasteners, protective coatings, separators, sealants, ridge vent, and other miscellaneous items as required for a complete roofing systems and as recommended by fabricator for TPO and asphalt roofing.

D. PIPE BOOT AT PENETRATIONS
   i. Product: Premolded, EPDM or rubber pipe collar with flexible aluminum ring bonded to base.

E. GUTTER
   i. Product: Stock 5" half-round gutter, galvanized, with rolled leading edge
      a. Length as shown on plan
      b. Use two-part adjustable gutter hangers, galvanized, with wire clips
      c. Provide cap at one end of gutter. Leave the other end open for drainage
      d. Finish: Kynar Finish from full range of Manufacturer's standard colors.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. QUALITY ASSURANCE
   i. Fabricator Qualifications: Provide record of successful in-service performance.
   ii. Preinstallation Conference:
      a. Meet with General Contractor, Owner Representative, Architect, and roofing installers. Review and finalize construction schedule; availability of materials, methods and procedures; flashing, details and roof penetrations; temporary protection requirements during and after roof installation.

B. EXAMINATION AND PREPARATION
   i. Examine substrates, areas, and conditions, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of the Work.
   ii. Clean substrates of substances harmful to installation, including removing projections capable of interfering with panel attachment.

C. INSTALLATION
   i. End lap all flashing and trim at least 3".

ii. Pipe Flashing: Form flashing around pipe penetration and sheet metal roofing. Fasten and seal to sheet metal roofing as recommended by SMACNA.

D. CLEANING
   i. Clean off excess sealants and clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
   ii. Touch up all minor scratches and spots.

END SECTION 076200 VOH SHEET METAL FLASHING AND TRIM

078400 VOH FIRE-RESISTIVE JOINT SYSTEMS AND PENETRATION FIRESTOPPING

1. SUMMARY

This section identifies the fire-resistive joint systems in and between fire-resistance rated construction in the EMR and hoistways as well as the fire stopping of penetrations at interior fire-resistance rated walls, smoke barriers and horizontal assemblies of the building. In addition, this section addresses the fabrication, fasteners, finishes and best practices for installation.

Related Sections:

033000	Cast-in-Place Concrete- See Structural Drawings??
061000	Rough Carpentry (Architectural)
072500	Envelope Control Layers.
092900	Gypsum Board

Related Drawing Information:
See Structural and MEP/FP drawings for penetrations and fire-resistance requirements.
See Architectural floor plans, RCPs, and partition types for locations of fire rated assemblies.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	NA	- Schedule including location and qualified design for each fire-resistive system.
Product Cut Sheets	**X**	- For each listed product
Compatibility Matrix	**X**	- Provide confirmation of control layer and adhesive product compatibility with adjacent products, see Section 072500 Envelope Control Layers. - No enclosure submittals will be approved until this matrix is submitted.
Product Samples	NA	
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information

3. PRODUCTS

A. SPRAY-ON FIRESTOPPING
   i. Manufacturer: USG Corporation, Hilti, Tremco Inc., or approved equal.
   ii. Product: CFS SP WB/Firecode brand acrylic firestop spray sealant, type SA.
   iii. Performance: movement capability
   iv. Color: Red, paintable
   v. Location: Applied to min 1/8” thickness or as indicated by UL assembly.

B. MORTAR TYPE FIRE COMPOUND
   i. Manufacturer: USG Corporation, Hilti, Tremco Inc., or approved equal.
   ii. Product: Firecode Brand Compound.

a. Performance: movement capability
b. Color: Red, paintable

iii. Location: Applied to min 1/2" thickness for 1 hr assembly, 1" thickness for 2 hr assembly, where indicated by UL assembly.

C. ACOUSTICAL SEALANT
i. Manufacturer: USG Corporation, Hilti, Tremco Inc., or approved equal.
ii. Product: CP 506/Sheetrock Brand Acoustical Sealant.
iii. Location: At base and top of acoustical walls as shown on the Drawings. (cannot be used at fire locations unless specifically rated for such use.)

D. INTUMESCENT ACRYLIC SEALANT
i. Manufacturer: USG Corporation, Hilti, Tremco Inc., or approved equal.
ii. Product: FS One/Firecode brand acrylic firestop sealant, type IA.
iii. Location: Applied to min. 1/2" thickness at appropriate penetrations and as indicated by UL assembly.

E. MINERAL WOOL FORMING MATERIAL
i. Manufacturer: Roxul, Hilti, Thermafiber, Hilti, or approved equal.
ii. Product: Type SAF or Safe mineral fiber/CP 767/777, 4 pcf min.
iii. Location: At wall/fluted steel deck joint, door frames and where indicated by UL assembly.

F. FOAM BACKER
i. Manufacturer: USG, or approved equal.
ii. Product: Backer Rod
iii. Location: As indicated by UL assembly.

G. VOC CONTENT LIMITS:
i. Sealants: 250 g/L
ii. Sealant primers for non-porous substrates: 250 g/L
iii. Sealant primers for porous substrates: 775 g/L

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. PREPARATION
i. See Wall types, indicated UL Assemblies, and plan and section details for required locations and applications.
ii. See mechanical, electrical and plumbing drawings for penetration locations and types.

B. INSTALLATION

i. Do not install when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
ii. Clean surfaces immediately before installing firestopping.
iii. Prime where recommended by manufacturer.
iv. Prepare sample area of joint systems for approval by Architect before proceeding with the work.

C. IDENTIFICATION
i. 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. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
ii. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
iii. Contractor's name, address, and phone number.
iv. Designation of applicable testing and inspecting agency.
v. Date of installation.
vi. Manufacturer's name.
vii. Installer's name.

D. CLEANING AND PROTECTION
i. Remove excess materials and protect work after installation.

END SECTION 078400 VOH FIRE-RESISTIVE JOINT SYSTEMS AND PENETRATION FIRESTOPPING

079200 VOH JOINT SEALANTS

1. SUMMARY

This section identifies the joint sealants between elements in the interior and the exterior of the building. Each trade shall be responsible for sealants associated with work they own. For joint sealants associated with particular trades and systems see the individual specification sections as listed, but not limited to, below.

Related Sections:

055000	Metal Fabrications
064023	Interior Architectural Woodwork
072500	Envelope Control Layers
074600	Exterior Siding
092900	Gypsum Board
099113	Exterior Painting
099123	Interior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	NA	- As part of other work
Product Cut Sheets	**X**	- For each product
Compatibility Matrix	**X**	- Provide confirmation of joint sealants and adhesive products compatibility with adjacent products. - No enclosure submittals will be reviewed until this matrix is submitted.
EPDs/HPDs	**X**	- For each product
Product Samples	NA	
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information

3. PRODUCTS

A. GENERAL

i. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content.
   a. Architectural Sealants: 250 g/L.
   b. Sealant Primers for Nonporous Substrates: 250 g/L.
   c. Sealant Primers for Porous Substrates: 775 g/L.

B. TYPICAL EXTERIOR SEALANT AND BACKER ROD

i. Manufacturer: Tremco Sealants

ii. Product: Dymeric 240 FC Multi-component Polyurethane Sealant or other Tremco sealant if more suitable to the task.

iii. Line/Color: By Architect from standard offerings
iv. Backer Rod: Closed cell polyethylene backer rod in sizes as indicated on the Drawings.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless noted otherwise.

A. JOINTS BETWEEN MATERIALS
   i. Material junctions: Install Backer rod and sealant to fill the width of the cavity.
   ii. Install backer rod to allow sealant depth of approximately the full joint width for joints smaller than ½".
   iii. Install backer rod to allow sealant depth of approximately one-half of joint width for joints ½" and larger.
   iv. Locations:
      a. Window jamb to Trim
      b. Trim to Concrete

B. AIR SEALING
   i. Provide continuous bead of sealant between wood-framed wall plates and concrete foundation walls. Follow manufacturer's instruction for sealing of interior vapor barrier membrane to underslab vapor barrier membrane.
   ii. Provide continuous bead of sealant between the bottom plate of the upper level wood-framed wall plates and second floor deck sheathing. Follow manufacturer's instruction for sealing of interior vapor barrier membrane.
   iii. Provide continuous bead of sealant at top plates.

END SECTION 079200 VOH JOINT SEALANTS

081100 VOH CLAD WOOD DOORS AND FRAMES

1. SUMMARY

This section identifies the insulated doors and frames for the new exterior vestibule door. In addition, this section addresses the fasteners, finishes, and best practices for installation. Exterior windows (See Section 085200) and doors if not provided by the same manufacturer and product line are required to meet the noted performance requirements as well as the coordinate aesthetically, as is suggested by the listed basis-of-design product (i.e. the interior and exterior materials, finishes, and the widths/profiles of the doors, sidelights, and windows, etc.).

Related Sections:

064023	Interior Architectural Woodwork
072500	Envelope Control Layers
081113	Hollow Metal Doors and Frames
081416	Flush Wood Doors
085200	Windows
087100	Door Hardware
099123	Interior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Elevations and details for each door and frame, including drawings showing the size, location and configuration of the panels and glazing panes
Product Cut Sheets	**X**	- For each listed product - Environmental Product Declarations (EPDs) - Health Product Declarations (HPDs)
Product Samples	**X**	- For all clear finish wood products
Mock-ups	**N/A**	-
Closeout submittals	**X**	- Manufacturer's standard warranty Information, O & M Information

3. PRODUCTS

A. GENERAL

i. All vision glass to meet ADA/ABA requirements for distance to finish floor, typ.

ii. All exterior components must meet AAMA 2605

B. EXTERIOR ALUMINUM-CLAD WOOD DOORS

i. Manufacturer: Marvin,

ii. Basis of Design Product: Signature Ultimate Commercial Door

iii. Joinery:

a. Frames: finger-jointed, edge glued core with non-finger jointed veneer from manufacturer’s full range of standard finishes.

b. Panels: Stiles to be Laminated Veneer Lumber (LVL) core with non finger-jointed veneer from manufacturer's full range of standard finishes. Top and bottom rails to be solid wood
c. Solid wood intermediate rail to be coordinated with Crash bars.

iv. Material/Finish:
a. Interior: clear pine wood (factory or field coat to match adjacent windows)
b. Exterior: aluminum clad exterior (not less than 1.3 mm thick) to meet AAMA 2605 requirements, standard color from manufacturer's standard offerings

v. Glazing: Tripane, 1" insulating unit with airspaces to match exterior window glazing.
a. Vision panel sizing to meet code and ADA requirements

vi. Size and thickness: Per schedule
a. Frame: Pre-hung frame. Clear pine wood, (factory or field coat to match adjacent windows)

vii. Threshold: ADA compliant, thermally broken

viii. Bottom: rot-resistant with weather sweep

4. EXECUTION & QUALITY CONTROL

Deliver, store and install according to manufacturer's written instructions unless otherwise indicated.

A. PREPARATION

i. Coordinate installation of anchorages for doors. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver items to Project site in time for installation.

B. FABRICATION

i. Hardware Preparation: Factory prepare all doors 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." Special attention and coordination to be made for all electric strikes and other hardware requiring power or electronic controls. Intermediate rail to be coordinated with Crash Bar.

C. INSTALLATION

i. Frames:

ii. Set frames plumb, aligned and square with no twist- 1/16 inch tolerances, shim as necessary.

iii. Secure frames appropriately for the frame and wall type.

D. ADJUSTING AND CLEANING

i. 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.

ii. Protect Hardware from finish painting, sealing.

END SECTION 081100 VOH WOOD DOORS AND FRAMES

081113 VOH HOLLOW METAL DOORS AND FRAMES

1. SUMMARY

This section identifies the hollow metal doors and frames throughout the project, including an insulated exterior hollow metal door at the east exit from the Dressing Room level. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Related Sections:

081416	Flush Wood Doors
087100	Door Hardware
088000	Glazing
092900	Gypsum Board
099113	Exterior Painting
099123	Interior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	**Req.**	**Specifics**
Shop Drawings	**X**	- Elevations and details for each door and frame (including glazing/lites)
Product Cut Sheets	**X**	- For each listed product and accessory
Product Samples		-
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information

3. PRODUCTS

A. GENERAL
   i. All vision glass to meet ADA/ABA requirements for distance to finish floor, typ.

B. STANDARD HOLLOW METAL DOORS:
   i. Manufacturer: TBD
   ii. Product: Flush Panel, square edge, Min. 20-gauge steel faces. Comply with ANSI/SDI A250.8.
   iii. Thickness and Edge: 1-3/4 inches thick, edge construction: Model 2, Seamless.
   iv. Interior Doors: Uncoated, cold-rolled steel sheet.
      a. SDI Standard Duty: Level 1, Performance Level C.
      b. Uncoated, cold-rolled steel sheet.
      c. Core: Manufacturer's standard Kraft-paper honeycomb, polystyrene, polyurethane, mineral board or vertical steel stiffener.
      d. Prep: for hardware as noted on the door and hardware schedule.
   v. Fire-Rated Door Assemblies:
      a. Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.

b. 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.
c. Glazing Dimension: 100 square inch window maximum at vision lites. (Configurations to meet ADA/ABA requirements)

vi. Shop Priming: Manufacturer's standard, fast-curing, lead- and chromate-free primer

C. INSULATED METAL DOORS (EXTERIOR):
i. Manufacturer: TBD
ii. Product: Flush Panel, square edge, Min. 18-gauge galvanized steel faces. Comply with ANSI/SDI A250.8.
iii. Thickness and Edge: 1-3/4 inches thick, edge construction: Model 2, Seamless.
iv. Exterior Doors: galvanized, cold-rolled steel sheet.
a. SDI Extra Heavy Duty: Level 3, Performance Level A.
b. A40 galvanized, 18 ga. cold-rolled steel sheet.
c. Core: Manufacturer's standard high density polystyrene core with reinforcement for exit device.
d. Provide thermal-resistance value not less than R-4 at exterior doors (U=.25 or less).
e. Weatherstripping: Provide brush-style weatherstripping on all edges.
f. Air Leakage at 1.57psf: .5cfm/sf of frame.
g. Prep: For hardware as noted on the door and hardware schedule.
v. Fire-Rated Door Assemblies: 90 min.
a. Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to ANSI 10C and NFPA 252.
b. 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.
c. Glazing Dimension: 100 square inch window maximum 6”x27” prep at vision lites.
vi. Shop Priming: Manufacturer's standard, fast-curing, lead- and chromate-free primer.
vii. Frame: Thermally broken 2” hollow metal frame.
viii. Sill: Outswing ADA-compliant aluminum sill with thermal break
ix. Accessories:
a. Sill Pan, corner seal pad, rain guard.

D. STANDARD HOLLOW METAL FRAMES
i. Manufacturer: TBD
ii. Product: Hollow Metal Frames
a. Interior Frames: Cold-rolled steel sheet.
b. Exterior Frames: Thermally broken frames fabricated from metallic-coated steel sheet.
iii. Rating: Hollow Metal Frames

a. Provide Assembly complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

iv. Fabrication:
   a. Full profile welded frames with mitered corners unless otherwise indicated.
   b. Minimum .042 inch steel sheet for steel and wood doors and borrowed lights
   c. Hardware reinforcement plates as required
   d. Shop Priming: Manufacturer's standard, fast-curing, lead- and chromate-free primer.
   e. Door Silencers: Except on weather-stripped doors, drill stop in strike jamb to receive three door silencers.

v. Throat Size:
   a. Provide frame throat size ¼" larger than assembly components.

E. FRAME ANCHORS
   i. Jamb Anchors: Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
   ii. Floor Anchors: Clip-type anchors formed from same material as frames, not less than 0.042 inch thick, with two holes to receive fasteners.

F. STOPS AND MOLDINGS
   i. Moldings for Glazed Lights in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
   ii. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
   iii. Loose Stops for Glazed Lights in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

G. GLAZING FOR BORROWED LITES
   i. Product: ¼" tempered glass.
   ii. Locations: See door and window schedules.

4. EXECUTION & QUALITY CONTROL

Deliver, store and install according to manufacturer's written instructions unless otherwise indicated.

A. PREPARATION
   i. 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 items to Project site in time for installation.

B. FABRICATION
   i. 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. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

C. INSTALLATION

i. Hollow Metal Frames:
   a. Set frames plumb, aligned and square with no twist- 1/16 inch tolerances.
   b. At fire-protection-rated openings, install frames according to NFPA 80.
   c. Install frames with removable glazing stops located on secure side of opening.
   d. Secure frames appropriately for the wall type.
   e. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors or powder-actuated fasteners.
   f. Install door silencers in frames before grouting.
   g. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames

ii. Hollow Metal Doors:
   a. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

iii. Glazing:
   a. Secure stops with countersunk flat-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

D. ADJUSTING AND CLEANING

i. 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.

END SECTION 081113 VOH HOLLOW METAL DOORS AND FRAMES

081416 VOH FLUSH WOOD DOORS

1. SUMMARY

This section identifies new flush wood doors with or without fire-rating, glazing and/or louvers in the interior of the building. The doors will not contain urea formaldehyde. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Related Sections:

062023	Interior Finish Carpentry
081113	Hollow Metal Doors and Frames
087100	Door Hardware
088000	Glazing
092900	Gypsum Board

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	**Req.**	**Specifics**
Shop Drawings	**X**	- Location, size, and hand of each door, elevations of each door type (including glazing/lites), locations and extent of hardware blocking.
Product Cut Sheets	**X**	- For each type of door indicated, including core and edge construction, louvers, and factory-finishing specifications. - Environmental Product Declaration (EPD) - Health Product Declaration (HPD)
Product Samples	**X**	- Factory finish applied to actual door face materials for each material and finish- approx. 8” x 10” samples. - Louver blade and frame and glazing frame- 6” sample.
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information

3. PRODUCTS

A. GENERAL

i. All vision glass to meet ADA/ABA requirements for distance to finish floor, typ.

B. VENEER-FACED DOORS FOR TRANSPARENT FINISH

i. Basis of Design Product: Solid-core doors with wood-veneer faces, factory clear finished.
   a. Grade: Heavy Duty, Premium, with Grade AA faces.
   b. Cut: Rotary cut
   c. Species: Select Birch
   d. Match between Veneer Leaves: Book match.
   e. Assembly of Veneer Leaves on Door Faces: Balance match.
   f. Special Matching: Pair and set match.
   g. Core: Particleboard made with binder containing no urea formaldehyde resin.

1. Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.

h. Construction: Five plies, bonded, square edge.
i. Adhesives: Type 1 per WDMA TM-6, low VOC, NO urea formaldehyde.
j. Louvers, glazing, or undercut as indicated in the Drawings.
   1. All glazing to meet ADA/ABA requirements for height and size.
   2. All glazing to meet life safety requirements for location and size.

C. FIRE-RATED VENEER-FACED DOORS FOR TRANSPARENT FINISH

i. Manufacturer: Same as other interior doors unless otherwise indicated.
ii. Product: Provide core specified or mineral core as needed to provide fire-protection rating indicated, with wood-veneer faces, factory finished.
   a. Match non-fire-rated doors material and finish.
   b. Provide positive pressure tested doors.
   c. Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
   d. Provide labeling and comply with requirements in NFPA 80.
   e. 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. 60 Min. Door: Category A, built in edge sealing, 1 3/4 inch.
   g. Provide glazing where shown on door schedule.
      1. All glazing to meet ADA/ABA requirements for height and size.
      2. All glazing to meet life safety requirements for location and size.

D. GLAZING FRAMES

i. General: Same Manufacturer as door unless otherwise indicated.
ii. Glazing frames: Flush Rectangular Wood Beads in same wood species and finish as doors. Sizes as shown on the Drawings.
iii. Glazing stops and frames 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. Metal frame if required for fire-protection rating.
iv. Standards:
   a. All glazing/vision panels to meet ADA standards for distance from finish floor to bottom of vision plane, typ.
   b. All glazing to meet life safety requirements for location and size.

E. FINISHING

i. Manufacturer: As provided by Door Manufacturer.
ii. Finish: Premium Grade, AWI System TR-6 catalyzed polyurethane, satin sheen.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless otherwise indicated.

A. FABRICATION

i. Hardware Preparation: 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 furnished as specified in Division 08 Section "Door Hardware."

ii. Openings: Cut and trim openings through doors in factory.
   a. Factory install glazing, louvers and trim when possible.

iii. Finishing: Factory finish faces, all four edges, edges of cutouts, and mortises.
   a. Transparent Finish: Premium Grade, AWI System TR-6 catalyzed polyurethane, satin sheen.

B. INSTALLATION

i. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

ii. Job-Fitted doors: Align and fit doors in frames with uniform clearances and bevels as necessary for proper installation; 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.
   a. Comply with NFPA 80 for fire-rated doors.

iii. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

iv. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

v. Adjustments: Rehang or replace doors that do not swing or operate freely.

vi. For entrance doors accessible to people with disabilities, adjust closers to provide a 5-second closer sweep period for doors to move from a 90-degree open position to 3 inches from the latch, measured to the leading door edge.

vii. 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 SECTION 081416 VOH FLUSH WOOD DOORS

083113 VOH ACCESS DOORS AND FRAMES

1. SUMMARY

This section identifies the access doors and frames required for accessing the new chase from the lower vestibule and for accessing under the stage from WC-1 Room 203. Other access panels may be required to access MEP and FP components. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Related Sections:
061000 Rough Carpentry (Architectural)
092900 Gypsum Board

See Architectural Drawings for access door locations.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Elevations, sections, details of each door type, locations and extent of hardware blocking.
Product Cut Sheets	**X**	- For each type of door and frame indicated.
Product Samples	**X**	For each door face material.
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information

3. PRODUCTS

A. ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS
   i. Basis-of-Design Product: Acudor Products, Inc., DW-5040 Drywall, Flush Access Doors with Concealed Flanges.
      a. Size:
         1. 24 inches wide x 24 inches high for WC-1.
      b. Finish: Prime Coated Steel. Field painted finish to match wall.
      c. Lock: Cylinder lock and key, Torx head cam Latch, or Spanner head cam latch.
      d. Trim: For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.

B. FIRE-RATED ACCESS DOORS AND FRAMES FOR INTERIOR WALLS
   i. Manufacturer: Acudor Products, Inc., OAE
   ii. Basis-of-Design Product: FB-5060, Fire Rated Uninsulated, Flush Access door with Concealed hinges
      a. Size: 16 inches wide x 24 inches high for Lower Vestibule chase
      b. Material: Steel
         1. Door: 16 gauge
         2. Mounting Frame: 16 gauge. Flush to frame with reinforced edges, flange 1" wide
         3. Hinge: Concealed
      c. Finish: Prime Coated. Field painted finish to match wall.

d. Standard Latch: Universal self-latching bolt, operated by either a knurled knob or flush key.
    1. Optional: Doors can be prepared for rim or mortise cylinder locks when master keying is required. Not required.
e. Concealed hinge
    1. Self-latching / Self-closing
    2. Self-closing & self-latching door mechanism
    3. Inside latch release
f. Trim: 1” flush frame/flanges
g. Installation: Fire Rating (Walls):
    1. UL — 1-1/2 hour "B" label.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless otherwise indicated.

A. INSTALLATION

i. Install doors in drywall surfaces flush with adjacent finish surfaces before taping to receive finish material.

ii. Adjust doors and hardware, after installation, for proper operation.

END SECTION 083113 VOH ACCESS DOORS AND FRAMES

085000 VOH WINDOWS

1. SUMMARY

This section identifies the new windows at the elevator and vestibule addition. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Related Sections:

061000 Rough Carpentry (Architectural)
062023 Interior Finish Carpentry
072500 Envelope Control Layers
074600 Exterior Siding
081613 Fiberglass Doors and Frames
099123 Interior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	X	- Plans, elevations, sections, details, attachment hardware
Product Cut Sheets	X	- For each listed product
Compatibility	X	- Provide confirmation of product and accessory product compatibility with adjacent products. - No enclosure submittals will be reviewed until this matrix is submitted.
Product Samples	X	- Window corner section
Mock-ups	X	- One mock-up of new window illustrating various installation conditions, or first instance testing of each installation condition.
Closeout submittals	X	- Manufacturer's standard warranty Information - Operations & Maintenance Information

3. PRODUCTS

A. WINDOWS- TRIPLE GLAZED:
   i. Manufacturer: Marvin Elevate
      a. Other options: approved equal.
   ii. Product Basis of Design: Marvin Elevate fiberglass window.
      a. Fixed Units: as shown on drawings and schedules.
      b. Sash and frame material: Fiberglass-reinforced Ultrex.
   iii. Frame Depth: 4 9/16”
   iv. Color: Ebony
   v. Interior: unfinished clear pine wood.
   vi. Thermal Transmittance: Whole window U- factor of .25 or better.
   vii. Glazing:
      a. 1 1/8” triple-gazed, low-e glass with argon (or argon/krypton mix), U-.25 max. whole window rating.
      b. Solar Heat Gain Coefficient: .37 whole window rating.

c. Warranty Period: 10 years from date of Substantial Completion.

viii. Nailing Fin: Factory installed nailing fin at all four sides.

ix. Sizes: Sizes as shown on the Drawings.

x. Hardware and Accessories:
   a. Standard Hardware, Color: Satin Nickle
   b. Interior drywall receiver

xi. Performance:
   a. Meets or exceeds AAMA/WDMA/CSA 101/I.S.2/A440 Ratings: LC-PG30, WDMA Hallmark Certified.
   b. Unit assembly shall withstand both positive and negative uniform static air pressure difference without damage when tested according to ASTM E 330.
   c. Air Infiltration at 1.57 psf wind pressure: 0.07 cfm/ft2 of frame max.
   d. Water Penetration Resistance: 4 psf min.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless otherwise indicated.

A. EXAMINATION

i. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify rough opening dimensions, levelness of sill plate, and operational clearances

ii. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weather-tight window installation.

iii. Correct unsatisfactory conditions before proceeding with window installation.

B. INSTALLATION – NEW WINDOWS

i. Install window opening flashings in proper sequence with vapor/air barrier assembly.

ii. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weather tight construction. Follow manufacturer’s recommended installation and fastening instructions.

iii. Tape window exterior to weather barrier with approved and compatible tape.

iv. Seal around window with low expanding spray foam and joint sealants.

C. TESTING

i. Exterior install may be reviewed and tested by Envelope Commissioning Agent. See envelope specifications for air sealing targets.

D. ADJUSTMENT, CLEANING, AND PROTECTION

i. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weather tight closure.

ii. Clean exposed surfaces immediately after installing windows. Keep protective films and coverings in place until final cleaning.

END SECTION 085000 VOH WINDOWS

087100 VOH DOOR HARDWARE

1. SUMMARY

This section identifies the door hardware for the exterior and interior doors and accessory door hardware for the buildings. See door schedules for hardware locations. Lock cores to be coordinated with Owner's existing locksets.

Related Sections:

081113	Hollow Metal Doors and Frames
081416	Flush Wood Doors
083113	Access Doors and Frames

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- For each product, including locations and schedule
	X	- Templates for door and frame fabrication for each product
Product Cut Sheets	**X**	- For each listed product
EPDs/HPDs	**X**	- for each listed material
Product Samples	**X**	- hardware finishes
Mock-ups	NA	-
Closeout submittals	**X**	- Warranty Information, Maintenance information

3. PRODUCTS

A. INTERIOR AND EXTERIOR DOOR LOCKS AND LEVERS
   i. Grade: Commercial, Grade 2, medium duty
   ii. Manufacturer: Sargent Manufacturing Company (Assa Abloy), US Lock, Falcon, OAE
   iii. BOD Product: US Lock 2050C / Sargent 7 Line, Cylinder Locks- 2 1/8" bore, 2 3/4" backset, ½" min. bolt throw.
      a. Finish: US26D, 626 Satin Chrome
      b. Lever: L Lever
   iv. Confirm compatibility with all door thicknesses shown in drawings.

B. FIRE EXIT DEVICES FOR STANDARD DOORS
   i. Grade: Commercial, Grade 2, medium duty
   ii. Manufacturer: Sargent Manufacturing Company (Assa Abloy), US Lock, Falcon, OAE
   iii. BOD Product: Falcon 19-R Series, non-handed rim device
      a. Finish: US26D, 626 Satin Chrome
   iv. Devices complying with NFPA 80.
   v. Confirm compatibility with all door thicknesses shown in drawings.

C. KEYING
- i. Manufacturer: Sargent, Falcon, US Lock, OAE
- ii. Cylinders: US Lock 15995 RXO Six pin restricted cylinder stainless steel, manufacturer's standard tumbler
  - a. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, raised trim ring.
- iii. Permanent Cores: Manufacturer's standard lock cylinders, face finished to match lockset, permanent cores that are interchangeable; Core insert, removable by use of a special key, usable with other manufacturer's cylinders.
- iv. Construction Keying/Cores: Provide construction cores that are replaceable by permanent cores. Provide 2 construction master keys.
- v. Keying system: Provide a factory registered keying system complying with the following:
  - a. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
- vi. Keys: Provide Nickel silver keys complying with the following:
  - a. Stamping: Permanently inscribe each key with a visual key control number and include the following notation: "DO NOT DUPLICATE".

D. HINGES AND PIVOTS
- i. Standards: Comply with the appropriate BHMA standard, comply with NFPA 80 at fire-rated doors.
- ii. Provide three hinges for each door unless noted otherwise.
- iii. Hinge weight:
  - a. Entrance Doors: Heavy-weight anti-friction bearing hinges.
  - b. Interior Doors: Standard-weight anti-friction bearing hinges.
- iv. Hinge Base Metal:
  - a. Exterior and Wet Areas: Stainless steel with stainless-steel pin.
  - b. Interior and Fire-rated Assemblies: Steel with steel pin.
- v. Provide non-removable pins at out-swinging corridor doors with locks.

E. CLOSERS
- i. Manufacturer: Sargent Manufacturing Company (Assa Abloy), Falcon, OAE
- ii. BOD Product: Falcon SC80A Series Aluminum Closer, non-handed arm with adjustable forearm assembly. Mounts hinge side, top jamb, or parallel arm. Single piece cast aluminum body. ANSI Grade 1.
- iii. Warranty: 10 years
- iv. Adjustable to meet ADA code required time delays.

F. ADA DOOR OPENERS
- i. Manufacturer: Ingersoll Rand or approved equal.
- ii. Product: LCN 4600 AutoEqualizer Series electro-hydraulic door oprerator.
- iii. Actuator: Hardwired 4.5" square stainless steel plate.

G. PROTECTIVE TRIM UNITS
- i. Kickplates: Ives 8400, or approved equal.

a. 1 ½ inches less than door width, 8" height typical unless door style prevents full height.
b. Material to match door hardware- .050 inch thickness typical, bevel top and two sides.
c. Fasteners: Manufacturer's standard exposed flush machine or self-tapping stainless steel screws.

H. PUSH-PULL TRIM
i. Push plate: Ives 8200, 4" x 16" stainless steel, US32D or approved equal.
ii. Pull trim, 1" round: Ives 8303, 4" x 16" plate, 10" centers, stainless steel, US32, Type F concealed mount with push plate for wood doors.
iii. Pull trim, 1" round: Ives 8103EZ (ADA), with 4" x 16"plate 10" centers, stainless steel, US32, Type H-I-L concealed pull mounting for hollow metal door and solid-core wood door.

I. STOPS AND HOLDERS
i. Wall Stops: Typical, provide blocking at each location.
ii. Floor Stops: For locations where wall stops are impractical. Do not mount where door stops will impede traffic.
iii. Silencers for Metal Door Frames: BHMA Grade 1, neoprene or rubber, min. ½" diameter, fabricated for drilled-in application of frame.
iv. Hold Open: Flip-down stop attached to door, satin chrome finish.

J. OCCUPANCY INDICATOR LATCHES
i. For Water Closet Doors to Display "OCCUPIED/VACANT"
ii. Finish: US26D, 626 Satin Chrome

K. DOOR GASKETING
i. Interior Doors for sound barrier: Provide continuous acoustic-strip seal at perimeter with bulb-type sweep at bottom.
ii. Exterior Doors: Provide continuous weather-strip gasketing at perimeter, meeting stile, and door bottoms.
a. Air leakage not to exceed 0.5 cfm per foot of crack length.

L. THRESHOLDS
i. All thresholds to meet ADA accessibility requirements.
ii. Exterior Threshold: Thermally broken aluminum.
iii. Dimension: Coordinate with door and wall thickness.
iv. Interior Thresholds: aluminum.

M. WEATHER-STRIPPING
i. Provide factory-installed weatherstripping in pre-hung Fiberglass or Aluminum storefront doors.

4. EXECUTION & QUALITY CONTROL
Install according to manufacturer's written instructions unless specifically noted otherwise.

A. GENERAL
   i. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
      a. Standard Steel Doors and Frames: ANSI/SDI A250.8
      b. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
   ii. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
   iii. Proceed with installation only after unsatisfactory conditions have been corrected.

B. LOCK CYLINDERS
   i. Install construction cores to secure building and areas during construction period.
   ii. Replace construction cores with permanent cores as directed by Owner or furnish permanent cores to Owner for installation.

C. ADJUSTMENT
   i. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
   ii. For entrance doors accessible to people with disabilities, adjust closers to provide a 5-second closer sweep period for doors to move from a 90-degree open position to 3 inches from the latch, measured to the leading door edge.
   iii. Provide occupancy adjustment 3 months after date of Substantial Completion.

D. CLEANING AND PROTECTION
   i. Clean adjacent surfaces soiled by door hardware installation and clean operating items as necessary to restore proper function and finish.
   ii. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

END SECTION 087100 VOH DOOR HARDWARE

092900 VOH GYPSUM BOARD

1. SUMMARY

This section identifies the interior gypsum board to be used for wall finish and ceiling finishes in the interior of the building, as well as in rated assemblies. The gypsum board shall be installed on studs or channel, taped, and finished with paint or other finishes. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Related Sections:

061000	Rough Carpentry (Architectural)
078400	Fire-Resistive Joint Systems and Penetration Firestopping
079200	Joint Sealants
099123	Interior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	-
Product Cut Sheets	**X**	- for each listed material
EPDs/HPDs	**X**	- for each listed material
Product Samples	**X**	- Expansion joint, tear-away bead, j-bead, corner bead
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information, O & M Information

3. PRODUCTS

A. GYPSUM BOARD – GENERAL

i. Comply with the following:

a. Content:

1. Made in the USA (to respond to toxicity concerns) and
2. Made with post-consumer recycled content. Provide % recycled content make-up information in submittal.

b. BOD Product: EcoSmart, OAE (https://www.usg.com/content/usgcom/en/products/walls/drywall/drywall-panels/sustainable-panels.html#search-results

c. Applicable Standards:

1. Comply with ASTM C1396 for 5/8 in. (15.9 mm), Type X, water-resistant gypsum wallboard and exterior gypsum soffit board
2. Classified as a Class A Interior Finish Material per Section 803.1 of the International Building Code® (IBC®)
3. UL Classification as to fire resistance, surface-burning characteristics and noncombustibility

B. INTERIOR TYPE "X" GYPSUM BOARD

i. Manufacturer: USG, Certainteed, American Gypsum, Georgia Pacific or approved equal.

ii. Product: Type “X” fire-rated gypsum wall board with 100% recycled paper faces.

iii. Dimension: 5/8"x 4'x 8-12' sheet
iv. Locations: At rated assemblies and as indicated on drawings

C. INTERIOR TYPE "C" GYPSUM BOARD
i. Manufacturer: USG, Certainteed, American Gypsum, Georgia Pacific or approved equal.
ii. Product: Type “C” fire-rated gypsum wall board with 100% recycled paper faces.
iii. Dimension: 5/8"x 4'x 8-12' sheet
iv. Locations: At rated assemblies and as indicated on drawings

D. MOISTURE AND MOLD-RESISTANT GYPSUM BOARD
i. Manufacturer: USG, Certainteed, American Gypsum, Georgia Pacific or approved equal.
ii. Product: Moisture and mold-resistant core and paper surface gypsum wall board with 100% recycled paper faces.
iii. Dimension: 5/8"x 4'x8' sheet.
iv. Locations: All toilet rooms, all janitor’s closets, kitchen, and wet locations, and as indicated on drawings

E. INTERIOR TRIM ACCESSORIES
i. Product: Galvanized or vinyl shapes.
a. Cornerbead – all cornerbead in circulation and high-traffic areas to be galvanized metal corner bead fastened with nails or screws at a minimum of 16” O.C.
b. Tear-away bead – Trim-Tex tear-away “L” Bead for flat transitions to adjacent materials.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Trim-Tex Z-Shadow bead for overlapping layers of gypsum board.
g. Expansion (control) joint. Required every 30’ for walls longer than 30’.
h. Curved-Edge Cornerbead: With notched or flexible flanges.
i. Termination Bead: to be provided at all locations where drywall meets any other material at wall or ceiling. (floor not needed)
ii. Locations: at any location where gypsum board meets any other surface other than gypsum board a J-bead or termination bead is to be provided, typ.

F. JOINT TAPES
i. Product: Paper tape allowed except at tile backer board locations.

G. JOINT COMPOUND FOR INTERIOR GYPSUM BOARD
i. Product: All-purpose compound or as required.

H. ACOUSTICAL AND FIRESTOP SEALANTS
i. Manufacturer: USG, Certainteed, or approved equal.
ii. Product: "Sheetrock" brand acoustical Sealant, Low VOC, for acoustic joint assemblies.

iii. Product: see section 078400 Fire-Resistive Joint Systems for Firestop Sealant products and locations.

I. AUXILIARY MATERIALS
i. Products: Steel drill screws.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless indicated otherwise. Install control joints where indicated on the Drawings.

A. INSTALLATION, GENERAL
i. All interior gypsum work shall meet applicable standards for workmanship regarding appearance and structural integrity.
ii. Level 4 finish unless otherwise indicated- for primer and finish application. See Section 099123 Interior Painting.

B. PROTECTION OF WORK
i. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
ii. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
iii. Reject, remove and replace panels that are wet, moisture, or mold damaged.

C. AT TILE BACKER
i. Fill joints between boards with latex-modified mortar and embed with fiberglass mesh joint tape.

END SECTION 092900 VOH GYPSUM BOARD

093000 VOH TILING

1. SUMMARY

This section identifies the ceramic tile flooring at the lower entrance vestibule and entry. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Related Sections:
092900 Gypsum Board
096500 Resilient Flooring Base and Accessories
096800 Carpeting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Tile layout and details for installation
Product Cut Sheets	**X**	- Each type of tile and other materials listed
Product Samples	**X**	Each tile and grout listed
Mock-ups	NA	
Closeout submittals	**X** **X**	Warranty Information Care and maintenance information

3. PRODUCTS

A. GLAZED OR UNGLAZED PORCELAIN TILE- ENTRANCE VESTIBULE
   i. Manufacturer: American Olean, Best Tile, Dal-Tile or approved equal.
   ii. Product: American Olean Colorbody Porcelain Highland Ridge, Kendall Slate, Historic Limestone, or approved equal.
      a. Field tile: 12”x18” or 12”x24” slip resistant- C.O.F. greater than .76 wet, .6 dry.
   iii. Setting Material: Latex modified thin-set.
   iv. Grout: 3/16" grout joint w/ stain and chemical resistant ready-to-use sanded grout- Mapei Flexcolor CQ basis of design.
   v. Layout: Staggered joints, per meeting with architect before installation.

B. SEALANT/CAULK (JOINTS AND PERIMETER)
   i. Manufacturer: As chosen by Subcontractor.
   ii. Product: Low VOC materials, as needed for a complete installation. See Joint Sealants 07 92 00 for VOC limits.

C. ACCESSORY MATERIALS
   i. Schluter Reno-TK brushed aluminum transition strip to adjacent non-tile flooring.
   ii. Isolation membrane: troweled on or peel and stick membrane.
      a. Basis of Design: Laticrete Fracture Ban or Fracture Ban SC.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. PREPARATION
   I. Substrates to be free of coatings, sealers or hardeners.

B. INSTALLATION
   i. Install only after concrete and other substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours, have cured, and are dry to bond with adhesive as determined by manufacturer's recommended test. Install after painting and ceiling operations have been completed.
   ii. Comply with manufacturer's written instructions for cleaning and protection after installation.

C. PROTECTION
   i. Cover until Substantial Completion.

END SECTION 093000 VOH TILING

095120 VOH ACOUSTICAL CEILING TILES AND SUSPENSION SYSTEMS

1. SUMMARY

This section identifies acoustical tile ceiling in the lower vestibule. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Related Sections:

054000	Cold-Formed Metal Framing
062023	Interior Finish Carpentry
079200	Joint Sealants
092900	Gypsum Board
099123	Interior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Ceiling layouts and details
Product Cut Sheets	**X**	- Each type or Acoustical Ceiling Panel and Metal Suspension System.
Product Samples		Acoustical Ceiling Panel- 6"x 6" panel for each type. Metal Suspension System- 6" section
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information, O&M Information

3. PRODUCTS

A. ACOUSTICAL CEILING TILES 2x2

i. Product:
   a. Performance Based- basis of design: Armstrong Ultima 9/16” Tegular Edge, Optima, Lyra or approved equal.

ii. Dimensions: 24"x 24" modular size, ¾-1" thickness.

iii. Type and Form: Type III, mineral base with painted finish; Form 4, cast or molded.

iv. Pattern and color: E (lightly textured), white.

v. Seams and edge profile: Heat welded, tapered/reveal edge.

vi. Light Reflectance: Not less than 0.80.

vii. Noise Reduction Coefficient: Not less than 0.70.

viii. Ceiling Attenuation Class: Not less than 35.

ix. Durability/Care: Sag and humidity resistant, scratch and impact resistant, washable/scrubbable, mold/mildew resistant.

B. METAL SUSPENSION SYSTEMS

i. Manufacturer: Armstrong World Industries or to match panel manufacturer

ii. Product: 9/16" square tegular exposed tee, painted galvanized steel

C. METAL EDGE MOLDINGS AND TRIM
i. Manufacturer: Manufacturer's standard to match suspension system
ii. Product: Roll-formed sheet metal of same width as exposed runner

D. ACOUSTICAL SEALANTS
i. Manufacturer: USG Corporation, Tremco Inc., or approved equal
ii. Product: Sheetrock Brand Acoustical Sealant
iii. VOC: Low VOC

E. MAINTENANCE MATERIALS
i. Ceiling Tiles: Furnish full-size units equal to 5 percent of amount installed for each type indicated, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

4. EXECUTION & QUALITY CONTROL
Install according to manufacturer's written instructions

A. PREPARATION
i. 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 layouts shown on reflected ceiling plans.

B. INSTALLATION
i. Suspend ceiling hangers from building's structural members and as follows:
a. Install supplemental suspension members and hangers in form of trapezes or equivalent devices where ducts or other construction interfere with standard hanger spacing.
b. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
c. Attach hangers to structural members.
d. Acoustical ceiling edges: Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
e. 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

C. CLEANING AND PROTECTION
i. Comply with manufacturer's written instructions for cleaning and protection after installation.

ii. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END SECTION 095120 VOH ACOUSTICAL CEILING TILES AND SUSPENSION SYSTEMS

096500 VOH RESILIENT FLOORING BASE AND ACCESSORIES

1. SUMMARY

This section identifies the linoleum flooring in new vestibules and the LULA, VCT in the dressing room level spaces, resilient base, and accessories to be used for flooring and wall base. In addition, this section addresses the fasteners, finishes, and best practices for installation.

Related Sections:

064023 Interior Architectural Woodwork
092900 Gypsum Board
096813 Carpeting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	NA	- Installation patterns and proposed seaming, as required
Product Cut Sheets	**X**	- For all listed products.
EPDs/HPDs	**X**	- For all listed products.
Product Samples	**X**	- For all listed products.
Mock-ups	NA	
Closeout submittals	**X**	- Warranty Information, Operations & Maintenance Information.

3. PRODUCTS

A. GENERAL REQUIREMENTS FOR ALL PRODUCTS:

i. Life Safety: Per NFPA 101 Section 12.3.3.5.2, floor finishes in exit enclosures and exit access corridors and in spaces not separated from them by walls complying with 12.3.6 and shall not be less than Class II

a. Per NFPA 101 Section 10.2.7.4.2 Class II interior floor finish shall have a critical radiant flux of not less than 0.22 W/cm2 but less than 0.45 W/cm2
b. Per NFPA 101 Section 10.2.7.5 Wherever the use of Class II interior floor finish is required, Class I interior floor finish shall be permitted.

ii. Sustainability and Health:

a. GREENGUARD Gold Certified for Low VOC Emissions
    1. Adhesives: VOC content of 40 g/L or less.
b. Supply all required products that are CA 01350 compliant.
c. ISO 14001 Environmental Management Systems certification.
d. Construction waste take back program for the purpose of reducing jobsite waste by taking back uninstalled waste flooring.
e. Flooring surfaces that are easily cleaned and do not require coatings and stripping, or use chemicals that may be hazardous to human health.
f. Flooring that is free of materials known to be teratogenic, mutagenic or carcinogenic.

g. Flooring that contains no polyvinyl chloride or plasticizers, halogens, phlates, nor asbestos.

iii. Installation: appropriate backer, substrate prep and underlayment shall be provided to meet manufacturer's recommendations for each of the materials described below and in the areas indicated on the finish floor plan.

iv. Substrate inspection and surface prep: to be per manufacturer's instructions and is the responsibility of the contractor to review and confirm as a part of project scope.

v. Underlayment: Provide required underlayment, per manufacturer's instructions and for the appropriate substrate material and condition.

B. LINOLEUM RESILIENT SHEET FLOORING

i. Manufacturer: Armstrong, Marmoleum or approved equal.

ii. BOD Product: Commercial Linoleum

iii. Dimension: Standard width, 0.1" minimum thickness, coils in manufacturer's standard length.

iv. Seams: Heat welded w/ manufacturer's standard color-matched solid color welding rod.

v. Colors: As chosen by architect from the full range of product colors.

vi. Underlayment: 3/8" Softwood Underlayment Plywood, nailed and glued to sub-floor.

C. VINYL COMPOSITION TILE FLOORING (VCT)

i. Manufacturer: Armstrong, or approved equal.

ii. Product: Class 2, through-pattern tile, smooth surface.

iii. Dimension: 12"x 12" Tiles, 0.125" minimum thickness.

iv. Seams: Standard seaming method.

v. Colors: As chosen by architect from the full range of product colors.

D. RESILIENT BASE – VULCANIZED RUBBER BASE

i. Manufacturer: Nora Rubber Flooring, Johnsonite, Burke Flooring, Endura Rubber Flooring, Felxco Inc., Roppe Corp. or approved equal

ii. Product: Type TS (Vulcanized Thermoset Rubber), Group 1, (solid, homogeneous), cove

iii. Dimension: 4" height, 0.125" minimum thickness, coils in manufacturer's standard length.

iv. Corners: Job formed.

v. Finish: Satin finish, colors as selected by Architect from the full range of industry colors.

E. MISCELLANEOUS FLOORING ACCESSORIES

i. Manufacturer: Nora Rubber Flooring, Johnsonite, Burke Flooring, Endura Rubber Flooring, Felxco Inc., Roppe Corp. or approved equal.

ii. Product:

a. Carpet edge.

b. Nosing for resilient flooring.

c. Reducer strip for resilient flooring.

d. Joiner for tile and adjacent flooring.

e. Transition strips.

iii. Material/Colors: by Architect

iv. Locations: Provide as required at flooring material transitions as shown on finish plan and as recommended by flooring manufacturer.

F. INSTALLATION MATERIALS

i. Trowelable Leveling and patching compounds- Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

ii. Adhesives: Water-resistant, VOC content of 40 g/L or less.

iii. Metal edge strips: Mill finish extruded aluminum.

iv. Floor polish: As recommended by manufacturer.

G. MAINTENANCE MATERIALS

i. Resilient Flooring: Furnish sheet material or full-size units equal to 5 percent of amount installed for each type indicated, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. PREPARATION

i. Prepare substrates to be free of coatings, sealers or hardeners. Fill cracks, holes and depressions with self-leveling trowelable compound.

ii. Per ASTM F710 (Concrete Substrate prep) and the Manufacturer’s Installation Guide

iii. Install primer/sealer only after concrete and other substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours, have cured, and are dry to bond with adhesive as determined by manufacturer's recommended test.

B. INSTALLATION

i. Install only after concrete and other substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours, have cured, and are dry to bond with adhesive as determined by manufacturer’s recommended test.

ii. Install after painting and ceiling operations have been completed.

iii. Install underlayment plywood with 1.25” underlayment nails and adhesive, staggering panel seams. Fill seams with trowelable self-leveling compound.

iv. Comply with manufacturer's written instructions for installation using maximum lengths possible and inside and outside corners. Tightly adhere material to substrate throughout surface of each piece.

v. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.

C. CLEANING AND PROTECTION

i. Comply with manufacturer's written instructions for cleaning and protection after installation.
ii. Remove adhesives and other blemishes and soil from material before applying 2 coats liquid floor polish or as specified by manufacturer.
iii. Cover until Substantial Completion.

END SECTION 096500 VOH RESILIENT FLOORING BASE AND ACCESSORIES

099113 VOH EXTERIOR PAINTING

1. SUMMARY

This section identifies the painting of the exterior steel elements as well as limited amounts of exterior wood trim boards, soffits, and canopy ceilings of the new additions. This section also addresses surface preparation and painting for the minor work on the wood elements of the existing building (windows above addition). In addition, this section addresses the best practices for installation.

Related Sections:
On-Drawing specs for structural steel elements
062013 Exterior Finish Carpentry
099123 Interior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	NA	-
Product Cut Sheets	**X**	- For each type of primer and paint - Environmental Product Declaration (EPD) - Health Product Declaration (HPD)
Product Samples	**X**	30" square labeled sample on rigid backing for each color and gloss of topcoat
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information

3. PRODUCTS

A. PAINTS GENERAL
   i. Basis of Design:
   ii. VOC Content: Comply with the following:
      a. Low VOC - 50 g/L max. Eggshell, 150 g/L max. non-flat.
   iii. Colors: As selected by the Architect from the manufacturer's full range.

B. EXTERIOR PRIMER/SEALER FOR WOOD AND ENGINEERED WOOD
   i. Alkyd primer/sealer compatible with manufacturer's finish coat.

C. WATER-BASED PAINTS
   i. Latex Exterior Flat
   ii. Latex Exterior Gloss

D. METAL FINISHES

i. Basis of Design: Sherwin Williams, Polane S Plus Polyurethane Enamel, low gloss, two component, acrylic polyurethane. Spray applied. Match coating to primer.

E. EXTERIOR CLEAR FINISH FOR EXPOSED WOOD
   i. Clear, two-component polyurethane varnish system

F. MAINTENANCE MATERIALS
   i. Product: Furnish extra materials from the same product run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
      a. Paint: portions of paint partially used for project work.

4. EXECUTION & QUALITY CONTROL

Store and install according to manufacturer's written instructions and recommendations in "MPI" Manual unless specifically noted otherwise.

A. PREPARATION
   i. Examination of Substrates:
      a. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
         1. Concrete: 12 percent.
         2. Wood: 15 percent.
   ii. Clean substrates of substances that could impair bond of paints
   iii. Special care to be taken with historic building components and exterior painted brick.
   iv. Fully scrape existing building as necessary. Contain and paint chippings that are loose and removed. Dispose of as required by the State of Vermont.

B. APPLICATION
   i. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
   ii. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. CLEANING AND PROTECTION
   i. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
   ii. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

D. EXTERIOR PAINTING SCHEDULE
   i. Wood Substrates
      a. Two finish coats over primer:

1. Columns, Trim boards, Soffits Finish: exterior gloss

END SECTION 099113 VOH EXTERIOR PAINTING

099123 VOH INTERIOR PAINTING AND STAINING

1. SUMMARY

This section identifies the interior painting, staining, and finishing for doors, frames, interior wood trim, window sills, walls, wall base, ceilings, and columns in the building. In addition, this section addresses the best practices for installation.

Related Sections:

062023	Interior Finish Carpentry
064023	Interior Architectural Woodwork
078400	Fire Resistive Joint Systems and Penetration Firestopping
081113	Hollow Metal Doors and Frames
081416	Flush Wood Doors
092900	Gypsum Board
099113	Exterior Painting

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	NA	-
Product Cut Sheets	**X**	- For each type of primer, paint and finish
EPDs/HPDs	**X**	- For each material
Product Samples	**X**	- 2’ piece of wood for clear finish - 30" square labeled sample on rigid backing for each color and gloss of topcoat
Mock-ups		-
Closeout submittals	**X**	Warranty Information

3. PRODUCTS

A. GENERAL REQUIREMENTS:

i. Life Safety: Per NFPA 101 Section 12.3.3.5.2, floor finishes in exit enclosures and exit access corridors and in spaces not separated from them by walls complying with 12.3.6 and shall not be less than Class II

a. Per NFPA 101 Section 10.2.7.4.2 Class II interior floor finish shall have a critical radiant flux of not less than 0.22 W/cm2 but less than 0.45 W/cm2

b. Per NFPA 101 Section 10.2.7.5 Wherever the use of Class II interior floor finish is required, Class I interior floor finish shall be permitted.

B. PAINTS GENERAL

i. Manufacturer: Benjamin Moore, Sherwin Williams or approved equal.

ii. Basis of Design Product: ProMar 400 or approved equal.

iii. Zero - VOC Content: Comply with the following:

a. LEED v4, GREENGUARD/GREENSEAL compliant

1. Flat Coating (Green Seal GS-11, 1993): VOC - 50 g/L max.
2. Non-flat Coating (Green Seal GS-11, 1993): VOC - 150 g/L max.
3. Anti-corrosive/Anti-rust Paint: VOC - 250 g/L max.
4. Clear Wood Finish: Varnish: VOC - 350 g/L max.
5. Primers, Sealer and Undercoats: VOC - 200 g/L max.

b. Colors: As selected by the Architect.
c. Assume the following number of colors throughout:
    1. Ceiling
    2. Up to (4) accent wall colors

C. INTERIOR WATER-BASED PRIMER/SEALER
- i. Latex based interior: Zero-VOC Interior Latex Primer or approved equivalent (MPI #50 or Institutional Low Oder/VOC MPI #149)

D. WATER-BASED PAINTS
- i. Latex Interior Eggshell, (Gloss Level 2): MPI #44
- ii. Latex Interior Semi-gloss, (Gloss Level 5): MPI # 54

E. METAL PAINTS (EXPOSED STRUCTURAL STEEL, DOOR FRAMES, HANDRAILS, GUARDRAILS)
- i. Latex Interior Semi-gloss, (Gloss Level 5): MPI # 54
    a. For spray application.

F. STAINS AND TRANSPARENT FINISHES
- i. Manufacturer: Vermont Natural Coatings, Sherwin Williams, Minwax, Cabot or as chosen by Subcontractor to meet criteria below unless Manufacturer is specified.
- ii. VOC Content: Comply with the following:
- iii. Clear Wood Finishes: non-yellowing, Polyurethane
- iv. VOC not more than 200 g/L.
- v. Note: confirm compatibility with Glu-lam adhesives for all exposed architectural finish glu-lam locations.

G. WOOD FILLER GENERAL
- i. Manufacturer: Sherwin Williams, Minwax, Cabot or as chosen by Subcontractor to meet criteria below unless Manufacturer is specified.
- ii. Greenguard Certified, zero VOC.

H. CAULK/SEALANT
- i. Non-VOC Caulks and Sealants as required for the work.

I. MAINTENANCE MATERIALS
- i. Product: Furnish extra materials from the same product run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
    a. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

4. <u>EXECUTION & QUALITY CONTROL</u>

Store and install according to manufacturer's written instructions and recommendations in "MPI" Manual unless specifically noted otherwise.

A. PREPARATION
   i. Examination of Substrates:
      a. All substrates shall be clean and dry prior to application.
      b. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
         1. Concrete: 12 percent.
         2. Wood: 15 percent.
         3. Gypsum Board: 12 percent.
         4. Plaster: 12 percent.
      c. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
      d. 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.
   ii. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting. Reinstall items that were removed.

B. APPLICATION
   i. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
   ii. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. CLEANING AND PROTECTION
   i. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
   ii. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

D. INTERIOR PAINTING AND STAINING SCHEDULE
   i. Primed Steel Substrates: Door Frames, Handrails
      a. Latex over Shop Primer System
         1. Touchup of Shop Primer; Intermediate Coat, semi-gloss, (Gloss Level 5); Topcoat, semi-gloss, (Gloss Level 5).
   ii. Gypsum Substrates:
      a. Two finish coats over primer
         1. Finish Coats: SW ProGreen Low Odor Interior Latex, (4 mils wet, 1.4 mils dry per coat)
            a. Gypsum Board Ceilings: Flat
            b. Gypsum Board Walls (excluding toilet room): Eggshell (Gloss Level 2)

c. Gypsum Board Walls in Toilet Room: Satin

iii. Wood Substrates, nontraffic:

a. Window Sills and Wall Cap:

1. Clear finish on hardwood.

END SECTION 099123 VOH INTERIOR PAINTING AND STAINING

SECTION 101453 – TRAFFIC SIGNAGE

PART 1.00 - GENERAL

1.01 WORK INCLUDED

A. This work consists of furnishing materials, fabrication and preparation of signs, erection, installation, and performance of incidental work, including all hardware, and posts, in the locations shown on the plans or as ordered by the Engineer.

1.02 REFERENCE STANDARDS

Information and requirements contained in this Specification are based on the most recent version of the following standards:

A. Vermont Agency of Transportation, Standard Specifications for Construction (latest version).

B. Manual on Uniform Traffic Control Devices, U.S. Department of Transportation, Federal Highway Administration (latest version).

1.03 SUBMITTALS

A. The Contractor shall submit manufacturer' product literature, certified product data, samples and installation instructions in accordance with Section 013300 of these Specifications for each type of material being used.

1.04 QUALITY ASSURANCE

A. The Contractor shall be thoroughly trained and experienced in the skills and equipment required for installation of signs.

B. The Contractor shall protect materials before, during and after installation. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

C. Upon direction of the Engineer, the Contractor shall remove, replace and/or rework all items that do not meet the requirements of this section. The Contractor shall perform all remedial measures at no additional cost to the Owner.

PART 2.00 - PRODUCTS

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2.01 MATERIALS

A. Signs

1. Signs shall be fabricated from Flat sheet aluminum meeting the requirements of ASTM B 209 for alloy 5052-H38 or 6061-T6.
2. Flat sheet aluminum sign base material shall be a minimum thickness of 0.060 inches.
3. Minimum signs sizes for shared-use paths shall be those shown in MUTCD Table 9B-1, and shall be used only for signs installed specifically for bicycle traffic applications.
4. For signs that apply to motorists and bicyclists, minimum sign size shall be as shown for conventional roads in MUTCD Table 2B-1.
5. Sign dimensions, shapes and colors prescribed in the Manual on Uniform Traffic Control Devices and in the "Standard Highway Signs" book shall be used and standard proportions shall be retained.
6. Fabrication of flat aluminum sheets, including cutting to size, bending and punching or drilling holes shall be completed prior to degreasing, etching, or treating and application of the background material. Material may be sheared, blanked, sawed, or milled. Cut edges shall be true and smooth and free from burrs. No flame cutting will be permitted. The surface of all sign faces shall be flat and free of buckles, warp, dents, burrs, or other defects.
7. The aluminum sheet shall be properly degreased and etched or treated with a light, tight, amorphous chromate coating in accordance with ASTM B 449.

B. Retroreflective Sheeting

1. A background retroreflective sheeting (white or colored) shall be applied to the entire background of the sign and shall meet the appropriate AASHTO M 268 (ASTM D 4956) classifications.
2. Retroreflective sheeting shall meet or exceed the minimum retroreflective and physical requirements of AASHTO M 268.
3. Background retroreflective sheeting colors for each sign shall conform with the colors adopted by AASHTO.

C. Plastic Lettering Film

1. Plastic lettering film shall conform to Section 750.10 of the VTrans Standard Specifications for Construction.
2. Plastic lettering film shall be used to form the letters, digits,

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symbols and borders comprising the text of the various types of signs shown on the Plans.

3. Freehand painting will not be permitted on any part of the finished sign face.
4. All word messages shall use standard wording and letters as shown in the MUTCD Manual and in the "Standard Highway Signs" book.
5. All sign lettering shall be in capital letters as provided in the "Standard Highway Signs" book.
6. Each sign shall have a border of the same color as the legend, at or just inside the edge. The corners of all sign borders shall be rounded, except for STOP signs.

D. Steel Flanged Channel Posts

1. Post material shall meet impact performance requirements for small sign supports contained in the current AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals".
2. Anchor plates for Flanged Channel Posts shall be galvanized in accordance with ASTM A123.
3. Steel anchor plates shall be trapezoidal in shape with bases of 6 and 12 inches, a depth of 6 inches and shall be 10 gauge in thickness.
4. Steel used for anchor plates shall meet the requirements of ASTM A36 or ASTM A1011 Structural Steel Grade 36.
5. Bolt holes of 7/16 inch shall be provided centered on the steel anchor plates with a spacing of 4 inches.
6. Posts and bases shall be a flanged channel section fabricated from either hot rolled carbon steel bars or carbon steel bars and shapes produced from standard rail steel.
7. The posts and bases shall meet the minimum physical properties of ASTM A499, Grade 60, except that the minimum yield strength shall be 70,000 psi.
8. The post shall meet chemical properties of ASTM A1 for rails 30 pounds per foot and heavier.
9. The weight of posts shall be as specified and shall be 2.00 (Post) or 3.00 (Base) pounds per foot plus or minus 5.0 percent before punching.
10. The posts shall be punched with continuous 7/16-inch diameter holes on 2-inch centers for the entire length of the post. The first

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hole shall be 1 inch from the top.

11. The post shall consist of two parts, a sign post and a base post. The sign post lengths shall be supplied in 1-foot increments up to 10 feet. The base posts shall be 42 inches in length and have holes in the base post, starting 1 inch from the top and continuing in 2-inch increments.
12. The posts shall be machine straightened and have a smooth uniform finish, free from defects affecting strength, durability, or appearance. The allowable tolerance for straightness shall be 1/4 inch in 5 feet.
13. The posts and bases after fabrication shall be galvanized in accordance with the requirements of AASHTO M111M/M 111.

E. Assembly Hardware

1. Assembly hardware used to fasten and support sign components shall conform to the designs and sizes used in standard commercial practices for the materials involved.
2. Bolts and washers shall be stainless steel conforming to the requirements of ASTM F 738M, Property Class A1-70, Condition CW. The alloy shall have a nickel content between 8.0 percent and 10.5 percent.
3. Nuts shall be stainless steel conforming to the requirements of and its supplementary requirements for S5. The alloy shall be ASTM F836M, Property Class A1-70, Condition CW, Alloy 304.

PART 3.00 - EXECUTION

3.01 APPLICATION OF RETROREFLECTIVE SHEETING

A. Before application of the retroreflective sheeting, the sign face shall be cleaned, degreased, coated, treated, and etched or abraded in accordance with standard commercial processes for the sign base material involved. The faces shall be dried by use of a forced hot-air drier and shall not be handled except by device or clean canvas gloves between all cleaning operations and application for the retroreflective sheeting. There shall be no opportunity for the sign faces to come in contact with greases, oils, or other contaminants prior to the application of the retroreflective sheeting.

B. Retroreflective sheeting shall be applied to the face of an extruded aluminum panel by a squeeze roller applicator. Retroreflective sheeting shall be applied to flat sheet aluminum and embossed letter frames by vacuum heat applicator at 95 C (200 F), or by squeeze roller applicator.

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After aging 48 hours at 20 C (68 F), adhesion of the retroreflective sheeting the sign surface shall be strong enough to resist stripping when tested with a stiff putty knife.

C. Retroreflective sheeting having a solvent or heat-activated adhesive shall be completely covered with a clear coating. Retroreflective sheeting with a pressure sensitive adhesive shall be edge sealed with a clear coating. When plastic lettering film is used for the sign text, the clear coating shall be applied only after the entire text is in place on the retroreflective sheeting.

3.02 PRODUCT STORAGE AND HANDLING

A. Handle and transport materials to insure they are in sound, undamaged condition and to prevent damage, in accordance with manufacturer's instructions.

B. Examine all materials before installing. Defective or damaged materials shall be rejected.

C. If defective or damaged materials are discovered after installation, the Contractor shall remove and replace the defective piece(s) at no additional cost to the Owner.

3.03 INSTALLATION OF SIGN POSTS

A. Signs posts shall be installed at the locations shown on the plans or ordered by the Engineer.

B. Posts may either be driven or placed in a hole carefully dug to a depth of 42 inches or as shown on the Plans. The post shall be plumbed and set so that the sign face will be oriented as indicated on the plans. The hole shall be backfilled with suitable material approved by the Engineer. The backfill shall be placed in layers of not more than six inches (6") and thoroughly compacted by the use of an air or mechanical tamper. Care shall be taken in placing and tamping the backfill to preserve the setting of the post. Springing or racking of posts to secure proper alignment will not be permitted.

C. Unless otherwise noted on the Plans, height of the bottom of the sign above finished grade shall be 7 feet.

3.04 MOUNTING OF SIGNS

A. After the post required for a sign has been erected, the sign shall be

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mounted tight to the post using the appropriate assembly hardware.

END OF SECTION 101453

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102800 VOH TOILET ACCESSORIES

1. SUMMARY

This section identifies the toilet accessories for the new restrooms at the Dressing Room level.

NOTE: SOME TOILET ACCESSORIES WILL BE REUSED FROM THE CURRENT DRESSING ROOM LEVEL TOILET ROOMS. CONTRACTOR TO REMOVE, STORE, AND REINSTALL THESE ITEMS.

Related Sections:

061000	Rough Carpentry (Architectural)
092000	Gypsum Board
096500	Resilient Flooring Base and Accessories

Provide quantities of each item described below as shown on plan drawings and interior elevations.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	**Req.**	**Specifics**
Shop Drawings	**X**	- Accessory schedule with type and quantity for each room using room numbers on the Drawings.
Product Cut Sheets	**X**	- Manufacturer's data sheets - Manufacturer finish charts
Product Samples	NA	
Mock-ups	NA	
Closeout submittals	**X**	- Warranty Information. Cleaning, maintenance, and replacement parts information.

3. PRODUCTS

A. GENERAL

i. Applicable Standards: all products and their installation must be ADA compliant and installed in accordance with ADA guidelines.

B. TOILET ACCESSORIES (PROVIDED BY OWNER, INSTALLED BY CONTRACTOR)

i. Manufacturer: Bradley, Bobrick, Kimberly Clark, Georgia Pacific or approved equal similar to basis of design products below.

ii. Products:

a. Toilet Paper dispenser: REUSE EXISTING.
   1. Locations: WC-1 Room 203, WC-2 Room 204.

b. Liquid Soap Dispenser: REUSE ONE EXISTING. PROVIDE ONE NEW ONE TO MATCH.
   1. Locations: WC-1 Room 203, WC-2 Room 204
   2. Product: Bobrick 818615 Contura Series Surface-mounted.

c. Towel Dispenser: REUSE EXISTING.
   1. Locations: WC-1 Room 203, WC-2 Room 204

d. Mirror: REUSE EXISTING.

1. Locations: WC-1 Room 203, WC-2 Room 204.

e. Coat hooks: Bobrick B-212 Clothes Hook with bumper, solid aluminum casting, matte finish with rubber bumper
   1. Locations: WC-1 Room 203, WC-2 Room 204.
      a. (1) per each single-occupancy WC doors. Confirm all mounting heights with architect and to meet ADA requirements.

C. GRAB BARS
   i. Manufacturer: Bradley, Bobrick or approved equal.
   ii. Product: Bradley Model 832, Bobrick B-5806 straight grab bar or "L" corner grab bar. Sizes as shown on the Drawings.
      a. 1-1/4" (32mm) dia. tubing. Constructed of 18-gauge, type 304 satin-finish stainless steel tubing. Concealed mounting flange 1⁄8" thick, type 304 stainless steel plate, 2" W x 3 1⁄8" H, with screw holes for concealed anchors. Cover is 22-gauge, type 304 stainless steel with satin finish, 3 1⁄4" diameter. Cover snaps over mounting flange to conceal screws.
   iii. Locations: WC-1 Room 203. See drawings for sizes and locations.
      a. All grab bars to meet ADA requirements for size, location, mounting, and installation.

D. UNDERLAVATORY GUARDS
   i. Manufacturer: Plumberex Specialty Products, Truebro by IPS Corp. or equal.
   ii. Product: Insulating white molded plastic pipe covering for supply and drain piping assemblies; allow service access without removing coverings for all locations where a shroud is not provided with the lavatory.
   iii. Locations: WC-1 Room 203.

4. EXECUTION & QUALITY CONTROL

Install according to manufacturer's written instructions unless specifically noted otherwise.

A. INSTALLATION
   i. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated, conforming with ADA regulations.
   ii. Grab Bars: Install to withstand a downward load of at least 250 lbf.

END SECTION 102800 VOH TOILET ACCESSORIES

142600 VOH LULA ELEVATOR

1. SUMMARY

This section identifies the Vertical Limited Use / Limited Access elevator to be located in the new addition adjacent on the west side of the Opera House. In addition, this section addresses the hoistway doors and best practices for installation.

This LU/LA elevator will travel from the existing City Hall floor level up to the existing Auditorium floor level, with a vertical travel distance of approximately 14'-6" with 2 stops. Both floors require the same door configuration and require a Type 1 Cab layout.

Related Sections:

061000	Rough Carpentry (Architectural)
092900	Gypsum Board

See Structural Drawings for the cast-in-place concrete pit and hoistway framing.
See MEP Drawings for electrical service, lighting, and fire alarm systems.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- LU/LA Elevator plans, sections, details, pit and hoistway dimensions, electrical and mechanical requirements, operation, control and signal systems.
Product Cut Sheets	**X**	- For each listed product.
Product Samples	**X**	Exposed equipment finishes and Interior finish samples.
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information, Operations and Maintenance information

3. PRODUCTS

A. LU/LA Elevator
   i. Manufacturer: Savaria.
   ii. Product: Orion 17 hydraulic LU/LA Elevator
   iii. Enclosure: Provide full enclosure with 1hr fire rating.
   iv. Platform Size: 48" x 54" Type 1
   v. Capacity: 1400 Lbs.
   vi. Travel: +/- 14'-6", 2 stops
   vii. Speed: 30 fpm.
   viii. Power Supply: 230 volt single phase, 40 amps, 60 Hz with manually operated fused line disconnect.
   ix. Emergency Operation: Emergency battery back-up for lighting, alarm and emergency lowering.

x. Lighting: Manufacturer's Standard
xi. Tel/Data: Provide dedicated phone line to EMR, hardwired into the LU/LA controller.
xii. Car Finishes:
  a. Car Wall finishes: Plastic laminate wall panels with stainless steel trim, in manufacturer's standard colors.
  b. Car Operating Panel: Brushed stainless steel panel with illuminated automatic controls including braille markings, keyed light switch, and alarm button.
  c. Car Floor Finishes: Linoleum sheet (by others – max. 5/8" thick)
  d. Car Ceiling Finishes: Stainless Steel Drop Ceiling with integrated LED lighting.
  e. Stainless steel handrail.
xiii. Control Station Finishes: Brushed Stainless steel with illuminated button.
xiv. Car Doors: Fully automatic, stainless steel side opening, sliding car doors with electromechanical interlocks, obstruction sensor, and automatic re-open system.
xv. Hoistway Doors: 1.5 hour fire-rated fully automatic stainless steel side opening, sliding hoistway doors in steel frame with electromechanical interlocks.
xvi. Hoistway Door Jambs: Stainless steel.
xvii. Lowering: Provide Automatic battery-powered lowering device.
xviii. Provide all standard components for a complete installation of this unit.

B. LU/LA Elevator Warranty
  i. Provide 36 month warranty on parts and system performance.

4. EXECUTION & QUALITY CONTROL

Deliver, store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. COORDINATION
  i. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are attached to hoistway. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
  ii. Coordinate locations and dimensions of other work relating to LU/LA elevator including pit; adjacent floors; electrical service; and location for external lift controls and equipment.

B. INSTALLATION
  i. Instructions: Install the LU/LA Elevator in accordance with the manufacturer's instructions and applicable State and local codes.
  ii. Alignment: Coordinate installation of hoistway entrances with installation of elevator for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until lift is in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

iii. See Savaria Orion Planning Guide and Architectural and Structural drawings for specific blocking requirement for this equipment.
iv. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction
v. Provide elevator operation demonstration to project owner, including a description of the annual maintenance and inspection requirements.

C. PROTECTION
i. Provide cab with temporary covering to protect finishes from damage when in use during construction.

END SECTION 142600 VOH LULA ELEVATOR

144400 VOH WHEELCHAIR LIFTS

1. SUMMARY

This section identifies the vertical platform wheelchair lift located on the east side of the stage, connecting the auditorium level to the stage level and the dressing room level. In addition, this section addresses the hoistway doors and best practices for installation.

Note – this lift configuration requires automatic doors, to be provided as part of the lift system.

Related Sections:
061000 Rough Carpentry (Architectural)
092900 Gypsum Board

See Structural Drawings for the cast-in-place concrete pit and hoistway framing.
See MEP Drawings for electrical service and fire alarm systems.

2. SUBMITTAL PROCESS

The following are required as part of the submittal for these products:

Submittal	Req.	Specifics
Shop Drawings	**X**	- Wheelchair lift plans, sections, details, pit and hoistway dimensions, electrical and mechanical requirements, operation, control and signal systems.
Product Cut Sheets	**X**	- For each listed product.
Product Samples	**X**	Exposed equipment finishes and Interior finish samples.
Mock-ups	NA	
Closeout submittals	**X**	Warranty Information, Operations and Maintenance information

3. PRODUCTS

A. VERTICAL PLATFORM WHEELCHAIR LIFT
   i. Manufacturer: Savaria Prolift SCL Model Type 2 Commercial Wheelchair lift
   ii. Platform/Enclosure: Provide full enclosure.
   iii. Platform Size: 36” x 54”
   iv. Capacity: 750 LB minimum.
   v. Travel: 8’-3” floor-to-floor (Dressing Room level to Stage level), 3 stops
   vi. Power Supply: 230 V 40 Amp single phase at 60 Hz.
   vii. Emergency Operation: Manual
   viii. Lighting: Manufacturer’s Standard
   ix. Pit Depth: 8” Minimum
   x. Overhead clearance: 92” min
   xi. Cab Finishes:
      a. Cab wall finishes: Melamine
      b. Cab Floor Finishes: Rubber Mat
      c. Cab Ceiling Finishes: Manufacturer’s Standard.

xii. Control Panel and Hall Station Finishes: Stainless steel.
xiii. Provide all standard components for a complete installation of this unit.
xiv. Hoistway Doors: Pro Auto Fire Rated Automatic Doors with Prolocks
   a. Door Type: UL Fire Rated 18 Ga. Hollow Metal.
   b. Frame Type: UL Fire Rated 16 Ga. Hollow Metal, fully welded.
   c. Finish: Factory primed.
   d. Vision Lite: 4" x 24" Rated Glass
   e. Front and Rear Door Size: 3'-0" x 6'-8
   f. Side Door Size: N/A
   g. Hardware: ADA Compliant
   h. Opener/Closer: Provide standard automatic operator in the header.
   i. Weatherstripping: Provide full weatherstripping around the door at stage level only, for acoustic noise control.

B. Wheelchair Lift Warranty
   i. Provide 36 month warranty on parts and system performance.

4. EXECUTION & QUALITY CONTROL

Deliver, store and install according to manufacturer's written instructions unless specifically noted otherwise.

A. COORDINATION
   i. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are attached to hoistway. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
   ii. Coordinate locations and dimensions of other work relating to wheelchair lift including pit; adjacent floors; electrical service; and location for external lift controls and equipment.

B. INSTALLATION
   i. Instructions: Install the wheelchair lift in accordance with the manufacturer's instructions and applicable State and local codes.
   ii. Alignment: Coordinate installation of hoistway entrances with installation of lift for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until lift is in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
   iii. See Savaria ProLift Planning Guide and Architectural and Structural drawings for specific blocking requirement for this equipment.
   iv. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction
   v. Acoustic: Provide a short loop of hydraulic hose between the pump and the hydraulic lines to reduce transmission of pump noise.
   vi. Provide wheelchair lift operation demonstration to project owner, including a description of the annual maintenance and inspection requirements.

C. PROTECTION
   i. Provide cab with temporary covering to protect finishes from damage when in use during construction.

END SECTION 144400 VOH WHEELCHAIR LIFTS

SECTION 310000 – EARTHWORK

PART 1.00 - GENERAL

1.01 WORK INCLUDED

A. Excavating
B. Pipe Bedding and Envelope
C. Trenching
D. Trench Backfilling
E. Structure Bedding
F. Structure Backfilling
G. Filling
H. Grading
I. Subgrade preparation
J. Geotextiles
K. Embankments
L. Subbase
M. Base
N. Compaction
O. Dewatering
P. <u>This Section does NOT include Earthwork related to buildings, footings, foundations.</u>

1.02 REFERENCE STANDARDS

A. State of Vermont, Agency of Transportation (VTrans), "Standard Specifications for Construction", latest version.
B. ASTM Standard Test Method D1557 for Laboratory Compaction Characteristics of Soil Using Modified Effort.
C. ASTM Standard Test Method D2992 for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).
D. AASHTO Test T96 for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
E. ASTM Standard Classification D2487 of Soils for Engineering Purposes (Unified Soil Classification System).
F. AASHTO Standard M145 - Recommended Practice for Classification of Soils.
G. State of Vermont, Agency of Natural Resources, Environmental Protection Rules-Chapter 1.
H. ASTM Standard Test Method D 4632 for Grab Tensile Strength of Geotextiles.
I. ASTM Standard Test Method D 3786 for Mullen Burst Strength of Geotextiles.
J. ASTM Standard Test Method D 4533 for Trapezoidal Tear Strength of Geotextiles.
K. ASTM Standard Test Method D 4833 for Puncture Strength of Geotextiles.
L. ASTM Standard Test Method D 4355 for UV Deterioration of Geotextiles.

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M. ASTM Standard Test Method D 4751 for Apparent Opening Size of Geotextiles.
N. ASTM Standard Test Method D 4491 for Flow Rate of Geotextiles.

1.03 SUBMITTALS

A. The Contractor shall submit supplier's certified laboratory gradation curves and moisture-density compaction curves (modified proctor) for each imported material to be used on the project.
B. The Contractor shall submit representative samples of each imported material to be used on the project, if requested by the Engineer.
C. The Contractor shall submit certified laboratory gradation curves, moisture-density compaction curves (modified proctor) and ASTM D2487 Soil Classification or AASHTO M145 Soil Classification for each on-site material proposed for Fill or Backfill on the project.
D. The Contractor shall submit representative samples of each on-site material proposed for Fill or Backfill on the project, if requested by the Engineer.
E. The Contractor shall submit manufacturer's data for Subgrade Stabilization/Separation Fabric, Filter Fabric.

1.04 QUALITY ASSURANCE

A. The Contractor shall allow the Owner's testing agency to perform field quality control testing, including, but not limited to, in place compaction testing of Subgrade and each layer of Embankment, Subbase, Base, or Fill, at the discretion of the Engineer. The Contractor shall proceed with subsequent earthwork only after test results for previously completed work comply with requirements. Should any work not meet the testing requirements, all subsequent testing required by the Owner shall be paid for by the Contractor.
B. When the testing agency reports that any area has not achieved the required level of compaction, the Contractor shall remove and replace, or uniformly moisten or scarify and aerate to obtain optimum moisture content, and then re-compact and retest until specified compaction is obtained. Reworking, replacement of material, re-compacting and retesting will be done at no additional expense to the Owner.
C. Unless modified by the Engineer, compaction tests may be performed at the following frequencies:
    1. Pipe Bedding and Structure Bedding: one test for each 150 feet or less of trench length.
    2. Initial Backfill/Envelope: at least one test for each 150 feet or less of trench length.
    3. Trench or Structure Backfill: at least one test for each 150 feet or less of trench length and/or at least one test per vertical foot of trench depth.
    4. Subgrade: at least one test for every 2,000 square feet or less of Subgrade.
    5. Embankment, Subbase or Base: at least one test for every 2,000 square feet or less, and/or at least one test per vertical foot of depth.

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6. Gravel Roadway and Driveway, Gravel Shoulder, or Gravel Sidewalk: at least one test for every 2,000 square feet or less, and/or at least one test per vertical foot of depth.
7. Fill: at least one test for every 2,000 square feet or less of Fill, and/or at least one test per vertical foot of depth.

D. Do not place materials on surfaces that are muddy, frozen or contain frost or ice.

E. Protect newly graded areas from traffic, freezing and erosion. Keep free of trash and debris.

F. Repair and reestablish, to specified tolerances, areas where completed or partially completed surfaces become eroded, rutted, settled or where they lose compaction due to pumping, subsequent construction operations or weather conditions.

G. Where settling occurs, the Contractor shall remove finished surface treatment, backfill with appropriate Base material, compact and replace surface treatment, all at no additional expense to the Owner. Restore appearance, quality and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

H. The Contractor shall be thoroughly trained and experienced in the skills and equipment required for Earthwork.

I. The Contractor shall protect Earthwork materials and areas before, during and after installation. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

J. Upon direction of the Engineer, the Contractor shall remove and/or rework all areas which do not meet the requirements of this Section. The Contractor shall perform all remedial measures at no additional cost to the Owner.

1.05 DEFINITIONS

A. Backfill: materials used to fill an Excavation
   1. Initial Backfill/Envelope: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. Trench Backfill: Backfill placed over Initial Backfill/Envelope to fill a trench Excavation.

B. Base Course: layer placed between the Subbase Course and either bituminous concrete pavement, curb, sidewalk, or other surface treatment.

C. Bedding: layer placed over the excavated Subgrade in a trench before placement of pipe or structure.

D. Borrow: imported materials from off-site sources.

E. Embankment: layer placed between Subgrade and Subbase.

F. Excavation: removal of material encountered above Subgrade elevations.

G. Fill: soil material used to raise existing grades in lawn and grass areas.

H. Onsite material: soil material stockpiled from Excavations.

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I. Rock: refer to Section 312316.26.
J. Structures: precast concrete wastewater and stormwater manholes, catch basins, storage tanks, pump stations, septic tanks, and vaults. "Structures" as discussed in this Specification does not include buildings, footings, foundations.
K. Subbase Course: layer placed between the Embankment and Base Course, or between Subgrade and Base course if no Embankment.
L. Subgrade: surface or elevation remaining after completing excavation; surface below Embankment or below Subbase or Bedding, if no Embankment.

PART 2.00 - PRODUCTS

2.01 BORROW MATERIALS

A. General
1. All Borrow materials shall be obtained from approved sources and be reasonably free from structurally weak pieces, thin or elongated pieces, silt, loam, topsoil, clay, organic or other deleterious material.
2. All Borrow materials shall be uniformly graded from coarse to fine.
3. All Borrow materials that include stone fractions shall be from rock types that are durable and resistant to weathering, and shall not be from sources that are primarily limestone or marble.

B. Bank Run Sand
1. Shall conform with Section 703.03 of the VTrans Standard Specifications for Construction.
2. Bank Run Sand shall meet the following gradation requirement:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
2 inches	100
1-½ inches	90-100
½ inch	70-100
No. 4	60-100
No. 100	0-20
No. 200	0-8

C. Bank Run Gravel
1. Shall conform with Section 704.04 of the VTrans Standard Specifications for Construction.
2. The percent of wear of the gravel shall not be more than 50 when tested in accordance with AASHTO T 96.
3. The maximum size stone particle shall not exceed 67% of the thickness of

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the layer being placed.

4. Bank Run Gravel shall meet the following gradation requirement:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
6 inches	100
1½ inches	60-100
No. 4	20-60
No. 100	0-12
No. 200	0-6

D. Coarse Crushed Gravel
   1. Shall conform with Section 704.05 of the VTrans Standard Specifications for Construction.
   2. The percent of wear of the gravel shall not be more than 40 when tested in accordance with AASHTO T 96.
   3. At least 50 percent, by weight, of the material coarser than the No. 4 sieve shall have at least one fractured face.
   4. Coarse Crushed Gravel shall meet the following gradation requirement:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
4 inches	95-100
No. 4	25-50
No. 100	0-12
No. 200	0-6

E. Fine Crushed Gravel
   1. Shall conform with Section 704.05 of the VTrans Standard Specifications for Construction.
   2. The percent of wear of the gravel shall not be more than 40 when tested in accordance with AASHTO T 96.
   3. At least 50 percent, by weight, of the material coarser than the No. 4 sieve shall have at least one fractured face.
   4. Fine Crushed Gravel shall meet the following gradation requirement:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve

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2 inches	100
1½ inches	90-100
No. 4	30-60
No. 100	0-12
No. 200	0-6

F. Plant Mixed Gravel

1. Shall consist of clean, hard, crushed stone or crushed gravel, mixed at the plant to give a specific gradation.
2. When the Plant Mixed Gravel is composed of crushed stone or crushed gravel, the percent of wear of the aggregate shall not be more than 35 when tested in accordance with AASHTO T 96. When the Plant Mixed Gravel is composed of crushed igneous rock, the percent of wear of the aggregate shall not be more than 50 when tested in accordance with AASHTO T 96.
3. When crushed gravel is used for the aggregate, at least 50 percent, by weight, of the material coarser than the No. 4 sieve shall have at least one fractured face.
4. The aggregate fractions shall be uniformly combined in such proportions that the resulting Plant Mixed Gravel gradation conforms to the following:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
1¾ inches	100
1½ inches	95-100
1 inch	60-85
¾ inch	50-70
½ inch	40-60
No. 4	20-40
No. 8	15-30
No. 200	0-4

G. Aggregate for Surface Course and Shoulders

1. Shall conform with Section 704.12 of the VTrans Standard Specifications for Construction.

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2. The percent of wear of the gravel when tested in accordance with AASHTO T 96 shall not be more than 40 for material used as Surface Course, or not more than 50 for material used as Shoulders.
3. Aggregate for Shoulders shall meet the following gradation requirement:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
1½ inches	100
1 inch	90-100
No. 4	45-65
No. 100	0-15
No. 200	0-12

4. Surface Course Gravel shall meet the following gradation requirement:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
1½ inches	100
1 inch	95-100
No. 4	45-65
No. 100	10-15
No. 200	8-12

H. "Sur-Pak" Gravel

1. "Sur-Pak" Gravel shall meet the following gradation requirements:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
¾ inch	100
½ inch	95-100
⅜ inch	80-95
No. 4	50-70
No. 8	30-50
No. 16	20-40

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No. 30	15-35
No. 50	10-30
No. 100	5-20
No. 200	2-10

I. Dense Graded Crushed Stone
   1. Shall conform with Section 704.06 of the VTrans Standard Specifications for Construction.
   2. The percent of wear of the crushed stone shall not be more than 40 when tested in accordance with AASHTO T 96. The percent of wear shall not be more than 50 if crushed igneous rock is used.
   3. Dense Graded Crushed Stone shall meet the following gradation requirement:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
3½ inches	100
3 inches	90-100
2 inches	75-100
1 inch	50-80
½ inch	30-60
No. 4	15-40
No. 200	0-6

J. Crushed Stone
   1. Shall conform with Section 704.02of the VTrans Standard Specifications for Construction.

   2. When the aggregate is composed of crushed stone, the percent of wear of the aggregate shall not be more than 35 when tested in accordance with AASHTO T 96. When the aggregate is composed of crushed igneous rock, the percent of wear of the aggregate shall not be more than 50 when tested in accordance with AASHTO T 96.

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3. ¾-inch Crushed Stone shall meet the following gradation requirement:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
1 inch	100
¾ inch	90-100
⅜ inch	20-55
No. 4	0-10
No. 8	0-5

4. 1½-inch Crushed Stone shall meet the following gradation requirement:

Sieve No.	Percentage by Weight Passing Square Mesh Sieve
2 inches	100
1½ inches	95-100
¾ inch	35-70
⅜ inch	10-30
No. 4	0-5

K. Rip-Rap Systems
   1. Shall conform with Section 706.04 of the VTrans Standard Specifications for Construction.
   2. Stone for rip-rap systems shall be unhewn, rough quarry stone, as nearly rectangular in section as practicable. The stones shall be hard, sound and resistant to the action of water and weathering. Blast rock may only be used for rip-rap if approved by the Engineer. They shall be a rock type other than serpentine rock containing the fibrous variety chrysotile (asbestos). Rip-rap systems shall be of the following types:
      a. Type I:
         i. The longest dimension of stone shall vary from 1 to 12 inches, and at least 50 percent of the volume of stone in place shall have at least dimension of 4 inches.
      b. Type II:
         i. The longest dimension of stone shall vary from 2 to 36

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inches, and at least 50 percent of the volume of stone in place shall have at least dimension of 12 inches.

c. Type III:
   i. The longest dimension of stone shall vary from 3 to 48 inches, and at least 50 percent of the volume of stone in place shall have at least dimension of 16 inches.

d. Type IV:
   i. The longest dimension of stone shall vary from 3 to 60 inches, and at least 50 percent of the volume of stone in place shall have at least dimension of 20 inches.

e. Type V
   i. The longest dimension of stone shall vary from 2 to 72 inches, and at least 50 percent of the volume of stone in place shall have at least dimension of 24 inches.

3. Rounded, un-fractured or smooth rocks or quarry screenings or tailings shall not be acceptable rip-rap.
4. Rock shall be gray or grayish-blue in color.

L. Topsoil: refer to Specification Section 329200.

M. Streambed Stone Fill
1. **Type E1** - The longest dimension of the stone shall be at least 18-inches, and at least 50% of the volume of the stone in place shall have a least dimension of 12-inches, and at least 25% of the material shall have a maximum dimension of 2-inches and be well graded material.
2. **Type E2** - The longest dimension of the stone shall be at least 24-inches, and at least 50% of the volume of the stone in place shall have a least dimension of 18-inches, and at least 25% of the material shall have a maximum dimension of 2-inches and be well graded material.
3. **Type E3** - The longest dimension of the stone shall be at least 36-inches, and at least 50% of the volume of the stone in place shall have a least dimension of 24-inches, and at least 25% of the material shall have a maximum dimension of 2-inches and be well graded material.
4. **Type E4** - The longest dimension of the stone shall be at least 48-inches, and at least 50% of the volume of the stone in place shall have a least dimension of 36-inches, and at least 25% of the material shall have a maximum dimension of 2- inches and be well graded material.
5. The streambed stone fill shall be hard, blasted, angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). Similar sized river sediment is an acceptable alternative, as is a mixture of angular material and river sediment.

N. Category I Imported Fill: shall conform to all the requirements for Category I Onsite Material.

O. River Stone:

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1. River stone shall be smooth, round, whole stones of the size and color as specified in the Drawings.
2. River stone shall be clean, washed and contain at least 90% whole stones with less than 1% passing the No. 200 Sieve, by weight.

2.02 ONSITE MATERIAL

A. Category I Onsite Material
   1. ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP and SM, or a combination of these group symbols, (See Table below).
   2. AASHTO M145 Soil Classification Groups A-1-a, A-1-b, A-3, A-2-4 and A-2-5, or a combination of these group symbols, (See Table below).

B. Category II Onsite Material:
   1. ASTM D2487 Soil Classification Groups GC, SM-SC, SC, ML, CL, MH and CH, or a combination of these group symbols, (See Table below).
   2. AASHTO M145 Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6 and A-7, or a combination of these group symbols, (See Table below).

C. Unsuitable Onsite Material:
   1. ASTM D2487 Soil Classification Groups ML-CL, OL, OH and PT, or a combination of these group symbols, (See Table below.
   2. AASHTO M145 Soil Classification Group A-8, (See Table below).
   3. Debris, waste, trash, frozen materials, clumps, vegetation, roots, stumps, peat, organics, topsoil, boulders, pavement, concrete, muck, rocks over eight inches in dimension, and other deleterious material.
   4. Unsuitable Onsite Materials include Category I and Category II Onsite Materials which the Contractor is unable to compact to specified densities.
   5. Unsuitable Onsite Materials include Category I and Category II Onsite that include any of the items listed in 2.02 C. 3.

D. Suitable Blast Rock:
   1. Shall consist of hard, angular blasted rock broken into various sizes. The longest dimension of the stone shall vary from one inch to eight inches, and at least 50 percent of the volume of the stone shall have a least dimension of four inches. The least dimension of the stone shall be greater than a of the longest dimension.
   2. Suitable Blast Rock shall be reasonably well graded from the smallest to the maximum size stone so as to form a compact mass without voids when in place.
   3. Shall be free from structurally weak pieces, silt, topsoil, clay, organic or other deleterious material.

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E. Table of ASTM D2487 Soil Classification Groups:

Group Symbol	Description	Range of max. dry densities, lbm/cf	Range of optimum moisture content, %	Onsite Material Category
GW	well-graded, clean gravels, gravel-sand mixtures	125-135	11-8	I
GP	poorly-graded, clean gravels, gravel-sand mixtures	115-125	14-11	I
GM	silty gravels, poorly graded gravel-sand-silt	120-135	12-8	I
GC	clayey gravels, poorly-graded gravel-sand-clay	115-130	14-9	II
SW	well-graded clean sands, gravely sands	110-130	16-9	I
SP	poorly-graded clean sands, sand-gravel mix	100-120	21-12	I
SM	silty sands, poorly-graded sand-silt mix	110-125	16-11	I
SM-SC	sand-silt-clay mix with slightly plastic fines	110-130	15-11	II
SC	clayey sands, poorly-graded sand-clay mix	105-125	19-11	II
ML	inorganic silts and clayey soils	95-120	24-12	II
ML-CL	mixture of organic silt and clay	100-120	22-12	U
CL	inorganic clays of low-to-medium plasticity	95-120	24-12	II
OL	organic silts and silt-clays, low plasticity	80-100	33-21	U
MH	inorganic clayey silts, elastic silts	70-95	40-24	II
CH	inorganic clays of high plasticity	75-105	36-19	II
OH	organic and silty clays	65-100	45-21	U

F. Table of AASHTO M145 Soil Classification Groups:

	Granular materials (35% or less passing No. 200 sieve)							silt-clay materials (35% or more passing No. 200 sieve)				
	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-8
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7					
Sieve Analysis: % passing												
No. 10	50 max.											
No. 40	30 max.	50 max.	51 min.									
No. 200	15 max.	25 max.	10 max.	35 max.	35 max.	35 max.	35 max.	36 min.	36 min.	36 min.	36 min.	
Characteristics of fraction passing												

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No. 40 liquid limit plasticity index	6 max.		non- plastic	40 max. 10 max.	41 min. 10 max.	40 max. 11 min.	41 min. 11 min.	40 max. 10 max.	41 min. 10 max.	40 max. 11 min.	41 min. 11 min.	peat,
Usual types of significant constituents	stone fragments gravel and sand		fine sand	silty or clayey gravel and sand				silty soils		clayey soils		highly organic soils
Onsite Material Category	I	I	I	I	I	II	II	II	II	II	II	U

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2.03 SATISFACTORY PIPE BEDDING AND INITIAL BACKFILL/ENVELOPE MATERIALS SHALL BE ONE OF THE FOLLOWING, AS APPLICABLE:

A. For ductile iron pipe:
   1. Dry trench bottom: Bank Run Sand, Screened Sand, Fine Crushed Gravel, Surface Course Gravel, Plant Mixed Gravel, ¾" Crushed Stone or Category I Onsite Material (1" stone maximum).
   2. Wet trench bottom: 1½" Crushed Stone.

B. For SDR 35 PVC pipe: ¾" Crushed Stone.

C. For SCH40 and SCH80 PVC pipe: ¾" Crushed Stone.

D. For C900, C905, CL160 or CL200 PVC pipe:
   1. Dry trench bottom: Bank Run Sand, Screened Sand, Fine Crushed Gravel, or ¾" Crushed Stone.
   2. Wet trench bottom: 1½" Crushed Stone.

E. For reinforced concrete pipe:
   1. Dry trench bottom: Bank Run Sand, Screened Sand, Fine Crushed Gravel, or ¾" Crushed Stone.
   2. Wet trench bottom: ¾" Crushed Stone.

F. For solid wall C906 HDPE pipe:
   1. Dry trench bottom: Bank Run Sand, Screened Sand, Fine Crushed Gravel, or ¾" Crushed Stone.
   2. Wet trench bottom: 1½" Crushed Stone.

G. For C901 HDPE tubing: Bank Run Sand, Screened Sand.

H. For corrugated HDPE pipe: ¾" Crushed Stone.

I. For corrugated metal pipe: ¾" Crushed Stone.

J. For copper pipe: Bank Run Sand, Screened Sand.

2.04 SATISFACTORY STRUCTURE BEDDING MATERIALS SHALL BE ONE OF THE FOLLOWING, AS APPLICABLE:

A. Below precast concrete wastewater manholes, catch basins, stormwater manholes, storage tanks, septic tanks, pump stations, and vaults: ¾" or 1½" Crushed Stone.

2.05 SATISFACTORY TRENCH BACKFILL AND STRUCTURE BACKFILL MATERIALS SHALL BE ONE OF THE FOLLOWING, AS APPLICABLE:

A. Below <u>any</u> surface treatment other than Lawn and Grass areas <u>or</u> when top edge of excavation is within five horizontal feet of any surface treatment other than Lawn and Grass areas (including, but not limited to, bituminous concrete pavement, curb, sidewalk, or other surface treatment):
   1. Bank Run Sand, Screened Sand, Bank Run Gravel, Coarse Crushed Gravel, Fine Crushed Gravel, Dense Graded Crushed Stone,
   2. Suitable Blast Rock - <u>only if thickness of Initial Backfill/Envelope is doubled,</u> at no additional cost to the Owner,
   3. Category I Onsite Materials, ENGINEER TO DECIDE IF OKAY FOR EACH PROJECT; & ALSO MAKE SURE COORDINATED WITH PIPE IN TRENCH

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DETAIL.

B. Below Lawn and Grass areas:
   1. Bank Run Sand, Screened Sand, Bank Run Gravel, Coarse Crushed Gravel, Fine Crushed Gravel, Dense Graded Crushed Stone,
   2. Suitable Blast Rock - only if thickness of Initial Backfill/Envelope is doubled, at no additional cost to the Owner,
   3. Category I Onsite Materials,
   4. Category II Onsite Materials,
   5. Category I Imported Fill.

2.06 SATISFACTORY FILL MATERIALS SHALL BE ONE OF THE FOLLOWING, AS APPLICABLE:

A. Below Lawn and Grass Areas:
   1. Bank Run Sand, Screened Sand, Bank Run Gravel, Coarse Crushed Gravel, Fine Crushed Gravel, Dense Graded Crushed Stone,
   2. Suitable Blast Rock,
   3. Category I Onsite Materials,
   4. Category II Onsite Materials,
   5. Category I Imported Fill.

B. Below ALL other areas: refer to Embankment Materials or Subbase Materials.

2.07 SATISFACTORY EMBANKMENT MATERIALS SHALL BE ONE OF THE FOLLOWING:

A. All Embankments: Bank Run Gravel, Coarse Crushed Gravel, Dense Graded Crushed Stone, Suitable Blast Rock.

2.08 SATISFACTORY SUBBASE MATERIALS SHALL BE ONE OF THE FOLLOWING, AS APPLICABLE:

A. Below Bituminous Concrete Pavement: Bank Run Gravel, Coarse Crushed Gravel or Dense Graded Crushed Stone.
B. Below Cast in Place Concrete Curb: Bank Run Gravel, Coarse Crushed Gravel or Dense Graded Crushed Stone.
C. Below Cast in Place Concrete Sidewalk: Bank Run Gravel, Coarse Crushed Gravel or Dense Graded Crushed Stone.
D. Below Granite Curb: Bank Run Gravel, Coarse Crushed Gravel or Dense Graded Crushed Stone.
E. Below Gravel Roadway and Driveway: Bank Run Gravel, Coarse Crushed Gravel or Dense Graded Crushed Stone.
F. Below Gravel Shoulder: Bank Run Gravel, Coarse Crushed Gravel or Dense Graded Crushed Stone.
G. Below Gravel Sidewalk: Bank Run Gravel, Coarse Crushed Gravel or Dense Graded Crushed Stone.

2.09 SATISFACTORY BASE MATERIALS SHALL BE ONE OF THE FOLLOWING, AS APPLICABLE:

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A. Below Bituminous Concrete Pavement: Fine Crushed Gravel, Plant Mixed Gravel.
B. Below Cast in Place Concrete Curb: Fine Crushed Gravel, Plant Mixed Gravel.
C. Below Cast in Place Concrete Sidewalk: Fine Crushed Gravel, Plant Mixed Gravel.
D. Below Granite Curb: Fine Crushed Gravel, Plant Mixed Gravel.
E. Below Gravel Roadway and Driveway: Fine Crushed Gravel, Plant Mixed Gravel.
F. Below Gravel Shoulder: Fine Crushed Gravel, Plant Mixed Gravel.
G. Below Gravel Sidewalk: Fine Crushed Gravel, Plant Mixed Gravel.

2.10 SATISFACTORY SURFACE TREATMENT MATERIALS SHALL BE ONE OF THE FOLLOWING, AS APPLICABLE:

A. Existing surfaces: if not indicated to be replaced otherwise, all disturbed surfaces shall be replaced with materials matching existing, including special finishes, colors, textures or material types.
B. Bituminous Concrete Pavement: refer to Section 321200.
C. Cast In Place Concrete Curb: refer to Section 321600.
D. Cast In Place Concrete Sidewalk: refer to Section 321600.
E. Granite Curb: refer to Section 321600.
F. Gravel Roadway and Driveway: Surface Course Gravel.
G. Gravel Shoulder: Surface Course Gravel.
H. Gravel Sidewalk: "Sur-Pak" Gravel.
I. Lawn and Grass areas: refer to Section 329200.

2.11 GEOTEXTILES

A. Subgrade Stabilization Fabric: Shall be Mirafi[7] 500X woven polypropylene geotextile or approved equal, meeting the following minimum standards:

	METRIC	ENGLISH
Grab Tensile Strength	0.89 kN	200 lbs
Mullen Burst Strength	2756 kPa	400 psi
Trapezoidal Tear Strength	0.33 kN	75 lbs
Puncture Strength	0.40 kN	90 lbs
UV Deterioration	70% of Strength	70% of Strength
Apparent Opening Size	0.300 mm	50 (U.S. Sieve)
Flow Rate	200 l/min/m5	5 gal/min/ft^2

B. Filter Fabric: Shall be Mirafi[7] 140N non-woven polypropylene geotextile or approved equal, meeting the following minimum standards:

	METRIC	ENGLISH
Grab Tensile Strength	0.53 kN	119 lbs.

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Mullen Burst Strength	1654 kPa	240 psi
Trapezoidal Tear Strength	0.22 kN	49 lbs.
Puncture Strength	0.31 kN	70 lbs.
UV Deterioration	70% of Strength	70% of Strength
Apparent Opening Size	0.212 mm	60 (U.S. Sieve)
Flow Rate	5500 l/min/m5	135 gal/min/ft^2

PART 3.00 - EXECUTION

3.01 PROTECTION

A. Protect buildings, structures, utilities, pipelines, sidewalks, plantings, pavement, and other facilities from damage caused by settlement, lateral movement, undermining, washout, subsidence due to lowering of groundwater and other hazards created by earthwork operations. The Contractor shall be responsible for any repairs or remedial work necessary, at no additional cost to the Owner.

B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil bearing water runoff or airborne dust.

C. Provide all necessary excavation and trench support systems, materials and equipment necessary to comply with all Local, State and Federal Standards. Excavation and trench support systems shall be kept in place and maintained until no longer required.

3.02 LAYOUT, LINES, GRADES, ELEVATIONS

A. All layout shall be performed by the Contractor.

B. Provide all qualified personnel and calibrated equipment necessary to establish and maintain all necessary controls for line, grade, elevation and location and to provide all construction layout.

C. Preserve all monuments, pins, pipes and rods. If disturbed or lost, the Contractor shall immediately have them replaced or reset by a Licensed Surveyor, at no additional cost to the Owner.

D. The Contractor shall be responsible for accurate placement of all work to the locations and elevations shown on the Drawings.

E. Horizontal and vertical control lines and elevations shall be set by the Contractor based on reference information provided by the Engineer. From information provided, the Contractor shall verify bench marks and perform all surveys and layout necessary for the completion of work.

F. The accuracy of the Contractor's survey and layout is the sole responsibility of the Contractor, and review of the survey and/or layout by the Engineer does not constitute a transferal of responsibility for accuracy.

3.03 DEWATERING

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A. Prevent surface water and groundwater from entering excavations, from ponding on prepared Subgrade, Embankment, Subbase, Base or Fill, and from flooding Project site and surrounding area.
B. Provide all necessary pumps, well points and other equipment and materials necessary for control and removal of surface and groundwater. The Contractor may encounter surface and groundwater in excavations. Pricing shall include all dewatering operations. Additional compensation for such work, over and above the contract price, shall not be approved.
C. Protect all surfaces from softening, undermining, washout and damage by rain or water accumulation. Reroute surface water runoff away from excavated areas. Do not use excavated trenches as temporary drainage ditches.
D. Install a dewatering system(s) to keep Subgrade dry and convey groundwater away from excavations. Maintain until dewatering is no longer required.
E. Water discharged from dewatering operations shall be directed to stable vegetated areas, properly sized dewatering silt capturing bag, or properly sized sedimentation pond. State Water Quality standards shall be maintained at all times.

3.04 EXCAVATING
A. Excavate to grades, depths, elevations and dimensions as shown on Drawings, or as required, within a tolerance of plus or minus one inch.
B. Do not disturb Subgrade.

3.05 UNAUTHORIZED EXCAVATIONS
A. Fill unauthorized excavations with Bedding, Embankment or Subbase materials, as appropriate, at no additional cost to the Owner.

3.06 STORAGE OF MATERIAL
A. Stockpile material without intermixing. Place, grade, and shape stockpiles to drain surface water.
B. Cover stockpiles to prevent windblown dust if necessary.
C. Provide necessary erosion control measures to prevent migration of stockpiled materials.
D. Stockpile materials away from edge of excavations. Do not store within drip line of trees to remain.

3.07 DISPOSAL OF UNSUITABLE ONSITE MATERIAL, SURPLUS ONSITE MATERIAL AND WASTE MATERIAL
A. Remove Unsuitable Onsite Material, surplus Onsite Material, waste material, trash and debris and legally dispose of it off the Owner=s property.
B. If surplus material disposal site(s) are indicated on the Drawings, the Contractor shall transport materials to designated areas. Spread or stockpile materials as directed.

3.08 TRENCHING

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A. Excavate to indicated grades, depths, elevations and dimensions and to uniform widths to provide a working clearance on each side of pipe or Structure.
B. Excavate trenches to required depth below pipe or Structure elevation to allow proper depth and width of bedding course.

3.09 PIPE BEDDING AND STRUCTURE BEDDING

A. Place required Bedding material to depth and width indicated. Shape Bedding course to provide continuous support for bells, joints and barrels of pipes, fittings and Structures. Care shall be taken to not have any part of the pipe or structure bearing on rocks. "Point contact" at fittings, joints or along the pipe length is not allowed.
B. If the Engineer determines that unsatisfactory or unstable Subgrade exists, continue excavation and replace with additional Bedding material.
C. Compact bedding material to density specified in Schedule below.

3.10 PIPE AND STRUCTURE INITIAL BACKFILL/ENVELOPE

A. Place required Initial Backfill/Envelope material to depth and width indicated. Provide proper haunching and support for bells, joints and barrels of pipes and fittings. Bring Initial Backfill/Envelope material evenly up on sides and along full length of piping or Structure. Do not damage or displace pipe or Structure.
B. Compact Initial Backfill/Envelope material to density specified in Schedule below.

3.11 TRENCH BACKFILLING AND STRUCTURE BACKFILLING

A. Place required Trench Backfill and Structure Backfill material in lifts evenly along full length of piping and evenly on all sides of Structure. Do not damage or displace pipe or Structure.
B. Compact each lift of Trench Backfill and Structure Backfill material to density specified in Schedule below.
C. As trench or excavation support system is removed, do not disturb Trench Backfill and Structure Backfill material.
D. Install warning tape directly above pipe at depth indicated on Drawings.
E. Continue backfilling and compacting to bottom of Embankment, Subbase or Base, as applicable.

3.12 SUBGRADE PREPARATION

A. Notify the Engineer when excavations have reached required Subgrade.
B. Subgrade shall be crowned or sloped to shed groundwater as indicated on the Drawings, or directed by the Engineer.
C. Proof roll Subgrade with loaded ten-wheel dump truck to identify soft, spongy or unstable areas or areas of excess yielding or shoving. Do not proof roll wet or saturated Subgrade. If the Engineer determines that unsatisfactory soil is present, continue excavation and replace with additional Bedding, Embankment or Subbase material, as appropriate.

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D. Reconstruct Subgrade damaged by freezing temperatures, frost, rain, accumulated water or construction traffic or activities, as directed by the Engineer, at no additional cost to the Owner.

3.13 SUBGRADE STABILIZATION/SEPARATION GEOTEXTILE INSTALLATION

A. Install specified Subgrade Stabilization/Separation Fabric on prepared Subgrade according to manufacturer's instructions. Fabric shall be rolled out flat and tight with no folds.
B. Fabric shall be overlapped a minimum of two feet at all seams.
C. Fabric shall be properly anchored as necessary.
D. Do not allow traffic or equipment to travel on fabric.
E. Protect fabric from damage and weather.
F. Any torn or damaged areas shall be replaced or overlaid with new sections of fabric.
G. All seams at replacement sections shall be overlapped a minimum of three feet.

3.14 EMBANKMENT INSTALLATION

A. Place required Embankment material in lifts on prepared Subgrade, evenly across width and length.
B. Compact each lift of Embankment material to density specified in Schedule below.
C. Continue placing and compacting Embankment material in lifts to grades, elevations, thickness, dimensions, cross slope and cross section shown on the Drawings.

3.15 SUBBASE

A. Place required Subbase material in lifts on prepared Embankment, or Subgrade if no Embankment, evenly across width and length.
B. Compact each lift of Subbase material to density specified in Schedule below.
C. Continue placing and compacting Subbase material in lifts to grades, elevations, thickness, dimensions, cross slope and cross section shown on the Drawings.

3.16 BASE

A. Place required Base material in lifts on prepared Subbase, or Subgrade if no Subbase, evenly across width and length.
B. Compact each lift of Base material to density specified in Schedule below.
C. Continue placing and compacting Base material in lifts to grades, elevations, thickness, dimensions, cross slope and cross section shown on the Drawings.

3.17 FILLING AND GRADING

A. Place required Fill material in lifts on prepared Subgrade evenly across width and length.
B. Compact each lift of Fill material to density specified in Schedule below.
C. Continue filling and compacting in lifts to grades, elevations and dimensions

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shown on the Drawings.

D. The Contractor shall provide positive drainage at all finish surfaces.

3.18 SURFACE TREATMENT INSTALLATION

A. Existing surfaces: unless indicated to be replaced otherwise, all disturbed surfaces shall be replaced to existing or better condition, location and elevation.
B. Bituminous Concrete Pavement: refer to Section 321200.
C. Cast In Place Concrete Curb: refer to Section 321600.
D. Cast In Place Concrete Sidewalk: refer to Section 321600.
E. Granite Curb: refer to Section 321600.
F. Gravel Roadway and Driveway, Gravel Shoulder, Gravel Sidewalk:
    1. Place required material in lifts on prepared Subbase, or Base if no Subbase, evenly across width and length.
    2. Compact each lift of material to density specified in Schedule below.
    3. Continue placing and compacting material in lifts to grades, elevations, thickness, dimensions, cross slope and cross section shown on the Drawings.
G. Lawn and Grass areas: refer to Section 329200.

3.19 SCHEDULE OF REQUIRED COMPACTION

A. Material shall be compacted with appropriate equipment, at the optimum moisture content, to the following percentage of the maximum dry density of the material determined by ASTM Standard Method D1557 (modified proctor):
    1. Pipe Bedding and Initial Backfill/Envelope Materials: 95%.
    2. Trench Backfill and Structure Backfill Materials:
        a. Below <u>any</u> surface treatment other than Lawn and Grass areas <u>or</u> when top edge of excavation is within five feet of any surface treatment other than Lawn and Grass areas (including, but not limited to, bituminous concrete pavement, curb, sidewalk, or other surface treatment): 90%.
        b. Below Lawn and Grass areas: 85%.
    3. Fill Materials:
        a. Lawn and Grass Areas: 85%.
        b. All other areas: refer to Embankment Materials or Subbase Materials.
    4. Embankment Materials: 95%.
    5. Subbase Materials: 95%.
    6. Base Materials: 95%.
    7. Gravel Roadways and Driveways: 90%.
    8. Gravel Shoulders: 90%.
    9. Gravel Sidewalks: 90%.
B. Jetting is not an acceptable method of compaction.

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3.20 RIP-RAP INSTALLATION

A. Rip Rap Systems shall be “Constructed” in such a manner that the end product will resemble the well-blended and consolidated rock mass that is depicted in the Detail.

B. “Dumping” rocks in a pile will not be an acceptable method of installation.

END OF SECTION 310000

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SECTION 312316 - ROCK REMOVAL

PART 1.00 - GENERAL

1.01 WORK INCLUDED

A. Furnishing all labor, equipment, materials, and services, and performing operations required to remove rock as specified, utilizing controlled blasting techniques such that resulting ground vibrations are consistently maintained below the maximum levels specified.

B. Protecting new and existing facilities, workers, Owner, and the general public from damage or injury from improper handling of explosives, flyrock, and excessive ground vibrations.

C. Furnishing, installing, and implementing an audible warning system to indicate impending blasting and familiarizing workers, engineer, Owner, and the general public with the system implemented.

D. Conducting blasting monitoring as required to excavate rock utilizing the blast monitoring procedures and equipment specified and provide monitoring reports to the Engineer.

E. The Contractor shall obtain and pay for all permits, insurance and licenses required to complete the work of this Section, at no additional cost to the Owner.

F. Conducting and documenting the required pre-blast and post-blast surveys.

1.02 REFERENCE STANDARDS

A. The Contractor shall comply with all applicable laws, rules, ordinances, codes, permits, best management practices (BMPs), and regulations of the Federal Government, the State of Vermont, and the municipality, governing the manufacture, transportation, storage, handling, and the use of explosives and blasting agents. All labor, materials, equipment, and services necessary to make the blasting operations comply with such requirements shall be provided without additional cost to the owner. Requirements include, but may not be limited to:

1. Federal Mine Safety and Health Administration Safety Standards for Explosives.
2. The Vermont Fire Protection and Building Code (latest edition), (http://firesafety.vermont.gov/buildingcode/codes) from the Vermont Labor and Industry Specifications, with reference to the NFPA 495 Explosive Material Code (latest edition), (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=495&tab=about).
3. State of Vermont Dept. Environmental Conservation Waste Management Prevention Division, Best Management Practices for Blasting to Avoid Environmental Contamination.
4. Vermont Occupational Safety and Health Administration (VOSHA) Safety

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and Health Standards for Construction.

B. In case of conflict between regulations or between regulations and Specifications, the Contractor shall comply with the strictest applicable code, regulation, or Specifications.

1.03 SUBMITTALS

A. Advance Submittals:

1. The Contractor shall submit the following information to the Engineer at least one (1) week prior to commencing drilling and blasting operations:
   a. "Pre-Blast Survey"
      i. The Contractor shall have prepared, by an independent consultant satisfactory to the Owner, a "Pre-Blast Survey" of all existing structures and utilities on the site and within 250 feet of the site, or greater if determined necessary by the Blaster. Said survey shall address the structural integrity of all existing structures and utilities. Upon completion of blasting operations, the Contractor shall have prepared, by the same independent agency, a survey addressing the structural integrity of the same structures and utilities.
   b. Blaster's Insurance Certificates.
   c. Methods of matting or covering of the blast area.
   d. Written evidence of the licensing, experience, and qualifications of the blasters who will be directly responsible for the loading of each shot and for firing it.
   e. Details of an audible advance signal system to be employed at the job site as a means of informing workers, Engineer, Owner and the general public that a blast is about to occur.
   f. List of instrumentation that the Contractor proposes to use to monitor vibrations.
   g. Recent calibration certificate(s) (within previous six (6) months) for the entire proposed blast monitoring instrumentation. Calibration shall be over the required frequency response ranges specified for blast monitoring instrumentation and to a standard traceable to the National Bureau of Standards.
   h. Submit a shop drawing indicating the location(s), limits, and details of initial test blast(s) proposed by the Contractor to define the relation between charge weight per delay and peak particle velocity level.
   i. Submit and a Ledge Blasting Notice to be handed out to residents and businesses in the adjacent and surrounding blasting area of the Project. The notice shall indicate the Notification Date, Project Name, Project Location, Blasting Duration Date(s), Site Contactor - Name, Contact Person, Phone Number and Company Address, and

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Blasting Company - Name, Contact Person, Phone Number and Company Address. The notice shall inform of the signage that will be posted, type of traffic control if applicable and description of the audible warning signals.

B. Progress Submittals:
   1. Within 24 hours following each blast, the Contractor shall submit to the Engineer a Blast Monitoring Report. Payment shall be withheld if Blast Monitoring Reports are not supplied. Each Blast Monitoring Report shall include all of the following applicable items.
      a. Report of Blast Monitoring including observer identification, location, time, date, charge weight per delay, total charge weight per blast, monitor instrumentation location and information, particle velocity readings.
      b. Blast Monitoring Location Plan.
      c. General Blast Round Design Data including blast pattern, charge weights, and distributions, other pertinent information, and location.
      d. Copy of strip chart from seismograph with calibration and monitoring record marked with the date, time, and location of the blast as well as the monitoring location. Copy shall be legible.
   2. Prior to changing the blast round designs, the Engineer shall be informed in writing as to the nature of the change and the reasons therefore.
   3. In the event that the Contractor's design round results in ground vibrations which exceed the blasting limit criteria specified in this Section, the Contractor shall immediately revise the round design appropriately.
   4. Review by the Engineer of blast designs and techniques shall not relieve the Contractor of responsibility for the accuracy, adequacy, and safety of the blasting, exercising proper supervision and field judgment, and producing the results within the blasting limits required by these Specifications.
   5. The Contractor shall report to the Engineer in writing all blasting complaints received by the Contractor within 24 hours of receipt. The Contractor shall provide the following information: complainant, date and time received, date and time of blast complained about, and a description of the circumstances which led to the complaint.
   6. The Contractor shall submit the following information to the Engineer at least one (1) week after drilling and blasting operations has ended:
      a. "Post-Blast Survey"
         i. The Contractor shall have prepared, by an independent consultant satisfactory to the Owner, a "Post-Blast Survey" of all existing structures and utilities on the site and within 250 feet of the site, or greater if determined necessary by

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the Blaster. Said survey shall address the structural integrity of all existing structures and utilities. Upon completion of blasting operations, the Contractor shall have prepared, by the same independent agency, a survey addressing the structural integrity of the same structures and utilities.

1.04 QUALITY ASSURANCE

A. The Contractor shall be thoroughly trained and experienced in the skills and equipment required for the work.

B. The Contractor shall protect materials before, during and after work. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

C. Upon direction of the Engineer, the Contractor shall rework all rock removal items that do not meet the requirements of this Section. The Contractor shall perform all remedial measures at no additional cost to the Owner.

D. Contractor Qualifications

1. The term "blaster" and "Contractor" shall include, in this specification section, a qualified professional licensed blasting contractor with a minimum of 5 years experience in the design, review, evaluation, and actual field experience in blasting operations. The blaster shall assign an experienced, qualified Superintendent to be on the job site at all times to review the blasting operations and direct such changes in the blasting operation to meet the requirements of these Specifications. The Superintendent shall have a minimum of 5 years of experience in field blasting work.

2. All blasting shall be conducted by persons qualified and experienced in drilling and controlled blasting procedures for rock excavation of the types required. Persons responsible for blasting shall be licensed blasters in the State of Vermont and shall have had acceptable experience in similar excavations in rock and controlled blasting techniques. The Contractor must submit a list of previous similar projects he or she and the field Superintendent have completed. Drillers shall have demonstrated proficiency in collaring and drilling holes precisely.

E. Blasting Limit Criteria:

1. Peak Particle Velocity Limits:

a. The blaster shall conduct all blasting in such a manner that the resulting peak particle velocity does not exceed 1.0 inches per second at the ground line adjacent to any existing structures in the vicinity of the project.

b. If circumstances, project conditions, surrounding structures or facilities require a lower peak particle velocity threshold, the blaster shall alter their methods to meet such limit without additional cost to the Owner.

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2. The blaster shall conduct all blasting in such a manner that conforms to chapter 8 of the NFPA 495 titled "Ground Vibrations, Airblast, Flyrock". The more stringent (i.e., lower peak particle velocity) of the two criteria (Section 8-1.1 and Section 8-1.2) cited in this standard shall apply. These vibration criteria shall also apply to all mechanical methods of rock removal (e.g., hoe-ramming).

F. Blasting Monitoring:
1. The Contractor shall monitor and record peak particle velocity resulting from all blast rounds fired for the project.

G. Blast Monitoring Reports:
1. Following each blast, a Blast Monitoring Report shall be submitted to the Engineer within 24 hours of the blast as specified.

H. Blast Monitoring Instrumentation:
1. All instrumentation shall be in proper working order for each monitored blast.

1.05 DEFINITIONS RELATING TO THIS SPECIFICATION

A. Controlled blasting: Shall be considered to mean excavation in rock in which the various elements of the blast, including hole size, position, alignment, depth, spacing, burden, charge size, distribution, and delay sequence are carefully controlled to fracture the rock so as to allow excavation of the rock to the desired lines with a relatively uniform surface and minimum overbreak and fracture of rock beyond the design excavation limits and to maintain resulting ground vibrations within specified limits.

B. Earth: All excavated materials not defined as rock.

C. Flyrock: Fractured rock or soil propelled through the air resulting from blasting if not prevented by use of blasting mats.

D. Geophone or vibration transducer: A sensor used to monitor ground vibrations (particle velocity components).

E. Overbreak: The excess amount of rock removed by and/or resulting from blasting outside, below or beyond Contract payment limits.

F. Peak particle velocity: The maximum of any one of the three mutually perpendicular ground motion velocity components of a vibration measured in directions vertical, radial, and perpendicular to the vibration source.

G. Rock: Material which is geologically classified as intact bedrock or boulders, and requires systematic drilling and blasting for removal, or removal by an excavator mounted demolition "hoe ram". Rock also includes boulders or loose rock fragments that are individually greater than two (2) cubic yards in volume.

H. Seismograph: An instrument used to record the magnitude and frequency of ground vibrations sensed by a geophone.

PART 2.00 - PRODUCTS

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2.01 EXPLOSIVES

A. All explosive material shall be of high quality, properly stored and handled to prevent damage by water, heat or weather. Any "duds" are to be immediately removed from the project by the blaster.

B. Explosive Selection. The following BMPs shall be followed to reduce the potential for groundwater contamination when explosives are used:

1. Explosive products shall be selected that are appropriate for site conditions and safe blast execution.
2. Explosive products shall be selected that have the appropriate for water resistance for the site conditions present to minimize the potential for hazardous effect of the product upon groundwater.

PART 3.00 - EXECUTION

3.01 JOB CONDITIONS

A. Notifications:

1. At least 48-hours prior to the start of blasting, the approved ledge blasting notice shall be issued to adjacent residents and businesses within 250-feet of the project limits.

B. Blasting:

1. Blasting shall NOT be permitted between the hours of 5:00 p.m. and 8:00 a.m., and all day Saturday, Sunday, and legal holidays.
2. The Contractor shall provide suitable advanced warning prior to detonating a blast.

C. Vibration Control:

1. The Contractor shall monitor vibrations for all blast(s) during the course of the work.
2. Blasting operations shall be controlled to conform with the requirements in this Section.
3. If the data indicates that these requirements are not being met, the Contractor shall take whatever measures are necessary, including reducing the size of the charge, reducing the length of advance, covering, or matting blasts, to reduce vibrations to below the maximum permissible levels specified.
4. The Contractor shall install a signal system between the location of the blasting switch and the monitoring instrument locations so instrument operators may be notified immediately prior to detonation. The signal system shall be relocated whenever the instruments are moved.
5. The Contractor shall maintain peak particle velocities within the specified limits, and minimize damage to rock left in place. Modifications to blasting and excavation methods required to meet these requirements shall be undertaken at no additional cost to the Owner.
6. All necessary blasting shall be done before any concrete or masonry work,

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to avoid damage to "green" cement. All blasting necessary for pipelines shall be done so as not to damage previously installed components.

3.02 SAFETY PRECAUTIONS

A. Special Hazards:
   1. The Contractor shall take all special precautions in handling, storage, and wiring necessary to prevent accidental detonation of charges by natural (e.g. thunderstorms) or manmade (e.g. power lines, transmitters) sources.

B. Clearing the Danger Area Before Blasting:
   1. No blasting shall be permitted until all personnel in the danger area have been removed to a place of safety. A loud, audible, warning system shall be sounded before each blast. The Contractor shall familiarize all personnel on the project, the Engineer, Owner, and the general public with the implemented system. The danger area shall be patrolled before each blast to make certain that it has been completely cleared and guards shall be stationed to prevent entry until the area has been cleared by the blaster following the blast.

C. Explosives shall be stored, handled, and employed in accordance with federal, state, and local regulations and in accordance with N.F.P.A codes.

D. No explosives, caps, detonators, or fuses shall be stored on the site during non-working hours unless a permit has been obtained from the State and Municipality and submitted to the Engineer.

E. The Contractor shall be responsible for determining any other safety requirements unique to blasting operations on this particular site so as not to endanger life, property, utility services, any existing or new facilities, or any property adjacent to the site.

F. The Contractor shall be completely responsible for all damages resulting from the blasting operations and shall, as a minimum, take whatever measures are necessary to maintain peak particle velocities within the specified limits, and to minimize damage to rock left in place. Modifications to blasting and excavation methods required to meet these requirements shall be undertaken at no cost to the Owner.

G. Immediately after each blast, the sidewalls of rock excavations shall be scaled to dislodge loose or shattered rock liable to fall. Previously excavated portions shall also be routinely tested and scaled.

H. No requirement of, or omission to require, any precautions under this contract shall be deemed to limit or impair any responsibility or obligations assumed by the Contractor under or in connection with a project; and the Contractor shall at all times maintain adequate protection to safeguard the public and all persons engaged in the work, and shall take such precautions as will accomplish such end, without undue interference to the public. The Contractor shall be responsible for and pay for any damage to adjacent facilities resulting from work executed under

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this Section.

3.03 DRILLING AND LOADING PRACTICES

A. The blasting contractor shall utilize the following drilling and loading practices to minimize environmental effects.

1. Blasthole boring logs shall be maintained by the driller and communicated directly to the blaster. The logs shall indicate depths and lengths of voids, cavities, and fault zones or other weak zones encountered as well as any groundwater conditions the driller notes (This is not a formal assessment of groundwater).
2. Blastholes shall be within five (5) degrees of the intended orientation.
3. Blastholes shall be drilled within one foot of the intended blast pattern.
4. Explosive products shall be managed on-site so that they are either used in the borehole, returned to the delivery vehicle, or placed in secure containers for off-site disposal.
5. Unpackaged/unsleeved ANFO and emulsions shall not be used if artesian or water flowing conditions are encountered.
6. Loaded explosives shall be detonated as soon as possible and shall not be left in the blastholes overnight unless weather or other safety concerns reasonably dictate that detonation should be postponed.
7. Loading equipment shall be cleaned in an area where wastewater can be properly contained and handled in a manner that prevents release of contaminants to the environment.

3.04 AMMONIUM NITRATE AND FUEL OIL (ANFO).

A. The following BMP's shall be followed to reduce nitrate or other impacts when ANFO is used:

1. Identify blastholes containing water and remove water prior to loading with ANFO.
2. Water resistant ANFO (ANFO-WR) shall be used in blastholes that recharge with groundwater and remain wet even after pumping.
3. ANFO should be handled in a manner to avoid spills.
4. If spills of ANFO or other blasting agents occur at the ground surface around the blasthole collars, these shall be cleaned up promptly and the ANFO either reused or taken off site for appropriate handling or disposal.
5. Adequate unloaded collar lengths shall be established to reduce both "blowback" when loading pneumatically and blasthole proximity effects.
6. Proper "standoff" distance and loading vessel pressure shall be maintained to reduce "blowback" during pneumatically loading ANFO.
7. Partially used bags of ANFO shall be resealed and returned to the explosive magazine.
8. Loading equipment shall be cleaned in an area where the water can be properly contained and handled in a manner that prevents releases.

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3.05 MONITORING PROCEDURE

A. Mount, place, and locate instrumentation to monitor the most critical and/or closest facility in the blasting area, in the probable shock wave path.

B. Alignment of the axis of vibration measurement:
   1. Axis 1: Vertical.
   2. Axis 2: Horizontal, radial direction to the blast location.
   3. Axis 3: Horizontal, perpendicular to the radial direction.

C. Set the strip chart(s) speed in accordance with instrumentation manufacturer's recommendations.

D. Make a calibration strip chart before blast detonation in accordance with instrumentation manufacturer's recommendations.

E. Clearly label the strip chart with calibration levels, control settings, location, time, and date of blast.

F. Coordinate closely with the blaster such that the strip chart is advancing at the time the blast is detonated.

G. During the measurement period, observe instrumentation to ensure that recorded vibrations correspond to blasting and not some other source.

3.06 EXCESS ROCK EXCAVATION

A. If rock is overbroken or excavated beyond the limits of the payment specified, the excess excavation, whether resulting from overbreak or other causes, shall be backfilled as noted below, at no additional cost to the Owner.

B. In pipe trenches, excess excavation shall be filled with material of the same type, placed and compacted in the same manner, as specified for the bedding.

C. In excavations for structures, excess excavation shall be filled with material of the same type, placed and compacted in the same manner, as specified for the structure base.

D. If the rock beyond or below the payment limits is overbroken, "humped" or causes damage or potential damage to the existing surfaces (i.e., sidewalk, road, etc.) due to drilling or blasting operations of the Contractor, the shattered rock shall be removed and the excavation shall be backfilled as previously specified. All such removal and backfilling shall be done at no additional cost to the Owner.

E. If the rock beyond or below the normal depth is shattered due to drilling or blasting operations of the Contractor, and the Engineer considers such rock to be unfit for foundations or bedding, the shattered rock shall be removed and the excavation shall be backfilled as previously specified. All such removal and backfilling shall be done at no additional cost to the Owner.

3.07 PREPARATION OF ROCK SURFACES

A. When rock surface is to remain and to be incorporated into the Project, the Contractor shall remove all dirt and loose rock and shall clean the surface of the rock. The designated area shall be observed to determine whether seams or

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other defects exist, and if the rock is competent.

B. The surfaces of rock foundations shall be left sufficiently rough to bond to masonry, concrete or embankment, as applicable. If necessary, benches or steps shall be excavated.

C. Before any masonry, concrete or embankment is built on or against the rock, the rock shall be completely freed from all vegetation, dirt, sand, clay, earth, boulders, scale, loose fragments, cracked rock, ice, snow and other objectionable substances.

3.08 DRILLING AND BLASTING OF SOLID ROCK ROAD SUBGRADE

A. Blasted rock road subgrade shall be shattered to a depth of four (4) feet below road subgrade elevation to eliminate water pockets. The area of blasted rock road subgrade shall extend sufficiently beyond the beginning and end of cut areas. Any rock that protrudes above the road subgrade elevation shall be removed to the subgrade elevation.

3.09 DISPOSAL OF EXCAVATED ROCK

A. Refer to the Earthwork specification regarding reuse of excavated rock.

B. Surplus excavated rock shall be disposed of by the Contractor at a suitable location, unless Contract conditions or Drawings specify otherwise.

END OF SECTION 312316

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SECTION 312500 - EROSION PREVENTION AND SEDIMENT CONTROL

PART 1.00 - GENERAL

1.01 WORK INCLUDED

A. All labor, materials and equipment for furnishing, installing, maintaining and inspecting of structural and non-structural erosion prevention and sediment control measures.

B. Establishing and marking limits of soil disturbance, archaeological sensitive areas, topsoil stockpiles, construction staging areas, storage areas, refueling and maintenance areas.

C. Complying with State of Vermont Water Quality Standards.

1.02 REFERENCE STANDARDS

Information and requirements contained in this Specification are based on the most recent version of the following standards:

A. Vermont General Permit 3-9020 (2020) for Stormwater Runoff from Construction Sites as amended February 2008.

B. Vermont Erosion Prevention and Sediment Control Field Guide, Vermont Department of Environmental Conservation, August 2006.

C. The Low Risk Site Handbook for Erosion Prevention and Sediment Control, Vermont Department of Environmental Conservation, August 2006.

D. The Vermont Standards & Specifications for Erosion Prevention & Sediment Control, Vermont Department of Environmental Conservation, 2006.

E. Winter Construction and the Vermont Construction General Permit: A Planner's Guide. State of Vermont, Department of Environmental Conservation.

F. Field Manual on Sediment and Erosion Control, Best Management Practices for Contractors and Inspectors, Fifield, 2002, Forester Press.

1.03 SUBMITTALS

A. The Contractor shall submit manufacturer's certified data for all products and materials used for erosion prevention and sediment control on the Project.

B. The Contractor shall submit manufacturer's product literature, samples and installation instructions for each specified material type to be used.

1.04 QUALITY ASSURANCE

A. The Contractor shall be thoroughly trained and experienced in the skills and equipment required for installation, monitoring and maintenance of all work in this Specification.

B. The Contractor shall protect materials before, during and after installation. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost

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to the Owner.

C. The Contractor shall at all times properly operate and maintain all erosion prevention and sediment control measures which are installed. All temporary measures shall be removed upon final Contract completion or final site stabilization, whichever occurs last.

D. The Contractor shall remove any sediment or debris collected by erosion prevention and sediment control measures. These materials shall be disposed of in a manner that will not allow for sediment or debris to enter the waters of the State.

E. The Contractor is responsible for all means, methods, sequences and scheduling under the terms of the Contract.

F. The Contractor is responsible for compliance with the State of Vermont Water Quality Standards. Any fines assessed by regulatory agencies for non-compliance with State Water Quality Standards shall be the responsibility of the Contractor.

G. Discharges of any material other than stormwater, such as vehicle and equipment maintenance spills, fuels, wash water, construction debris, oil, wet concrete (including washout water from concrete batch trucks or equipment used to mix concrete), and other substances, are prohibited.

H. In areas of concentrated flow, the Contractor shall take precautions to ensure that work will take place in a dry channel. This may be accomplished by directing the flow through a temporary channel - through temporary culverts or by use of a cofferdam and pumps. The anticipated procedure shall ensure that erosion, sediment and water are controlled.

I. The Contractor is responsible for monitoring erosion prevention and sediment control measures. The Contractor shall have experience working with erosion prevention and sediment control measures, and possess the ability to observe, evaluate, and synthesize information; to consider alternatives; and to propose appropriate recommendations in a clear, logical manner as related to maintaining State water quality standards. The Contractor shall be on site on a daily basis during active construction.

PART 2.00 - PRODUCTS

2.01 LIMITS OF DISTURBANCE

A. Flagging Ribbon/Paint

1. Flagging shall be "survey" type, weatherproof poly vinyl chloride for harsh outdoor conditions. Bright, fade-resistant color for maximum visibility. Constructed of non-adhesive, non-conducting vinyl.
2. Paint for marking limits shall be bright color for maximum visibility.

B. Barrier tape

1. Barrier tape shall be high visibility PVC coated mesh or fiberglass tape, minimum of 3-inches in width, or approved equal.

C. Construction Fence

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1. Fence shall be 100% polypropylene polymer extruded fence orange in color, minimum 4 feet high and UV protected for durability, or approved equal.

2.02 SEEDING MATERIALS AND TOPSOIL

A. Specification Section 329200 provides a description of the topsoil, fertilizer, and seeding materials and application rates used on the project.

2.03 NON-STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES

A. Refer to Drawings for locations and types required.

B. Mulch Material:

1. Specification Section 329200 provides a description of mulch materials and application rates used on the project.

C. Rolled Erosion Control Products (RECPs)

1. Short Term - For slopes steeper than 3:1 and less than 2:1 and low flow channels, erosion control blankets shall be BioNet S75BN by North American Green or approved equal. Blanket matrix shall consist of 100% agricultural straw covered on the top side with 100% biodegradable woven natural organic fiber net. Netting consisting of two intertwined yarns interwoven to form a 0.5-inch x 1.0-inch mesh. Product shall be designed with a functional longevity of up to12 months. Netting: Leno woven 100% biodegradable, 9.30 lbs/1,000 ft^2. Blanket matrix: 100% straw fiber at 0.5 lbs/yd^2. Thread: Biodegradable.
2. Extended Term - For slopes steeper than 2:1 and less than 1:1 and moderate flow channels, erosion control blankets shall be type BioNet C125BN by North American Green or approved equal. Blanket matrix shall consist of 100% coconut fiber covered on the top and bottom sides with 100% biodegradable woven natural organic fiber. Netting shall consist of two intertwined yarns interwoven to form a 0.5-inch x 1.0 in mesh. Product shall be designed with a functional longevity of up to 24-months. Netting: Leno woven 100% biodegradable jute 9.3 lbs/1000 ft^2. Blanket matrix: 100% coconut fiber 0.5 lbs/yd^2. Thread: Biodegradable.
3. Permanent - For slopes steeper than 1:1 and high flow drainage channels, mat shall be type P300 Permanent Turf Reinforcement Mat by North American Green or approved equal. Product shall be designed to not degrade over time. Matrix: 100% UV stable polypropylene fiber 0.7 lbs/yd^2. Netting: Topside, heavyweight UV stabilized 5 lbs/1,000 ft^2. Bottom side, heavyweight UV stabilized 3 lbs/1,000 ft^2. Thread: 100% black polypropylene.

D. Refer to *The Vermont Standards & Specifications for Erosion Prevention & Sediment Control* for additional non-structural erosion prevention and sediment control measures.

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2.04 STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES

A. Refer to Drawings for locations and types required.

B. Stone Check Dams - refer to Section 310000 for aggregate material requirements.

C. Silt Fence - Prefabricated Silt Fence Structures shall be Mirafi Envirofence® by Mirafi Construction Products, Inc.; equivalent product by Indian Valley Industries, Inc., or approved equal. Fence shall consist of complete prefabricated system with woven fabric reinforced net backing and 1¼-inch hardwood posts at 8.3-foot spacing or 10.0-foot spacing.

D. Inlet Control (Paved Areas) - Catch basins and stormwater inlet structures shall use an inlet filter mat, designed to be installed above the inlet grate, secured to the inlet grate with zip ties and overlap the structure by 3 inches on each side, "Coir Inlet Filter" by Blocksom & Co., "Sediguard" by Earth Support Systems, or approved equal.

E. Inlet Control (Unpaved Areas) - Catch basins and stormwater inlet structures shall use materials as specified on the Drawings and Section 310000 of the specifications.

F. Dewatering - Where required by field conditions and Contractor operations, dewatering operations shall discharge to Dandy Dewatering Bags™ by Mirafi Construction Products, Inc.; equivalent product by Indian Valley Industries, Inc., or approved equal.

G. Stabilized Construction Entrance - refer to Section 310000 for aggregate material requirements.

H. Refer to *The Vermont Standards & Specifications for Erosion Prevention & Sediment Control* for additional structural erosion prevention and sediment control measures.

2.05 PRODUCT STORAGE AND HANDLING

A. Handle and transport materials to insure they are in sound, undamaged condition and to prevent damage, in accordance with manufacturer's instructions.

B. Examine all materials before installing. Defective or damaged materials shall be rejected.

C. If defective or damaged materials are discovered after installation, the Contractor shall remove and replace the defective piece(s) at no additional cost to the Owner.

PART 3.00 - EXECUTION

3.01 GENERAL

A. Prior to initiating primary earth disturbance activities, the Contractor shall mark limits of soil disturbance, archaeological sensitive areas, topsoil stockpiles, construction staging areas, storage areas, refueling and maintenance areas.

B. Following demarcation, the Contractor shall install sediment control measures

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before initiating earth disturbing activities.

C. Refer to Section 310000 for excavating, bedding, envelope, backfilling and compaction requirements.

D. Refer to Section 329200 for planting requirements.

E. Severe weather may require additional measures be implemented by the Contractor to prevent erosion and control sediment transport. The Contractor is responsible for monitoring Erosion Prevention and Sediment Control measures. Special attention must be given by the Contractor during extreme weather events to prevent overload, breakthrough, plugging, flooding and washouts. The Contractor may need to modify measures based on observations, field and weather conditions.

F. Strategies - To minimize soil erosion and the transport of sediment to surface waters, the following strategies shall be used:

1. **Minimize Impact Area** - The Contractor shall phase construction so that land disturbance at any one time is limited. As work in each phased area is completed, the disturbed areas shall be stabilized. For pipeline installation, it is intended that the area impacted by the trench will be maintained at 10 to 12-feet or less. It is in the Contractor's best interest to minimize the area of impact, thus requiring less soil stabilization.
2. **Minimize Impact Time** - Areas impacted by the project shall be stabilized within seven (7) days. Prior to finish grading, impacted areas may be temporarily covered with mulch or stabilization fabric. Impacted areas shall be topsoiled, fertilized, seeded and mulched within 48 hours of final grading. In those areas where pavement is impacted, the area will be backfilled with fine crushed gravel and compacted until final paving is completed for the project. Areas of special concern (i.e., higher risk of erosion) shall be final graded, seeded, and rolled erosion control matting installed at the end of each day's operations.
3. **Manage Stormwater Runoff** - Prevent off-site stormwater from entering the areas of disturbed soil on-site. Control water on-site to keep low velocities so that erosion is minimized.
4. **Trap Sediment On-Site** - Install and maintain erosion prevention and sediment control measures to trap sediment on site and prevent discharges.
5. **Existing Drainage Preservation** - Natural cover shall be protected wherever possible and replaced where disturbed.

G. Erosion prevention and sediment control measures included in this specification are guidelines and intended to be used in conjunction with the Reference Standards and sound judgment and diligence on the part of the Contractor.

3.02 INSTALLATION OF NON-STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES

A. Mulch

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1. Seedbed shall be raked, seeded and fertilized as required by Section 329200. Installation shall be reviewed by the Engineer prior to proceeding with mulch installation.

B. Rolled Erosion Control Products (RECPs)
1. Seedbed shall be raked, seeded and fertilized as required by Section 329200. Installation shall be reviewed by the Engineering prior to proceeding with the installation of RECPs.
2. Blanket edges shall be anchored by trenching and staples according to the manufacturer's recommendations.
3. Edges of parallel blankets shall overlap five (5) inches or as indicated by the manufacturer.
4. Blanket shall be in solid contact with the ground surface.

C. Additional Measures
1. Refer to *The Vermont Standards & Specifications for Erosion Prevention & Sediment Control* for installation requirements of additional non-structural erosion prevention and sediment control measures.

3.03 INSTALLATION OF STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES

A. Stone Check Dams - Shall be installed as indicated on the Drawings.

B. Silt Fence
1. Excavate a 6-inch x 6-inch trench to the desired length.
2. Place fabric material in the trench using a continuous roll of fabric in an "L" shape with the "tail" on the uphill side, and backfill with soil. When joining two silt fences refer to the detail as shown in the Drawings.
3. Install wood or steel posts "downstream" of the fabric at 5 to 8-feet apart. Posts shall extend a minimum of 12-inches into the soil. Securely fasten the fabric to the posts and compact backfill material.
4. Silt Fence shall be installed and maintained according to the manufacturer's instructions. Bottom of fence shall be "toed in" along its entire length. End sections shall overlap.

C. Inlet Control (Paved Areas)
1. Control products for stormwater inlets shall be installed and maintained according to the manufacturer's instructions.

D. Inlet Control (Unpaved Areas)
1. Inlet control for unpaved areas will only be installed where a sump condition exists.
2. Refer to Details showing material and construction requirements.

E. Dewatering - All dewatering operations shall be performed in such a manner so as to prevent the discharge of sediment laden stormwater from the construction site. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both.

F. Stabilized Construction Entrance
1. Shall be dense graded crushed stone meeting the requirements of

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Specification Section 310000.

2. Shall be installed as indicated on the Drawings.

G. Additional Measures

1. Refer to *The Vermont Standards & Specifications for Erosion Prevention & Sediment Control* for installation requirements of additional structural erosion prevention and sediment control measures.

3.04 WINTER EROSION AND SEDIMENT CONTROL MEASURES

A. Soil disturbances that occur between October 15, and April 15, or any bare soil left unstabilized without seeding and mulching after September 15, shall be treated with winter erosion control measures. The following winter erosion prevention and sediment control measures shall be taken for work that occurs between October 15, and April 15.

1. Silt fence shall be installed where required before the ground freezes.
2. Stone check dams shall be installed where required before the ground freezes.
3. Degradable erosion control blankets/matting with seed shall be used in all grassed and disturbed soil areas during this period. These areas shall be seeded and mulched as soon as possible in the spring, if necessary.
4. All disturbed paved and gravel areas shall be backfilled with gravel to the design grade. All paved areas will be repaved as soon as practical in the spring.
5. All disturbed areas shall be stabilized on a daily basis.
6. Mulch used for temporary stabilization must be applied at double the standard rate, or a minimum of 3-inches with an 80-90% cover.

3.05 INSPECTIONS

A. Frequency of Inspection

1. Initial Sediment Controls Inspection - A review shall be done by the Contractor after the sediment controls are installed, but before any clearing or grading occurs.
2. Routine Inspection - All erosion prevention and sediment control measures shall be inspected by or under the direction of the Contractor, at least once every seven (7) calendar days, and as soon as possible, but no later than 24 hours after any storm event which generates a discharge of stormwater runoff from the construction site.
3. Final Review - Before final project completion, the Contractor shall verify that the sediment controls are acceptable, site development is complete and that well established ground cover has taken place throughout the site.

3.06 MAINTENANCE

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A. The Contractor shall at all times properly operate and maintain all erosion prevention and sediment control measures which are installed and required to achieve compliance with the State of Vermont Water Quality Standards. All temporary measures shall be removed upon final contract completion or final site stabilization, whichever occurs last. If erosion prevention and sediment control measures are to remain effective, they must be installed correctly, inspected in a timely manner and maintained. Repairing barriers, removing accumulated sediment from containment systems and evaluating whether vegetation is established are all the responsibility of the Contractor.

B. Refer to *The Vermont Standards & Specifications for Erosion Prevention & Sediment Control* for maintenance requirements of erosion prevention and sediment control measures.

C. Refer to manufacturers' recommendations for additional maintenance requirements.

3.07 CORRECTIVE ACTION

A. Any evidence of measurable amounts of sediment or sediment laden water, leaving the construction site or any visible discoloration of surface waters, shall be noted and immediate action shall be taken to inspect and maintain existing erosion and sediment control measures and install supplemental measures as necessary until the discharge and/or the condition is corrected.

B. In the event that a discharge is observed, all existing erosion control measures shall be inspected and any maintenance/repairs shall be completed. If it has been determined that these measures are inadequate, corrective measures shall be installed to control sediment discharges from construction activities. The measures shown on the drawings necessary under the current standard of care for average weather conditions. Severe weather may require additional measures be implemented by the Contractor to prevent erosion and control sediment transport. The Contractor is responsible for monitoring erosion prevention and sediment control measures. Special attention must be given by the Contractor during extreme weather events to prevent overload, breakthrough, plugging, flooding and washouts. The Contractor may need to modify the Erosion Prevention and Sediment Control Measures based on observations, field and weather conditions.

3.08 RECORDKEEPING

A. The Contractor shall maintain a record of all problem areas and the measures taken to correct those problems and prevent future problems.

3.09 OFF-SITE STOCKPILES, STAGING AREAS, EQUIPMENT STORAGE AND REFUELING/MAINTENANCE AREAS, STUMP AND EXCESS SOIL DISPOSAL AREAS

A. No arrangements or agreements have been made with any landowners for off-

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site stockpiles, nor have any necessary permits been obtained for these areas.

B. Erosion prevention and sediment control measures, including but not limited to the items indicated in the Drawings shall be installed and maintained as necessary for site specific conditions. All provisions and requirements of the plans and this Specification apply to these areas.

END OF SECTION 312500

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SECTION 321600 – CURB AND SIDEWALK

PART 1.00 - GENERAL

1.01 WORK INCLUDED

A. Cast-in-place concrete curb, sidewalk and ramps.
B. Granite curb.
C. Detectable Warning Surface (Truncated Domes).

1.02 REFERENCE STANDARDS

A. Where referenced, the Contractor shall adhere to the latest version of the State of Vermont Agency of Transportation (VTrans), AStandard Specifications for Construction".

1.03 SUBMITTALS

A. The Contractor shall submit separate project mix criteria according to the reference standards for each concrete type to be used on the project, including all calculations, data and information necessary for mix evaluation and placement review and testing. The contractor shall secure the Engineer's approval for the mix design a minimum of 48 hours prior to the start of concrete placement.
B. The Contractor shall submit manufacturer's data and secure the Engineer's approval for fiber reinforcement, admixtures, curing and sealing compound, exposed aggregate/surface treatment retardant compound and all other necessary materials before the start of concrete placement.
C. The Contractor shall submit the name and address of quarry and supplier of granite. If required by the Engineer, a granite sample shall also be supplied.
D. The Contractor shall submit manufacturer's data and secure the Engineer's approval for truncated domes before the start of concrete placement.

1.04 QUALITY ASSURANCE

A. The Contractor shall be thoroughly trained and experienced in the skills and equipment required for placement and finishing of curb and sidewalk.
B. The Contractor shall protect curb and sidewalk materials before, during and after installation. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.
C. 24 HR notification required prior to concrete being placed.
D. Testing to verify air content and slump of concrete being placed shall be done at the time of placement, at the Engineer's discretion.
E. Cylinder samples for concrete strength testing shall be taken at the time of

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placement, at the Engineer's discretion.

F. The Contractor shall keep a record at the project site showing time and location of each segment of concrete placed, together with mix delivery slips certifying the contents of each load of concrete. One copy of all such records shall be furnished to the Engineer.

G. Upon direction of the Engineer, the Contractor shall cut out and replace all curb and sidewalk that do not meet the requirements of this Section. The Contractor shall perform all remedial measures at no additional cost to the Owner.

PART 2.00 - PRODUCTS

2.01 MATERIALS

A. Concrete curb and sidewalk shall have a minimum compressive strength of 4,000 psi at 28 days, unless otherwise specified, and shall meet all other requirements for Class A Concrete in the referenced standard, unless revised below.
   1. Air entrainment shall be 7% ±1.5%, or shall be 6% ± 2.0% for slipform curb and gutter.
   2. Maximum Water - Cement ratio shall be 0.44.
   3. Min. Cement Factor (lbs/C.Y.) shall be 660, or shall be 680 for slipform curb and gutter.
   4. Maximum Slump shall be 4-inches without water reducing admixtures, or shall be 1-inch ±0.5-inch without water reducing admixtures for slipform curb and gutter. When a multi range water reducer is approved, refer to concrete mix design for slump requirements. The mix shall not exhibit segregation at the slump/spread used at placement.

B. Concrete curbs and sidewalks shall have Grace Construction Products "MicroFiber"™ reinforcement admixture, "Micromesh®" or equal.
   1. Fibers shall be ¾-inch polypropylene, maximum 3 denier, complying with ASTM C1116, Type III, Par. 4.1.3.
   2. Fibers shall be added at the concrete batch plant to ensure proper mixing. Mix in truck for a minimum of 20 minutes after fiber addition.
   3. Fiber application rate shall be one pound per cubic yard of concrete, resulting in not less than 50 million individual fibers per pound.

C. Portland Cement shall be ASTM C150, Type II unless otherwise specified. Use of air-entraining or other types of cements is prohibited without the prior acceptance of Engineer. Use only one brand of cement. Color variations which prejudice the appearance of exposed concrete are deemed unacceptable.

D. Fine Aggregate for concrete shall meet ASTM C33.

E. Coarse Aggregate for concrete shall meet ASTM C33, ¾-inch maximum size.

F. Concrete Admixtures
   1. Air Entraining - "Darex II AEA", by W.R. Grace, "Micro Air" by BASF The Chemical Company or approved equal. Use of air entraining cement is

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prohibited. Air entraining admixtures shall be added to all concrete which will remain exposed to freezing and thawing. Other concrete may be air entrained at Contractor's option.

2. Water Reducing Retarder - ASTM C-494 - "Pozzolith 100XR" by BASF The Chemical Company, "Daratard 17" by W.R. Grace or approved equal. Quantity of retarder to be added per sack of cement shall be as recommended by the approved manufacturer for general use and as required to suit actual ambient or mix temperatures.
3. Water Reducing - "Glenium 7500" by BASF The Chemical Company, "ADVA 140" by W.R. Grace or approved equal.
4. Accelerator - ASTM C-494C - "Pozzutec 20+" by BASF The Chemical Company, "Polarset" by W.R. Grace, "Daraset 400" by W.R. Grace or approved equal. A non-chloride non corrosive set accelerating admixture may be used where ambient air temperature is $<40^{O}$F. Chloride based accelerators shall not be permitted.
5. No other admixtures are permitted without the prior review of the Engineer.
6. Admixtures shall be compatible with one another and with aggregates, cement, finishing materials, and other materials which may be affected thereby.

G. Mixing water shall be fresh, clean and potable. Should Engineer question the suitability of the water, Contractor shall have it tested in accordance with AASHTO T-26.

H. Curing and sealing compound shall be HARRIS CERTI-VEX® AC 1315" as manufactured by A.H. Harris & Sons, "Lin-Seal White" as manufactured by WR Meadows, or equal.

I. Exposed aggregate/surface retardant compound shall be "Rugasol-S" as manufactured by Sika Corporation, or equal.

J. Expansion joint material shall be preformed type with vegetable fibers, mineral fillers and two asphalt-saturated felt liners, complying with ASTM D994, with a minimum thickness of 2-inch. Depth of expansion joint shall be the thickness of the concrete minus ¼-inch. Expansion joints shall be provided at all joints between building slabs and foundations, joints in sidewalks, driveways, curbs, steps, and at other locations shown on the Drawings.

K. Detectable Warning Surface (Truncated Domes) shall be a pattern of truncated domes that meets the dimensional and spacing requirements of the Americans with Disabilities Act (ADA) Accessibility Guidelines.

1. Detectable warning surfaces shall be provided on sidewalk ramps at locations shown on the Drawings.
2. Truncated domes shall be cast iron.

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3. The Detectable Warning surface shall be cast iron as manufactured by Neenah Foundry.
4. The Detectable warning surface shall be one of the products on the "Approved Products List" on file with the VTrans Materials and Research Section, telephone number 802-828-2561.

L. Granite Curb shall consist of hard, durable, quarried granite. It shall be gray in color, free from seams, cracks or structural defects and shall be of a smooth splitting character. The curb may have natural color variations that are characteristic of the granite source.
1. The individual curb stones shall be of the dimensions indicated on the Drawings and shall be of uniform thickness in any continuous run. The individual curb stones shall be furnished in minimum lengths of 6 feet, unless otherwise specified.
2. The top surface of the curb stones shall be sawed to an approximately true plane and shall have no projection or depression greater than ⅛-inch. The bottom surface may be sawn or split.
3. The top front arris line shall be rounded as indicated on the Drawings. The exposed arris line shall be pitched straight and true, with no variations from a straight line greater than ⅛-inch.
4. The front face shall be at right angles to the plane at the top and shall be smooth quarry split. Drill holes in the exposed part of the face shall not be permitted. The front face shall have no projections greater than one inch or depressions greater than 2 inch, measured from the vertical plane of the face through the top arris line for a distance of eight inches down from the top. For the remaining distance, there shall be no projections or depressions greater than one inch measured in the same manner.
5. The back surface of the curb stones shall have no projection for a distance of three inches down from the top which would fall outside of a plane having a batter of one horizontal to three vertical from the back arris line.
6. The ends of all curb stones shall be square with the planes of the top and front face and so finished that when the stones are placed end to end as closely as possible, no space more than one inch shall show in the joint for the full width of the top or down on the face for eight inches. The remainder of the end may break back not over six inches from the plane of the joint.

M. Mortar between Granite Curb sections shall be Type I, conforming to Section 707.01 of the referenced standard.

PART 3.00 - EXECUTION

3.01 CAST IN PLACE CONCRETE CURB AND SIDEWALK

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A. Weather and Site Conditions
   1. Cast in place concrete shall not be placed when the air temperature at the site in the shade and away from artificial heat is below 40^{O}F, unless directed by Engineer.
   2. Freshly placed concrete shall not be allowed to exceed 85^{O}F, unless directed by Engineer.
   3. Concrete shall not be placed on a frozen or thawing base or when weather or other conditions would prevent the proper handling, finishing or consolidation of the material.
   4. The Contractor shall haul, transport and place concrete in manners to prevent segregation of aggregate from the mix.

B. Fix Forming or Slipform Paving
   1. Fix Form
      a. The contractor may use metal or wood forms appropriate for the purpose. Forms shall be free from warp and sufficiently strong to resist the weight of concrete.
      b. Forms shall be cleaned and oiled before placing. The Contractor shall brace and stake forms adequately to hold line and grade until removed.
      c. Slip forms may not be used without the written approval of the Engineer.
   2. Slip Form Paving
      a. Using a self-propelled slip form paver or combination of pavers equipped with traveling forms rigid enough to produce the required cross section, shall spread, consolidate, screed and finish the concrete in one complete pass of the machine which will keep hand finishing to a minimum. The slip form machine must produce dense homogeneous concrete and have internal vibrators capable of consolidating the entire concrete placement.
      b. Use equipment guided by reference system to ensure the concrete is placed to the specified line, grade, and cross section.

C. Placing Concrete
   1. The Contractor shall place sufficient concrete to attain full depth at all sections along walk or curb.
   2. The Contractor shall thoroughly consolidate the concrete so that all honeycombs will be eliminated.

D. Finishing Concrete
   1. Surface is to be finished by float.
   2. No plastering or patching is permitted.
   3. Edges of walks and curbs are to be rounded with edger with 3 inch radius.

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4. Before the concrete is set, the Contractor shall test for waves or irregularities with a straight edge (10 feet long). All defects above or below the proper surface of more than 3 inch shall be corrected.
5. After screeding and floating, the Contractor shall finish sidewalks with broom, drawn over surface perpendicular to the line of traffic.
6. The Contractor shall make final pass with edger and jointer after broom finishing.
7. Handicap ramps and other sections as designated on the Drawings are to have exposed aggregate finish.

E. Joints
1. Expansion joints in walk and curb shall be placed every 20 feet, and shall be formed around fixed objects such as, but not limited to, buildings, manholes, utility poles, curb stops, steps and valve boxes.
2. Expansion joints and filler material shall extend full depth of walk and curb.
3. "Dummy" joints in walk and curb shall be placed every 5 feet, unless otherwise specified. Dummy joints shall be ⅛-inch wide and 12 inches deep, and rounded with edger with 3-inch radius.

F. Curing
1. The Contractor shall apply first coat of curing and sealing compound, at manufacturer's recommended application rate, uniformly and evenly, as soon as possible after final finishing.
2. The Contractor shall apply exposed aggregate retarding compound, where required, at manufacturer's recommended application rate, after surface is finished. The Contractor shall power wash the surface in approximately 12 hours, subject to weather conditions.
3. The Contractor shall ensure a minimum of 3 days without pedestrian traffic and 14 days without vehicle traffic. The contractor shall provide barriers and protection as necessary to prevent damage. Any sections damaged or marked shall be replaced by the Contractor at no additional expense to the Owner.
4. The Contractor shall protect the concrete from rain, freezing or inclement weather.
5. The Contractor shall apply second coat of curing and sealing compound at manufacturer's recommended application rate, uniformly and evenly, after 7 days.

3.02 DETECTABLE WARNING SURFACE

A. Detectable Warning Surface shall be installed by following all applicable supplier's and manufacturer's requirements for environmental conditions, surface preparation, installation procedures, curing procedures and materials

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compatibility.

B. The Contractor is responsible for removing any material spatters. The Contractor shall repair any damage that should arise from installation or clean-up effort.

3.03 GRANITE CURB

A. The curb and slope edging shall be set so that the front top arris line conforms to the line and grade required. All space under and behind the curbing shall be filled with concrete (4,000 psi).

B. The curb and slope edging shall be laid so there will be no open joints exceeding one inch between stones. Joints between stones shall be carefully filled with mortar, Type I, and neatly pointed on the top and exposed front portions. After pointing, the stone shall be satisfactorily cleaned of all excess mortar and the joints kept moist until the mortar has set.

END OF SECTION 321600

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SECTION 329200 - LAWNS AND GRASSES

PART 1.00 - GENERAL

1.01 WORK INCLUDED

A. Preparation, furnishing and installing topsoil, fertilizer, seed and mulch.

B. Maintenance of lawns and grasses.

1.02 SUBMITTALS

A. The Contractor shall submit seed mix compositions and analysis for each seed mix type to be used on the project. Each seed mix shall indicate percentage and germination of each seed type in the mixture. Purity and weed seed content of the mixture shall be indicated.

B. The Contractor shall submit the location of source, analysis and sample of off-site topsoil, as required by the Engineer.

1.03 QUALITY ASSURANCE

A. The Contractor shall be thoroughly trained and experienced in the skills and equipment required for the work included.

B. The Contractor shall protect lawn and grass areas and materials before, during and after installation. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

C. Upon direction of the Engineer, the Contractor shall remove and/or rework all lawn and grass areas that do not meet the requirements of this Section. The Contractor shall perform all remedial measures at no additional cost to the Owner.

D. Lawn and grass areas shall have a healthy, uniform growth upon completion, with no weeds, bare spots, rocks, clumps, or standing water.

PART 2.00 - PRODUCTS

2.01 MATERIALS

A. Topsoil shall be fertile, natural soil, typical of the locality, unfrozen, friable clay loam. It shall be free from clay lumps, stones, roots, sticks, stumps, peat, weeds, sod, brush, noxious seeds, or foreign materials.

1. Topsoil shall have a pH range of 6 to 8.
2. Topsoil shall not contain toxic material harmful to plant growth.
3. Topsoil shall be removed and stockpiled from the disturbed areas. In the event the topsoil removed during excavation is unsatisfactory or insufficient to obtain the required finished grades, the Contractor shall

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furnish the required quantity of satisfactory topsoil from approved off-site sources at no additional expense to the Owner.

4. Under no circumstances may the Contractor remove topsoil from the work area of this project for use elsewhere.

B. Fertilizer shall be a standard commercial grade prepared and packaged material containing a minimum of 10 percent nitrogen, 10 percent phosphoric acid and 10 percent potash. Fertilizer shall comply with local, state and federal laws.

1. Fertilizer shall be delivered in the original, unopened containers, each showing the manufacturer's guaranteed analysis. It shall be stored so that when used it is dry and free-flowing.

C. Seed mixtures shall be of commercial stock of the current or previous season's crop, shall be delivered in unopened containers bearing the dealer's guaranteed analysis and shall not have a weed content of exceeding 0.4% by weight and shall be free of all noxious seed. Seed shall be stored in a dry, protected place. Seed that becomes wet, moldy, or otherwise damage will be rejected.

1. Urban mix grass seed meeting the following mixture shall be used for finished lawns, public street grass areas and any other maintained grass areas.

Type of Seed	Percent by Weight	Minimum Percent Germination	Minimum Percent Purity
Creeping Red Fescue	42.5%	85%	98%
Kentucky Bluegrass	42.5%	85%	85%
Pennfine or Manhattan Perennial Rye	10%	85%	95%
Annual Rye Grass	5%	85%	95%

2. Conservation mix grass seed meeting the following gradation shall be used for all other grass areas where urban mix is not used.

Type of Seed	Percentage by Weight
Creeping Red Fescue	35.0%
VNS Turff-Type Tall Fescue	25.0%

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Annual Rye	15.0%
Pennfine or Manhattan Perennial Rye	12.0%
Kentucky Bluegrass	10.0%
White Clover	3.0%

D. Hay mulch shall consist of mowed and properly cured stalks of oats, wheat, rye or other approved crops free from weeds, swamp grass, twigs, debris, rot, mold or other deleterious material. Wildflower seed shall not be mulched with hay; light straw mulch shall be used if recommended by seed supplier.

E. Water shall be furnished by the Contractor which is suitable for irrigation and free from ingredients harmful to plant life. Hose and any watering equipment required shall be furnished by the Contractor.

PART 3.00 - EXECUTION

3.01 PREPARATION

A. Seeding shall only be done when weather and season will allow proper germination.

B. Areas to receive topsoil shall be graded to a depth of not less than four inches below the finished grade. If the existing depth of topsoil prior to construction was greater than four inches, the topsoil shall be replaced not less than the greater depth.

C. Remove all debris, sticks, roots, stones and inorganic material and rake subgrade prior to placing topsoil. Topsoil shall not be placed on frozen or muddy subgrade.

3.02 INSTALLATION - GRASS

A. Specified topsoil shall be spread and lightly compacted on the prepared subgrade to the depth required.

B. Uniformly spread the fertilizer at a rate of 20 pounds per 1,000 square feet and immediately mix with the upper two inches of topsoil.

C. Immediately following this preparation, uniformly apply the seed at a rate of 5 pounds per 1,000 square feet.

D. Lightly rake the seed into the surface. Lightly roll the surface and water with a fine spray.

E. Promptly thereafter or within 24 hours after the seeding, lightly and uniformly mulch the area at a rate of 90 pounds per 1,000 square feet. Mechanical or hand spreaders may be used. Excessive amounts or bunching of mulch will not be

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accepted.

F. Mulch shall be anchored by an acceptable method.

G. Unless otherwise specified, mulch shall be left in place and allowed to disintegrate. Any anchorage or mulch that has not disintegrated at time of first mowing shall be removed.

H. Seeded areas shall be watered as often as required to obtain germination and to obtain and maintain a satisfactory sod growth. Watering shall be done in a manner to prevent washing out of seed or mulch.

I. All lawn and grass areas shall drain properly. Under no circumstances will standing water or puddling be allowed.

J. Hydroseeding may be accepted as an alternative method of applying fertilizer, seed and mulch, upon approval of the Engineer.

3.03 MAINTENANCE AND PROTECTION

A. Contractor shall mow all lawn areas before the new grass reaches a height of three inches. Not more than a of the grass leaf shall be removed by the initial or subsequent cuttings. Contractor shall maintain and mow all lawn areas until Substantial Completion of the Project.

B. The Contractor shall be responsible for protecting and caring for seeded areas until final acceptance of the work. The Contractor shall repair and replace, at no additional expense to the Owner, all areas where seed has failed to germinate, or any areas damaged by erosion, weeds, pedestrian or vehicular traffic or other causes.

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SECTION 334211 - STORMWATER PIPING

PART 1.00 - GENERAL

1.01 WORK INCLUDED

A. Stormwater mains and services.
B. Stormwater piping end sections/flared outlets.

1.02 REFERENCE STANDARDS

A. ASTM Standard Specification D3034 for PVC Pipe and Fittings.
B. ASTM Standard Specification F679 for PVC Large-Diameter (18 to 27 in.) Plastic Gravity Pipe and Fittings.
C. ASTM Standard Specification D3212 for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals (Gaskets).
D. ASTM Standard Test Method D2412 for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
E. ASTM Standard Specification D1784 for Rigid PVC Compounds.
F. ASTM Standard Practice D2321 for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
G. ASTM Standard Specification F477 for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
H. ASTM Standard Specification C361 for Reinforced Concrete Pipe.
I. ASTM Standard Specification C443 for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
J. ASTM Standard Specification C76 for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
K. ASTM Standard Specification F405 for Corrugated Polyethylene Tubing and Fittings.
L. ASTM Standard Specification F667 for Large Diameter Corrugated Polyethylene Pipe and Fittings.
M. AASHTO Standard Specifications M252, M294 and MP6 for Corrugated Polyethylene Drainage Tubing.
N. AASHTO Standard Specification M-36 for Galvanized Corrugated Steel Pipe.
O. AASHTO Standard Specification M-274 for Aluminized Corrugated Steel Pipe.
P. ASTM Standard Specification D1785 for PVC Plastic Pipe, Schedules 40 and 80.
Q. ASTM Standard Specification D2665 for PVC Plastic Drain, Waste, and Vent Pipe and Fittings.
R. ASTM Standard Specification D2466 for PVC Plastic Pipe Fittings, Schedule 40.
S. ASTM Standard Specification D2467 for PVC Plastic Pipe Fittings, Schedule 80.
T. ASTM Standard Specification D2564 for Solvent Cements for PVC Plastic Piping Systems.
U. ASTM Standard Practice D2855 for Making Solvent-Cemented Joints with PVC

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Pipe and Fittings.

V. AASHTO H-20 criteria for design loading.

1.03 SUBMITTALS

A. The Contractor shall submit manufacturer's certified data for each pipe type to be used on the Project, including: dimensions, specifications of pipe material, gasket material, pipe class/pressure rating, coatings and linings.

B. The Contractor shall submit manufacturer's certified data for each fitting and end section type to be used on the Project, including: dimensions, specifications of fitting material, gasket material, fitting class/pressure rating, coatings, linings and joint restraints.

1.04 QUALITY ASSURANCE

A. The Contractor shall be thoroughly trained and experienced in the skills and equipment required for installation and testing of stormwater piping.

B. The Contractor shall protect stormwater piping materials before, during and after installation. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

C. Upon direction of the Engineer, the Contractor shall remove, replace and/or rework all stormwater piping that does not meet the requirements of this Section. The Contractor shall perform all remedial measures at no additional cost to the Owner.

D. Gravity Stormwater Piping Testing.

1. Engineer shall witness all testing.
2. Visual Inspection
   a. The Engineer and the Contractor shall lamp the new piping to check for a "full moon" to determine if accurate line was maintained.
3. Mandrel Test of PVC and P.E. piping:
   a. Flush all piping prior to performing mandrel testing.
   b. Mandrel testing shall not be completed until at least 30 days after installation of piping to be tested, or as required by the Engineer.
   c. Testing for deflection shall be done by pulling a properly sized "go, no-go" mandrel through all installed gravity stormwater piping. The mandrel shall be constructed so that it will only pass through piping with deflections of less than 7%. No mechanical pulling devices shall be used. Provisions shall be used during testing to allow mandrel to be "backed out".
   d. Piping exceeding the 7% allowable deflection shall be replaced at no additional cost to the Owner.

E. The Contractor shall clean stormwater piping by jetting and camera of each sewer main pipe run between sewer manholes.

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PART 2.00 - PRODUCTS

2.01 MATERIALS

A. Each pipe length and fitting shall be clearly marked with the manufacturer's name or trademark, nominal pipe size, material designation, dimension ratio, pressure class and ASTM designations.

B. Provide all necessary fittings, couplings and accessories, whether or not specifically shown on the Drawings.

C. Pipe material and size for different applications shall be as indicated on the Drawings, meeting applicable reference standards and the following requirements, as applicable:

1. SDR35 PVC Stormwater pipe and fittings:
   a. Pipe and fitting joints shall be push-on bell and spigot type with locked in elastomeric gaskets.
   b. Pipe shall be furnished in 13-foot laying lengths.
   c. Pipe and fittings shall be "Ring-Tite"[7] or "Enviro-Tite"[7] manufactured by Ipex, Inc. or approved equal.
2. Class 3 Reinforced Concrete (RCP) Stormwater pipe and fittings:
   a. Pipe and fitting joints shall be push-on bell and spigot type with o-ring rubber gaskets.
   b. Pipe shall be furnished in 8-foot laying lengths.
   c. No lifting holes are allowed.
   d. Pipe and fittings shall not have any chips, cracks, holes or other defects. Parging or repairing of pipe is not allowed.
   e. All RCP's to be manufactured with DCI corrosion inhibitor admixture, or approved equal.
   f. Reinforced Concrete Pipe exterior joints are to be wrapped in 36" wide "Ice and Water Shield" roofing underlayment centered on the joint and provided a 12" overlap.
3. Corrugated Exterior, Smooth Interior, High Density Polyethylene (HDPE) Stormwater pipe and fittings:
   a. Pipe and fitting joints shall be push-on bell and spigot type with soil/silt-tight rubber gaskets meeting ASTM Standard Specification F477 for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
   b. Pipe shall be furnished in 20-foot laying lengths.
   c. Pipe and fittings shall be "N-12® ST IB" manufactured by Advanced Drainage Systems (ADS), Inc. or "Hi-Q Sure-Lok"[7] manufactured by Hancor, Inc. or approved equal.
4. Corrugated Metal (CMP) Stormwater pipe and fittings <u>equal to or less than 18-inch diameter:</u>
   a. Pipe and fittings shall be Galvanized Corrugated Steel Pipe with

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band angle connectors.

b. Pipe and fittings shall be minimum 16 gauge unless otherwise indicated.

5. Corrugated Metal (CMP) Stormwater pipe and fittings greater than 18-inch diameter:

a. Pipe and fittings shall be Aluminized Type II Corrugated Steel Pipe with band angle connectors and strip gaskets.

b. Pipe and fittings shall be minimum 16 gauge unless otherwise indicated.

D. Couplings for joining non-pressure pipes of different diameters and/or materials shall be Fernco[7] flexible couplings. Couplings shall be of appropriate style and size for the pipes being connected.

E. End sections/flared outlets are required for all stormwater pipes beginning or terminating at "daylight", unless otherwise indicated. End section material shall be the same as the pipe, unless otherwise indicated on the Drawings, or directed by the Engineer. End sections shall be properly connected to the pipe and restrained so as not to settle, separate or pull away.

F. Provide all necessary equipment, gauges, piping, pumps and personnel required for testing.

2.02 PRODUCT STORAGE AND HANDLING

A. Handle and transport pipe and fittings to insure they are in sound, undamaged condition and to prevent damage to coating and lining.

B. Furnish slings, straps and other devices to support pipe and fittings when lifted. Do not drop or drag pipe or fittings from trucks onto the ground or into the trench.

C. Examine all pipe and fittings before installing. Defective or damaged materials shall be rejected.

D. Pipe or fittings with damaged coatings and/or linings shall be rejected.

E. Cracked or chipped pipe or fittings shall be rejected.

F. If defective pipe or fittings are discovered after installation, the Contractor shall remove and replace the defective piece(s) at no additional cost to the Owner.

G. Plastic pipe and fittings shall be protected from direct sunlight for prolonged periods, to avoid deterioration of the material.

H. Extra care shall be taken when handling plastic pipe and fittings in freezing conditions, due to the reduced impact resistance and flexibility.

PART 3.00 - EXECUTION

3.01 GENERAL

A. Refer to Section 310000 for excavating, bedding, envelope, backfilling and compaction requirements.

B. When cutting of pipe is required, the cutting shall be done with power saws. Cut

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ends shall be smooth and at right angles to the pipe. Cut pipe ends shall be beveled and de-burred on interior and exterior.

3.02 CONTROL OF GRADE AND ALIGNMENT

A. Levels and transits shall be used to establish line and grade for stormwater piping.
B. Pipe lasers shall be used to maintain gravity stormwater piping on line and grade.
C. Pipe and fittings shall be laid accurately to the lines, grades and locations indicated on the Drawings.

3.03 INSTALLATION

A. Push-on bell and spigot type joints shall be assembled as follows:
    1. Verify that the proper gasket is being used for the pipe and fitting type.
    2. Clean the bell, spigot and gasket.
    3. Check the bell, spigot and gasket for damage.
    4. Install gasket in bell, in proper direction.
    5. Apply a thin film of lubricant to the surface of the gasket which contacts the spigot. Use the manufacturer's recommended lubricant for the pipe and gasket type.
    6. Apply a thin film of lubricant to the spigot end of the pipe or fitting.
    7. Keep the gasket, spigot and bell clean. Do not allow the end of the pipe to contact the ground. Any deleterious material in the joint will result in leaks.
    8. Keep the spigot and bell ends straight while the joint is being "homed".
    9. Push the spigot end of the pipe into the bell the manufacturer's recommended distance to obtain a proper seal.
    10. Do not push the spigot end of the pipe into the bell beyond the manufacturer's recommended distance.
    11. If an effective seal is not attained at the joint, the joint shall be disassembled, cleaned, the gasket replaced and then the joint reassembled.
B. Do not joint pipe or fittings under water.
C. Support the pipe and fittings fully along their entire length.
D. Open ends of pipe shall be temporarily plugged or capped to keep deleterious material out.
E. Install fittings, bends, service connections, couplings as necessary.
F. Check pipe for alignment and grade before placing Initial Backfill material.
G. Cleanouts shall be assembled as follows:
    1. Cleanouts shall be installed in locations indicated on the plans, where a run of pipe is greater than one-hundred feet without any bends or at each bend or change in direction of 45^{O} or more.
    2. Cleanouts shall be constructed by installing a wye and two 45^{O} bends of

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the same diameter as the storm lateral pipe.

3. Cleanouts shall be brought up to four inches of the final grade
4. Cleanout frame and covers shall be brought to grade.

H. Test pipe and fittings as specified.

END OF SECTION 334211

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Mechanical, Electrical, Plumbing and Fire Protection Scope (MEP FP) Narrative for Design-Build Delivery

NOTES:

See project specifications for General Requirement of the Contract and for all related project scope.

Note that MEP FP demolition work required to install these work scopes is part of this contract, even if the demolition is not explicitly described.

Coordination of the work between the Construction Manager, the MEP FP Design-Builders and other trades is the responsibility of the Construction Manager and the MEP FP Design-Builders.

The Scope of the MEP FP work is defined by this document, the related scoping drawings in the Drawing Set, and the Design Development pricing proposals that have been obtained from the Design-Builders by the Construction Manager

Division 21 Fire Suppression

1. Fire suppression system modifications to be provided be a qualified design-build contractor. Alpine Sprinkler currently services the fire protection system in this building. Alpine conducted a site visit on 2/1/23 to review proposed modifications and requirements. See drawing FP-2.2 for scoping notes regarding fire protection systems.
2. Extend the existing sprinkler system to serve the new elevator addition on both levels. This extension can be on the dry system if that is easier to configure.
3. Modify the existing sprinkler system to accommodate the new WC and Lift configuration on the Dressing Room level as well at the Auditorium and Stage levels.
4. Replace dry system piping protecting the bridge, including heads in the portion of the bridge that serves as a canopy outside the entry door.

Division 22 Plumbing

Plumbing:

1. Plumbing demolition and new components are straightforward, and will not require a design-build contractor. The architecture team will specify the new plumbing fixtures. Representatives from Ryan conducted a site visit on 2/1/23 to review proposed modifications and requirements. See drawing M-2.2 for scoping notes regarding plumbing systems.
2. Provide new toilets as shown on the mechanical plan M-2.2. New toilets to be Toto 'Drake' with elongated bowl at ADA height, or equivalent. The toilet in WC-2 will need to have a tank-mounted hand wash sink tank cover, or this whole fixture needs to have this feature.
3. Provide new wall-hung porcelain lavatory for the Dressing Room W.C. New sink to be Amercian Standard 'Lucerne' or equivalent. Provide ADA compliant faucet and pipe shroud.
4. Provide new water distribution for hot and cold water above toilet rooms.
5. Provide Drain, Waste and Vent piping for above toilet rooms.
6. Provide new ADA compliant faucet and pipe insulation/protection for drain piping.

Division 23 HVAC

HVAC:

1. HVAC system modifications and new components for the addition to be provided by a design-build HVAC contractor. JW & DE Ryan have done work on this building. Representatives from Ryan conducted a site visit on 2/1/23 to review proposed modifications and requirements. See drawing M-2.2 for scoping notes regarding HVAC systems.
2. Rework/relocate refrigerant lines from exterior condensers to interior AHU. These lines currently run adjacent to and then under the bridge. New line routing will also run adjacent to and then under bridge, and into the canopy and then across the vestibule ceiling. This higher location will require coring 4 holes through the brick veneer. Note that the associated electrical conduits feeding the condensers will no longer be part of this bundle – that equipment will be fed by a new pedestal next to the power pole. ~~Ideally the lines would run in the exterior insulation/rain screen cavity along the north wall of the elevator hoistway, and continue into the chase between the elevator and the current exterior wall, and use the existing penetrations into the building.~~
3. Provide a new hydronic cabinet unit heater in the lower vestibule, located in the ceiling. ~~mounted on the east wall adjacent to the elevator.~~ If this cabinet location cannot provide enough BTUs for this space, high-output hydronic baseboard can be used in this space.
4. Provide a new hydronic cabinet unit heater in the upper vestibule, mounted on the south wall below the window. ~~east wall below the existing access door into the electrical room.~~ If

this cabinet location cannot provide enough BTUs for this space, high-output hydronic baseboard can be used in this space.

5. Provide a new toilet room exhaust fan in the new Dressing Room WC-1 and WC-2.
6. Modify the baseboard cabinet and heating pipes in east Entry 200 to fit onto the shorter wall. This 7'-6" unit will be cut down to approximately 5'-0".
7. Existing fin tube baseboard in former toilet room being replaced by lift to be removed.
8. Existing fin tube baseboard in former toilet in north-west corner to remain in place.

Division 26 Electrical

Electrical Service:

1. Electrical system modifications and new electrical work to be provided by a qualified design-build electrical contractor. Glen Peck electric currently provides electrical system work on this building. An existing conditions drawing and a proposed drawing have been created for the service feed portions of this project, in collaboration with Peck Electric. See drawings E-7.1E and E-7.1C.
2. ~~Relocate the CT cabinet and meter packs that are currently located under the bridge adjacent to the lower west entrance. This work will include rework or relocation of some of the conduit feeds from the power pole at the NW corner of the property to this location.~~
3. Provide a new power feed and disconnect and service wiring to the new Savaria Orion 17 LULA, single-phase 240 V, 40 amps. ~~elevator. For this SD estimate, assume that the elevator control components will be located in the new EMR, and connections to and from will be in surface-mounted conduits run along the mechanical room ceiling. Once Otis is on board, we will investigate the feasibility of a machine room-less elevator.~~ Elevator Machine Room location has been determined and is shown on plans.
4. Provide a new power feed and disconnect and service wiring to the new lift. Lift to be a Savaria Prolift SCL, fed with a single-phase 240 V, 40 amps. - ~~For this SD estimate, assume that the lift control components and pump will be located in the new EMR, and connections to that location will be in surface-mounted conduits run along the mechanical room ceiling.~~ Elevator Machine Room location has been determined and is shown on plans.
5. ~~Provide an empty conduit from main panel location out of building, for future solar generation connection. Assume 15 LF of conduit~~

Lighting:

1. Provide new electrical lighting for all new spaces.
2. New lighting for both elevator vestibules to be LED "can" lights recessed into the ceiling.
3. New lighting outside the lower level vestibule to be LED "can" lights recessed into the canopy ceiling. The fixture spec that was permitted with the City was a Lotus 6" round

regressed LED, LL6RR.Lotus LED 'can' type lights may be a good spec for vestibule lighting and lighting for other new spaces.

4. New lighting for Dressing Room WC-1 and WC-2 to be ~~wall-mounted decorative sconces~~ LED "can" lights recessed into the ceiling.
5. New lighting for the EMR to be an LED strip work light, mounted on existing ceiling. Coordinate with elevator vendor on Footcandle requirements.
6. Rework/relocate existing lighting in the west end of the Dressing Room.
7. Provide manual switching for all new lights, except for occupant sensor lighting controls for toilet room lighting.
8. Provide new ceiling-mounted exit lights at exit doors in each new vestibule, and rework/relocate exit lighting at the east and west ends of the Dressing Room.
9. Provide five path lights in the plaza, as shown on the architectural site plan A-0.1. The fixture spec that was permitted with the City is a WAC Lighting WL-LED100 step lights, mounted in a weatherproof junction box. These path lights will be mounted on the iron fence along the east edge of the plaza, and fed from below with conduit buried in the planting bed.
10. Provide a 4' LED strip work light inside the LULA hoistway and inside the Prolift hoistway. These lights will likely be installed low in the hoistway, to provide the required 19 Footcandles at the pit floor level.

Power Distribution

1. All devices to be commercial grade.
2. Provide new power distribution to all new spaces. One receptacle will be required in each new vestibule and one in the new Dressing Room WC. Provide two new receptacles in the new EMR room.
3. Provide power for LULA service disconnect and Prolift service disconnect in the EMR. Coordinate exact disconnect equipment with the lift equipment vendor – he suggest not to use Cutler Hammer equipment, as these disconnects are hard to procure.
4. Provide GFI receptacles in wet locations or other locations as required by code.
5. Provide one new receptacle inside the LULA hoistway and one inside the Prolift hoistway. The receptacles are often installed in a quad box along with a light switch for the hoistway lighting specified above.

Tel-Data/Misc.

1. ~~This project should not require any work to the tel/data system.~~
2. Exterior relocation of the telephone pedestal to be achieved by the owner working with Consolidated Communications.
3. Provide one new telephone line into the EMR, for connection of lift controllers.

Fire Alarm

1. Expand the existing Fire Alarm system for all new spaces.
2. Rework Fire Alarm devices as needed for Dressing Room renovations.
3. Provide code-required interties for Elevator and Lift. This includes a Phase 1 FA recall.
4. Provide new smoke detector inside of the EMR.
5. Provide new smoke detectors outside of LULA or Prolift doors, at both levels.

END